

# 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 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 = 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.  
 Power = Height of antenna (meters) and intensity of current at its base (meters-amperes).  
 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 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. O. = 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
Baltimore, Md. (Logan Field). <sup>1</sup>	FA, FX	WEEB	3,070 (97.71), 3,075 (97.52), 5,890 (52.72).	P	X	Aeronautical Radio (Inc.).
Beverly Hills, Calif. <sup>2</sup>	FX	KGWW	1,552 (193.30), 1,554 (193.05), 1,556 (192.80).	P	X	Fox Film Corporation.
Blue Ash, Ohio, radio Cincinnati). <sup>3</sup>	FO	WGK	4,775 (62.82), 5,525 (54.29), 8,570 (35.01).	PG	-----	R. M. C. A.
Boise, Idaho. <sup>4</sup>	FA	KRA	3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,175 (94.39), 5,570 (53.86), 5,660 (53).	P	X	Aeronautical Radio (Inc.).
Brooksville, Pa. <sup>5</sup>	FA	WNAL	3,166 (94.9)	P	N	Do.
Burbank, Calif. (Los Angeles). <sup>6</sup>	FX	KGUR	2,326 (123.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.86), 12,210 (24.57).	P	X	Do.
Guam, Guam	FX	KFQ	7,445 (40.29), 14,890 (20.15), 22,660 (13.239).	-----	-----	Globe Wireless (Ltd).
Hollywood, Calif. <sup>7</sup>	FX	KGWZ	1,554 (193.05)	P	X 9	Columbia Pictures Corporation of California.
Kokomo, Ind. <sup>8</sup>	FX	WPDT	2,470 (121.5)	P	N	City of Kokomo, police department.
Pasco, Wash. <sup>9</sup>	FA	KRD	3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,175 (94.39), 5,570 (53.86), 5,660 (53).	P	X	Aeronautical Radio (Inc.).
St. Petersburg, Fla. <sup>10</sup>	FX	WPDM	2,440 (123)	P	N	City of St. Petersburg (Fla.) police department.
Summit, N. J. <sup>10</sup>	FA	WNAO	3,166 (94.9)	P	N	Aeronautical Radio (Inc.).
Sunbury, Pa. <sup>11</sup>	FA	WNAM	do	P	N	Do.
<i>Portable</i>						
California <sup>12</sup>	FX	KGWV	1,552 (193.30), 1,554 (193.05), 1,556 (192.80).	P	X	Fox Film Corporation.
Los Angeles, Calif. <sup>13</sup>	FX	KGWX	do	P	X	Atlantic Broadcasting Corporation.
San Francisco, Calif., bay. <sup>14</sup>	-----	KDL	375 (800)	P	X	R. M. C. A.
Sixth radio district. <sup>15</sup>	FX	KGWY	1,554 (193.05)	P	X	Columbia Pictures Corporation of California.

<sup>1</sup> Loc. (approximate) 76° 31' 00" W., 39° 15' 00" N.

<sup>2</sup> Type, A1, A3.

<sup>3</sup> Loc. (approximate) 84° 22' 40" W., 39° 13' 50" N.; type, A1, A2; hours, 9 a. m. to 5 p. m. and other times as necessary, rates 10 cents (52 centimes per word).

<sup>4</sup> Type, A3.

<sup>5</sup> Loc. 79° 06' 30" W., 41° 08' 43" N.; type, A3.

<sup>6</sup> Loc. 118° 21' 24" W., 34° 11' 56" N.; type, A1, A3.

<sup>7</sup> Loc. (approximate) 118° 19' 00" W., 34° 06' 00" N.; type, A3.

<sup>8</sup> Loc. 86° 07' 30" W., 40° 29' 57" N.; type, A3.

<sup>9</sup> Loc. (approximate) 119° 07' 30" W., 46° 17' 30" N.; type, A3.

<sup>10</sup> Loc. (approximate) 74° 02' 00" W., 40° 55' 00" N.; type, A3.

<sup>11</sup> Loc. (approximate) 76° 46' 50" W., 40° 53' 20" N.; type, A3.

<sup>12</sup> Type, A1, A2, A3.

<sup>13</sup> Loc. (approximate) 117° 00' 00" W., 34° 00' 00" N.; type, A1, A2, A3.

<sup>14</sup> Type, A2; used for calibration of radio compass.

*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—
Belle Isle.....	WBET	8	PG	X	John Gabelich.....	Owner.
Musketeer.....	WBES	8	PG	X	Andrew Zambarini.....	Do.
Swayne & Hoyt (general call for any of all vessels operated by).	KGAG					R. M. C. A.
Wellhart.....	WBEQ	8	PG	X	Wellhart S. S. Co.....	Do.
White Star.....	WBEB	8	PG	X	Van Camp Sea Food Co.	Katarin Cesareo.

*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
No. 39-N (No. 117).....	KHOX		P	X	Western Air Express (Inc.).
No. 129-M (No. 400).....	KHOBY		P	X	Do.
NC-233M.....	KHNTG		P	X	Standard Oil Co. of California.
No. 528M (No. 121).....	KHODW		P	X	Do.

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

[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	Class	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Owner
Ensenada, P. R. (San Juan district U. S. N. R.).....	FX	NEJ		O	X	U. S. Navy.
Grosse Ile, Mich. (Naval Reserve air base).....	FA	NFB		O		Do.

*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
Astoria.....	NACD		O	X	U. S. Navy.
Minneapolis.....	NACF		O	X	Do.
New Orleans.....	NABJ		O	X	Do.
Portland.....	NACB		O	X	Do.
Ranger.....	NABF		O	X	Do.

*Government 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	Hours	Owner
Akron—any aircraft attached to United States ship.	NVMDA	-----	-----	U. S. Navy.
Antares—any aircraft attached to United States ship.	NVMFC	-----	-----	Do.
Argonne—any aircraft attached to United States ship.	NVMJA	-----	-----	Do.
Astoria—any aircraft attached to United States ship.	NVMDB	-----	-----	Do.
Minneapolis—any aircraft attached to United States ship.	NVMDC	-----	-----	Do.
New Orleans—any aircraft attached to United States ship.	NVMFH	-----	-----	Do.
Portland—any aircraft attached to United States ship.	NVMFB	-----	-----	Do.
Ranger—any aircraft attached to United States ship.	NVMHF	-----	-----	Do.

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

Call signal	Name of station	Call signal	Name of station
KDL	San Francisco, Calif. Bay (portable) <sup>1</sup> .....fx	NVMDB	Astoria—any aircraft attached to United States ship.....a
KFQ	Guam, Guam.....fx	NVMDC	Minneapolis—any aircraft attached to United States ship.....s
KGAG	Swayne & Hoyt (general call for any or all vessels operated by).....b	NVMFB	Portland—any aircraft attached to United States ship.....a
KGUR	Burbank, Calif. (Los Angeles).....fx	NVMFC	Antares—any aircraft attached to United States ship.....a
KGWV	California (portable).....fx	NVMFH	New Orleans—any aircraft attached to United States ship.....a
KGWW	Beverly Hills, Calif.....fx	NVMHF	Ranger—any aircraft attached to United States ship.....a
KGWX	Los Angeles, Calif. (portable).....fx	NVMJA	Argonne—any aircraft attached to United States ship.....a
KGWY	Sixth radio district (portable).....fx	WBEI	Dorothea.....b
KGWZ	Hollywood, Calif.....fx	WBEQ	Wellhart.....b
KHNTG	NC-233M.....a	WBER	White Star.....b
KHOBY	No. 129-M (No. 400).....a	WBES	Musketeer.....b
KHOX	No. 89-N (No. 117).....a	WBET	Belle Isle.....b
KHODW	No. 528-M (No. 121).....a	WEEB	Baltimore, Md. (Logan Field).....fa, fx
KRA	Boise, Idaho.....fa	WGK	Blue Ash, Ohio, radio (Cincinnati).....fc
KHD	Pasco, Wash.....fa	WNAL	Brooksville, Pa.....fa
NABF	Ranger.....b	WNAM	Sunbury, Pa.....fa
NABJ	New Orleans.....b	WNAO	Summit, N. J.....fa
NACB	Portland.....b	WPDM	St. Petersburg, Fla.....fx
NACD	Astoria.....b	WPDT	Kokomo, Ind.....fx
NACF	Minneapolis.....b		
NEJ	Ensenada, P. R. (San Juan district U. S. N. R.).....fx		
NFB	Grosse Ile, Mich. (Naval Reserve air base).....fa		
NVMDA	Akron—any aircraft attached to United States ship.....a		

<sup>1</sup> Radio compass calibration.

*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)
Michigan: Marquette.....	WBEQ	1,310 (229).....	100

*Broadcasting station, by call signal*

Call signal	Location of transmitter (mail address)	Licensee	Frequency in kilocycles, meters in parentheses	Power (watts)
WBEQ	Marquette, Mich., 109 Fifth St., Calumet, Mich.	Charles C. MacLeod.	1,310 (229).....	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 and post-office address
California: Palo Alto.....	W6XD	27,800 (10.791), 30,200 (9.93)	5,000	M. R. T. Co.
Massachusetts: Boston.....	W1XAU	1,604 (187.03).....	500	Shortwave & Television Corp., 70 Brookline Ave.
New Jersey: Lawrenceville..	W3XT	6,755 (44.41), 9,170 (32.72), 9,750 (30.77), 9,870 (30.40), 10,550 (28.44), 13,390 (22.40), 14,470 (20.73), 14,590 (20.56), 16,270 (18.439), 18,340 (16.358), 19,220 (15.609), 19,820 (15.136), 21,060 (14.245), 21,420 (14.066)	500	American Telephone & Telegraph Co.
New York: Brooklyn.....	W2XDF	1,604 (187.03), 2,398 (125.1), 3,256 (92.5), 6,425 (46.7), 12,850 (23.35)	500	Faske Engineering Co., 1515 Eastern Parkway.
New York..... <i>Portable</i>	W2XH	95 (3,160), 99 (3,030).....	750	American Radio News Corp. 235 E. Forty-fifth St.
Pennsylvania: Philadelphia..	W3XB	2,440 (122.95).....	500	De Forest Radio Co., Passaic, N. J.

*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
		<i>Portable</i>		
New York: New York.....	W2XCZ	2,392 (125.41).....	7.5	National Broadcasting Co.

*Visual 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
New York: New York....	W2XAB	2,750 (109.1) to 2,850 (105.3)	500	Atlantic Broadcasting Corporation, 485 Madison Ave.
Wisconsin: Milwaukee....	W9XD	43,000 (6.97) to 44,000 (6.81)	500	The Journal Co. (Milwaukee Journal).

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

Call signal	District and station	Call signal	District and station
W1XAU	First district: Boston, Mass.	W3XB	Third district: Philadelphia, Pa.
W2XAB	Second district: New York, N. Y.	W3XT	Lawrenceville, N. J.
W2XCZ	New York, N. Y. (portable).	W6XD	Sixth district: Palo Alto, Calif.
W2XDF	Brooklyn, N. Y.	W9XD	Ninth district: Milwaukee, Wis.
W2XH	New York, N. Y.		

## 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.**—Loc. (approximate) 122° 28' 00" W., 37° 47' 00" N.; fy., add 2,722 (110.21), 2,734 (109.72), 4,108 (73.02), 6,350 (47.24) 8,015 (37.43), 12,180 (24.63).
- ALBUQUERQUE, N. MEX. (KGSD).**—Call changed to KSX.
- ALPENA, MICH.**—Read Alpena, Mich. radio; class of station, add FC.
- AMARILLO, TEX.**—Call changed to KSV; loc. 101° 41' 36" W., 33° 14' 24" N.; fy., add 2,722 (110.21), 2,734 (109.72), 4,108 (73.02), 6,350 (47.24), 8,015 (37.43), 12,180 (24.63).
- BAYTOWN, TEX., radio.**—Power, 35/6.
- BELLE ISLE, MICH.**—Power, 35/2.6.
- BOLINAS, CALIF. (KKQ).**—Type, add A2, A3; power, 15 to 150/100.
- BOLINAS, CALIF. (KKW).**—Fy., strike out 15,445 (19.424), add 13,705 (21.89).
- BROWNSVILLE, TEX. (municipal airport).**—Fy., strike out 6,350 (47.24), add 4,164 (72.04), 6,305 (47.58), 6,320 (47.46), 12,210 (24.57).
- BURBANK, CALIF. (Los Angeles).**—Class of station, FA only; fy., strike out 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), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- CHEYENNE, WYO. (municipal airport).**—Fy., strike out 278 (1,080), add 2,482 (120.87), 2,506 (119.71), 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 4,124 (72.74), 5,570 (53.86), 6,215 (48.27), 6,230 (48.15).
- CHICAGO, ILL. (WAK).**—Loc., changed to Tinley Park, Ill.
- DES MOINES, IOWA (municipal airport).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- EDMONDS, WASH. (KGR).**—Loc. (approximate) 120° 19' 00" W., 47° 49' 00" N.
- FRESNO, CALIF. (Chandler Field—KGT).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86); licensee, Aeronautical Radio (Inc.).
- INDIO, CALIF. (KGUQ).**—Fy., strike out 3,484 (86.10), 5,630 (53.28).
- IOWA CITY, IOWA (municipal airport).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- KAHUKU, HAWAII (KKP).**—Fy., strike out 13,705 (21.890), add 16,030 (18.715).
- KANSAS CITY, MO. (KGTG).**—Call changed to KST.
- KATALLA, ALASKA, radio.**—Type, add A1; fy., strike out 182 (1,650), 414 (725), add 268 (1,120), 274 (1,095), 460 (652).
- LINCOLN, NEBR. (municipal airport).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- LOS ANGELES, CALIF. (Alhambra Airport).**—Call changed to KSI; fy., add 3,076 (97.52), 5,510 (54.44); power, 18/5.
- LOS ANGELES, CALIF., radio (KSM).**—Loc., changed to Cypress, Calif.
- MEDFORD, OREG. (municipal airport).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- NORTH PLATTE, NEBR. (municipal airport).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- OAKLAND, CALIF. (Oakland Airport—KFO).**—Fy., add 2,482 (120.87), 2,506 (119.71), 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 4,124 (72.74), 5,570 (53.86), 6,215 (48.27), 6,230 (48.15).
- PALO ALTO, CALIF. (KWT).**—Loc., 122° 16' 15" W., 37° 26' 37" N.
- PORTLAND, OREG. (Swan Island Airport—KVO).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- RENO, NEV. (Hubbard Field).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- ROCKLAND, ME. (near).**—Fy., add 109 (2,750).
- SACRAMENTO, CALIF. (Mather Field—KFM).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).
- SAN DIEGO, CALIF. (KGQZ).**—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,578 (53.86); power, 18/9.

- SANTA MARIA, CALIF. (KGJE).—Power, 20/3.  
 SEATTLE, WASH. (Boeing Field).—Class of station, FA only; fy., strike out 278 (1,080), add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 5,570 (53.86).  
 TUCSON, ARIZ.—Class of station, FA only; power, 15.38/5.  
 TULSA, OKLA. (KGSF).—Call changed to KSY; loc. (approximate), 96° 00' 00" W., 36° 20' 00" N.; fy., add 5,510 (54.45).  
 WEST PALM BEACH, FLA., radio.—Fy., strike out 16,575 (18.009), add 16,580 (18.094).  
 WINSLOW, ARIZ. (KGTA).—Type, add A3; fy., add 3,070 (97.7), 3,076 (97.52), 5,510 (54.45).  
 WYANDOTTE, MICH.—Read Wyandotte, Mich., radio; hours, 8 a. m. to 5 p. m. daily except Saturday, Sunday, and holidays; 8 to 12 a. m. Saturdays; 8.45 to 11 a. m. Sundays and holidays.

*Portable*

- TEXAS, LOUISIANA, AND OKLAHOMA (KGJZ).—Read Texas, Louisiana, and Oklahoma No. 1.  
 WESTERN STATES.—Fy., add 1,664 (180.29).  
 Strike out all particulars of the following-named stations: Alameda, Calif. (KLR); Albuquerque, N. Mex. (KSI); Clovis, N. Mex.; Kingman, Ariz. (T. A. T. Airport—KXS); Miami, Fla. (dinner key—WGF); San Francisco, Calif. (KUO); Sheepshead Bay, N. Y.; Waynoka, Okla.; Winslow, Ariz. (KSV).

## 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]

- ADMIRAL DEWEY.—Hours, add X.  
 A. E. R. SCHNEIDER.—Name changed to S. B. Way.  
 AGWIWORLD.—Fy., add 454 (660).  
 ALABAMA.—Hours, strike out N.; accounts, R. M. C. A.  
 ALDER.—Owner, Gertrude Hickman Thompson.  
 ALGONQUIN (KGDL).—Fy., strike out 157 (1,910), 454 (660); power, 26/8.  
 ALVA.—Type, A1, A2; fy., 143 (2,100), 151 (1,985), 157 (1,910), 160 (1,875), 375 (800), 400 (750), 425 (705), 500 (600), 5,525 (54.3), 5,555 (54), 6,590 (45.52), 6,605 (45.42), 8,290 (36.19), 8,330 (36.01), 11,050 (27.15), 11,110 (27), 16,580 (18.094), 16,660 (18.007); power, 20/15.  
 ALVA LIFEBOAT No. 1.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600); power, 7/3.  
 ALOHA.—Fy., strike out 153 (1,960), add 157 (1,910), 159 (1,885).  
 AMIDA.—Fy., add 5,555 (54).  
 ARCHER.—Owner, Baltimore Mail S. S. Co. (Inc.).  
 BALLENAS.—Accounts, R. M. C. A.  
 BEACONLIGHT.—Fy., add 155 (1,935).  
 BELLINGHAM.—Fy., strike out 410 (730).  
 BENJAMIN BREWSTER.—Power, 26/8.  
 B. H. TAYLOR.—Fy., strike out 500 (600).  
 BORINQUEN.—Owner, Coamo S. S. Corp.  
 BREEZIN THRU.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600); power, 13/4.  
 CALCITE.—Fy., strike out 500 (600).  
 CAMDEN (KDKL).—Fy., add 5,525 (54.3), 5,555 (54), 6,635 (45.21), 8,330 (36.01), 11,050 (27.15), 13,240 (22.66), 16,580 (18.094), 16,660 (18.007).  
 CAPAC.—Hours, strike out N.  
 CAPT. JOHN W. MCKIE.—Type, add A1, A2; fy., add 3,420 (87.7), 6,515 (46.05).  
 CARL D. BRADLEY.—Type, add A1; fy., add 143 (2,100), 157 (1,910); power, 14/11.  
 CERRO EBANO.—Hours, add N.  
 CHARLES C. WEST.—Fy., strike out 143 (2,100), 151 (1,985); power, 20/8.  
 CHARLES E. HARWOOD.—Power, 24/7.  
 CHARLES L. HUTCHINSON.—Accounts, Pioneer S. S. Co.  
 CHARLIE WATSON.—Fy., strike out 410 (730), add 468 (640).  
 CITIES SERVICE OKLAHOMA.—Fy., add 400 (750).  
 CITY OF BUFFALO.—Accounts, Cleveland & Buffalo Transit Co.  
 CITY OF ERIE.—Cleveland & Buffalo Transit Co.

- CITY OF SAN FRANCISCO.—Fy., add 400 (750), 8,330 (36.01), 11,110 (27), 16,860 (17.794).
- CLETUS SCHNEIDER.—Power, 13/6.
- COAXET.—Fy., add 454 (660).
- CORSAIR.—Fy., add 375 (800), 5,555 (54).
- DELIGHT.—Owner, Swayne & Hoyt (Ltd.).
- DOCHET.—Owner, Swayne & Hoyt (Ltd.).
- DRYDEN.—Fy., add 155 (1,935).
- ECUADOR.—Fy., strike out 153 (1,960), add 155 (1,935), 5,555 (54), 11,110 (27), 16,860 (17.794).
- EDNA CHRISTENSON.—Accounts, M. R. T. Co.
- EFFNA.—Fy., add 454 (660).
- EMERGENCY AID.—Fy., add 454 (660).
- EMMA R. S.—Power, 13/1.5.
- E. P. Co. No. 4.—Rates, 6 cents per word.
- FLORENCE LUCKENBACH.—Type, strike out B, add A2; fy., strike out 454 (660), add 400 (750), 468 (640); power, 27/9.
- FONTANA.—Owner, Maritime S. S. Co.
- GENEVIEVE LYKES.—Power, 24/6.
- GOLDEN DRAGON.—Fy., strike out 157 (1,910).
- GOLDEN HARVEST.—Fy., add 410 (730), 454 (660).
- GOLDEN HIND.—Fy., strike out 157 (1,910).
- GUATEMALA.—Fy., add 5,525 (54.3), 8,330 (36.01), 11,110 (27), 16,660 (18.007), 16,860 (17.794).
- GULF OF VENEZUELA.—Fy., strike out 400 (750).
- HAIDA.—Fy., add 159 (1,885), 8,290 (36.19), 8,450 (35.5).
- HAVANA.—Type, add B.
- HEFFRON.—Fy., strike out 410 (730), 454 (660).
- HERBERT F. BLACK.—Name changed to Joliet.
- H. F. DEBARDELEBEN.—Type, A1, 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.
- HUGUENOT.—Fy., add 454 (660).
- ILLINOIS (KDSZ).—Fy., add 160 (1,875).
- INDEPENDENCE HALL.—Power, 25/18.
- INDIANA (KGRJ).—Owner, Mississippi Barge Line Co.
- INVADER.—Type, A1; fy., 5,525 (54.3), 5,555 (54), 8,290 (36.19), 16,580 (18.094), 16,660 (18.007); power, 12.33/2.
- JAMES E. FERRIS.—Accounts, Pioneer S. S. Co.
- JAMES MACNAUGHTON.—Accounts, Wilson Transit Co.
- JAMES W. GOOD.—Fy., add 500 (600); accounts, Inland Waterways Corporation.
- JEANNE.—Fy., add 468 (640), 5,615 (53.42).
- J. J. SULLIVAN.—Accounts, Pioneer S. S. Co.
- JOHN A. DONALDSON.—Accounts, Midland S. S. Co.
- JOHN G. MUNSON.—Fy., strike out 500 (600).
- JOHN STANTON.—Accounts, Pioneer S. S. Co.
- JOHN W. WEEKS.—Power, 14/12.
- JOSEPH G. BUTLER, Jr.—Accounts, Pioneer S. S. Co.
- JOSEPH SEEP.—Power, 29/8.
- KEKOSKEE.—Fy., add 454 (660).
- LAKE BENBOW.—Type, strike out B; add A2.
- LAKE TREBA.—Power, 17/4.
- L. E. BLOCK.—Power, 18/12.
- LILLIAN.—Accounts, A. H. Bull S. S. Co.
- LOUISIANA (KGRK).—Owner, Mississippi Barge Line Co.
- MARIETTA B.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600); power, 15/5.
- MARTINIQUE.—Fy., strike out 410 (730).
- MICHIGAN (KFLN).—Fy., add 143 (2,100), 157 (1,910).
- MINNESOTA.—Fy., add 3,420 (87.7), 6,515 (46.05).
- OHIO.—Owner, Mississippi Barge Line Co.
- OLDHAM.—Fy., strike out 355 (845).
- OLYMPIC.—Power, 20/8.
- PATRICK J. HURLEY.—Service, P; accounts, Inland Waterways Corp.
- PIONEER (WOCW).—Power, 30/7.
- POINT BONITA.—Owner, Swayne & Hoyt (Ltd.).



POINT FERMIN.—Owner, Swayne & Hoyt (Ltd.).  
 POINT MONTARA.—Owner, Swayne & Hoyt (Ltd.).  
 PONCE.—Hours, add N.  
 PRESIDENT JACKSON.—Owner, American Mail Line (Ltd.).  
 PRESIDENT MADISON.—Owner, American Mail Line (Ltd.).  
 PRESIDENT MCKINLEY.—Owner, American Mail Line (Ltd.).  
 ROSINCO.—Fy., add 410 (730); power, 9.85/3.  
 SABOTAWAN.—Owner, Swayne & Hoyt (Ltd.).  
 SANTA FLAVIA.—Owner, Associated Fishermen of Alaska (Inc.).  
 S. B. WAY.—Name changed to Howard P. Eells, jr.  
 SCANTIC.—Owner, American Scantic Line (Inc.).  
 TENNESSEE.—Owner, Mississippi Barge Line Co.  
 TIDEWATER.—Owner, Tide Water Associated Transport Corp.  
 TIDEWATER ASSOCIATED.—Owner, Tide Water Associated Transport Corp.

#### 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]

NAUGATUCK.—Fy., strike out 3,484 (86.10), add 3,238 (92.64).  
 NC-231.—Type, A3; fy., 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 5,570 (53.86), 5,660 (53).  
 NC-489E.—Type, A3; fy., 3,484 (86.10), 5,630 (53.29).  
 NC-580K.—Type, A3; fy., 3,484 (86.10), 5,630 (53.29).  
 NC-581K.—Type, A3; fy., 3,484 (86.10), 5,630 (53.29).  
 NC-651E.—Type, A3; fy., 3,484 (86.10), 5,630 (53.29).  
 NC-725W.—Type, A3; fy., 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 5,570 (53.86), 5,660 (53).  
 NC-800E.—Fy., strike out 3,106 (96.59), 5,600 (53.57), add 5,630 (53.29); licensee, Southern Air Fast Express (Inc.).  
 NC-801E.—Fy., strike out 5,600 (53.57), add 5,630 (53.29); licensee, Southern Air Fast Express (Inc.).  
 NC-802E.—Type, A3; fy., 3,484 (86.10), 5,630 (53.29).  
 NC-8486.—Fy., strike out 3,484 (86.10), add 3,238 (92.64).  
 NC-9677.—Name changed to NC-9677 (Nonawtum); fy., strike out 3,484 (86.10), add 3,238 (92.64).  
 NC-9681.—Name changed to NC-9681 (Nemissa); fy., strike out 3,484 (86.10), add 3,238 (92.64).  
 NC-10225M.—Type, A3; fy., 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 5,570 (53.86), 5,660 (53).  
 Strike out all particulars of the following-named stations: C-5340, Emsco, F-113 W. A. E., Greater St. Louis, NC-9652, NC-9653, NC-9654, NC-9655, NC-9656, NC-9657, NC-9658, NC-9659, NC-9660, NR-9696.

#### 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]

Strike out all particulars of the following-named vessels: Clarinda, North Dakota, Porpoise.

#### 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]

BOSTON, MASS.—Fy., strike out 320 (938), add 266 (1,127).  
 GOSHEN, IND.—Fy., strike out 320 (938), add 332 (903).  
 KEY WEST, FLA.—Fy., strike out 284 (1,056), add 338 (893).  
 STERLING, ILL.—Fy., strike out 326 (920), add 272 (1,100).

#### 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]

PORTLAND LIGHTSHIP, ME.—Fy., strike out 290 (1,034), add 284 (1,056); hours, operates the third fifteen minutes of each hour.

- CAPE COD LIGHT STATION, MASS.—Fy., changed to 305 (984).  
 VINEYARD SOUND LIGHTSHIP, MASS.—Hours, add Operator stands watch first fifteen minutes of each hour from 8 a. m. to 9.15 p. m. in clear weather.  
 FIRE ISLAND LIGHTSHIP, N. Y.—Hours, add operates daily second fifteen minutes of each hour.  
 COVE POINT LIGHT STATION, MD.—Hours, strike out Operator stands watch first fifteen minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.  
 CAPE HENRY LIGHT STATION, VA.—Hours, strike out Operator stands watch first fifteen minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.  
 SMITH POINT LIGHT STATION, VA.—Hours, strike out Operator stands watch first fifteen minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.  
 JUPITER INLET LIGHT STATION, FLA.—Hours, operates continuously during thick or foggy weather and daily in clear weather for the first fifteen minutes of each hour.  
 ST. JOHNS RIVER LIGHT STATION, FLA.—Hours, add Operator stands watch first fifteen minutes each hour from 8 a. m. to 9.15 p. m. in clear weather.  
 GRAYS REEF LIGHTSHIP, MICH.—Loc., 86° 15' 18" W., 45° 46' 51" N.  
 CAPE ST. ELIAS LIGHT STATION, ALASKA.—Hours, only operates first fifteen minutes of each hour.  
 CAPE SPENCER LIGHT STATION, ALASKA.—Hours, daily in clear weather from 8 to 8.30 a. m.; 2 to 2.30 p. m., and for the first fifteen minutes of each even hour from 7 p. m. to 5 p. m.  
 SCOTCH CAP LIGHT STATION, ALASKA.—Loc., 164° 56' 00" W., 54° 24' 00" N.  
 MAKAPUU POINT LIGHT STATION, HAWAII (Oahu Island).—Hours, daily in clear weather from 6 to 6.30 a. m.; 1 to 1.30 p. m., and third 15 minutes each hour from 10 p. m. to 9.15 a. m.  
 CRISTOBAL MOLE, CANAL ZONE.—Hours, transmits continuously for the first and fourth 10 minutes of each hour.

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

KG0I, read Joliet; KGJZ, read Texas, Louisiana, and Oklahoma No. 1 (portable); KHNOL, read NC-9677 (Nonawtum); KHNPk, read NC-9681 (Nemissa); KSI, read Los Angeles, Calif. (Alhambra Airport); KSM, read Cypress, Calif.; KST, read Kansas City, Mo.; KSV, read Amarillo, Tex.; KSX, read Albuquerque, N. Mex.; WAK, read Tinley Park, Ill.; WCV, read Wyandotte, Mich., radio; WDDP, read Howard P. Eells, jr.; WFUI, read S. B. Way; WNO, read Alpena, Mich., radio; strike out all particulars following the call signals: KGSD, KGSE, KGSF, KGTG, KGTI, KHCVE, KHDOL, KHDLO, KHDNM, KHDNM, KHDPK, KHDQJ, KHDRI, KHDSh, KHDTG, KHIRI, KHLFU, KHNFU, KHNLO, KLR, KSI, KST, KSV, KSX, KSY, KUO, NAQM, NEPL, NUFZ, WGE, WGF.

#### 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]

- KGDY (Huron, S. Dak.).—Licensee, Voice of South Dakota.  
 KGFw (Ravenna, Nebr.).—Licensee, Central Nebraska Broadcasting Corp.  
 KGJF (Little Rock, Ark.).—Loc. 89° 30' 14" W., 33° 10' 17" N.  
 KOOS (Marshfield, Oreg.).—Post office address, studio and transmitter loc., Hall Bldg., loc., 124° 12' 54" W., 43° 22' 11" N.  
 KPCB (Seattle, Wash.).—Licensee, Queen City Broadcasting Co.  
 KRSC (Seattle, Wash.).—Post office address and studio loc., Sixth and Union Sts. (Washington Athletic Club); loc., 122° 19' 59" W., 47° 36' 25" N.  
 KTSM (El Paso, Tex.).—Transmitter loc., Corner Texas and Stanton Sts., 106° 29' 12" W., 31° 45' 30" N.  
 KWG (Stockton, Calif.).—Transmitter loc. changed to Webber and E Sts., loc., 121° 16' 01" W., 38° 57' 54" N.  
 KWK (St. Louis, Mo.).—Transmitter loc., Kirkwood, Mo., loc., 90° 20' 42" W., 38° 27' 36" N.  
 WDAH (El Paso, Tex.).—Post office address, studio and transmitter loc., 200 S. El Paso St., loc., 106° 30' 14" W., 31° 37' 54" N.  
 WDRC (New Haven, Conn.).—Transmitter loc., 783 Blue Hills Ave., Bloomfield, Conn.; post office address and studio loc., 11 Asylum St., Hartford, Conn.; loc. (Approx.) 72° 42' 00" W., 41° 49' 00" N.

- WEDH (Erie, Pa.).—Power, 100.  
 WEEI (Weymouth, Mass.).—Post office address and studio loc., 182 Tremont St., Boston, Mass.  
 WFBR (Baltimore, Md.).—Power, 500.  
 WHAT (Philadelphia, Pa.).—Loc., 75° 09' 12" W., 37° 57' 40" N.  
 WHP (Lemoyne, Pa.).—Power, 500 night, 1,000 day.  
 WIAS (Ottumwa, Iowa.).—Licensee, Iowa Broadcasting Co.  
 WNAX (Yankton, S. Dak.).—Licensee, The House of Gurney (Inc.).  
 WOKO (Mt. Beacon, N. Y.).—Licensee, WOKO (Inc.).  
 WSOC (Gastonia, N. C.).—Licensee, WSOC (Inc.).  
 Strike out all particulars of the following-named stations: KFHA (Gunnison, Colo.); WTNT (Nashville, Tenn.) (near).

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]

CALIFORNIA: Palo Alto (W6XV).—Fy., add 23,100 (12.987), 25,700 (11.673), 26,000 (11.538), 27,100 (11.070), 34,600 (8.67), 41,000 (7.31), 51,400 (5.83).

MASSACHUSETTS:

Cambridge (W1XM).—Fy., strike out 24,100 (12.448), 26,100 (11.494), add 23,100 (12.987), 25,700 (11.673), 26,000 (11.538).

Dartmouth (W1XV).—Fy., strike out 24,100 (12.448), 26,100 (11.494), add 23,100 (12.987), 26,000 (11.538).

South Dartmouth (W1XP).—Fy., strike out 24,100 (12.448), 26,100 (11.494), add 23,100 (12.987), 25,700 (11.673), 26,000 (11.538).

NEW YORK:

Riverhead (W2XDC).—Fy., strike out 1,604 (187.03), 2,398 (125.1), 3,256 (92.5), 4,795 (62.57), 6,425 (46.7), 8,650 (34.68), 51,900 (5.78); add 51,400 (5.83).

Rocky Point (W2XBI).—Fy., strike out 50,100 (5.98), add 51,400 (5.83).

Rocky Point (W2XBM).—Fy., strike out 25,100 (11.952), add 23,100 (12.987), 25,700 (11.673).

Rocky Point (W2XBP).—Fy., strike out 25,100 (11.952), add 23,100 (12.987), 25,700 (11.673).

South Schenectady (W2XAW).—Fy., strike out 24,100 (12.448), 26,100 (11.494), 35,100 (8.55), 50,100 (5.98), add 25,700 (11.673), 26,000 (11.538), 34,600 (8.67), 41,000 (7.31), 51,400 (5.83).

OHIO:

Dayton (W8XL).—Strike out all particulars.

West Dover, Ohio (W8XJ).—Fy., add 3,082 (97.33), 3,088 (97.15), 3,106 (96.58), 3,160 (94.93), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 5,540 (54.15), 5,570 (53.86), 5,660 (53).

PENNSYLVANIA: East Pittsburgh (W8XS).—Fy., strike out 1,604 (187.03), 4,795 (62.57), 6,425 (46.7), 8,650 (34.68), 12,850 (23.35), 17,300 (17.341).

Portable

CALIFORNIA:

California No. 1 (W6XF).—Fy., strike out 30,100 (9.97), 35,100 (8.55), 40,100 (7.48), 50,100 (5.98), add 23,100 (12.987), 25,700 (11.673), 27,100 (11.070), 34,600 (8.67), 41,000 (7.31), 51,400 (5.83).

California No. 2 (W6XJ).—Fy., strike out 30,100 (9.97), 35,100 (8.55), 40,100 (7.48), 50,100 (5.98), add 23,100 (12.987), 25,700 (11.673), 26,000 (11.538), 27,100 (11.070), 34,600 (8.67), 41,000 (7.31), 51,400 (5.83).

Los Angeles (W6XAJ).—Read Cypress, Calif.

San Francisco Bay.—(W6XC).—Strike out all particulars.

MARYLAND (W3XAF).—Strike out all particulars.

MASSACHUSETTS: Dartmouth (W1XAN).—Now stationary.

NEW JERSEY (W2XDE).—Fy., strike out 6,158 (48.74), add 6,155 (48.74), 6,200 (48.39), 6,600 (45.45), 7,000 (42.86), 7,400 (40.54), 7,700 (38.96).

PENNSYLVANIA: East Pittsburgh (W8XP).—Now stationary.

WASHINGTON: Edmonds (W7XC).—Now stationary.

## Aircraft

NC-952V (W2XBX).—Fy., strike out 1,608 (186.57), 2,302 (130.32), 3,076 (97.5), 4,108 (73.028), 5,510 (54.45), 6,155 (48.74); add 1,604 (187.03), 2,398 (125.1), 3,256 (92.5), 4,795 (62.57), 6,425 (46.7), 8,650 (34.68), 6,200 (48.39), 6,600 (45.45), 7,000 (42.86), 7,400 (40.54), 7,700 (38.96).

NC-9779 (W10XL).—Fy., add 333 (900), 500 (600), 3,106 (96.59), 4,188 (71.63), 4,795 (62.56), 5,525 (54.3), 6,425 (46.69), 8,390 (35.76), 8,650 (34.68), 9,480 (31.65).

## MISCELLANEOUS

## CHANGES IN THE 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
<b>COMMERCIAL</b>		
A. L. Kent.....	KDLL	Mystic S. S. Co.
Alva.....	WBK	W. K. Vanderbilt.
Comet.....	WBEL	Standard Shipping Co.
David McKelvy.....	KDTD	Tidewater Oil Co.
Fontana.....	KFTW	Maritime S. S. Co.
Golden Cloud.....	WSOI	Oceanic & Oriental Navigation Co.
Penobscot.....	KGQR	Nicholson Universal S. S. Co.
Sandmaster.....	KDIW	Construction Materials Co.
Trudone.....	KGRZ	Ross W. Judson.

## GENERAL ORDERS OF THE FEDERAL RADIO COMMISSION

*Broadcasting station licenses extended, with exceptions, until April 30, 1931—General Order No. 103, January 30, 1931.*—It is ordered: The licenses of all broadcasting stations with the following exceptions are hereby extended subject to the terms and conditions provided in said licenses for the period beginning 3 a. m., eastern standard time, January 31, 1931, and ending 3 a. m., eastern standard time, April 30, 1931:

(A) WLBX, KFQU, WJBW, KTSA, WHK, WCGU, KFQW, KGEF, and KZM, which have been heretofore designated for hearing. The licenses for these stations are hereby extended until decision of the commission as a result of the said hearings but in no event later than 3 a. m., eastern standard time, March 31, 1931.

(B) KFXV, KGB, KWKH, WJAY, WRUF, WMRJ, WIBR, WJW, WALR, WWL, WHBC, WRBL, WGCM, KRLD, KONO, KFYO, KLRA, WLOE, and WMBC, which are pending investigation. The licenses for these stations are hereby extended until the completion of said investigation or until decision of the commission if, after a result of said investigation, the applications are designated for hearing but in no event later than 3 a. m., eastern standard time, March 31, 1931.

(C) WBRE, WCLS, WELL, WEVD, WHEC-WABO, WKBO, WKBQ, WLTH, WMBJ, WMBQ, WWRL, KBPS, KFUL, KGAR, KGBZ, KMPC, KTNT, KTRH, WNJ, WAIU, and WREC-WOAN, which have been heard and are pending the decision of the commission. The licenses for these stations are hereby extended until decision of the commission, as a result of said hearings, and in no event later than 3 a. m., eastern standard time, April 30, 1931.

(D) WAWZ, WDRC, WKAQ, WOAX, WDBJ, WGAR, WHP, WACO, WDAG, KGCR, KFVD, KFXJ, KOL, KSEI, and KUJ, which have not filed applications for renewal of station licenses.

No authority herein contained shall be construed as a finding by the Federal Radio Commission that the operation of these stations is now or will be in the public interest beyond the dates specified in this order.

It is further ordered: The operation of General Order No. 97 is hereby postponed to 3 a. m., eastern standard time, April 30, 1931.

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

*Regulation governing application for broadcasting facilities in overquota and underquota zones, under unit and quota allocations—General Order No. 102, January 8, 1931.*—Whereas, under the unit and quota figures adopted by the com-

mission, the first and second zones are under quota and the remaining three zones are over quota;

And whereas, there are a number of States that are over quota and a number of States that are under quota;

And whereas, there is now pending before the commission a number of applications from under-quota States which, under the law, are entitled to their pro rata share of radio facilities;

Therefore, in order to bring about an equalization of these radio facilities among the States in the zones, the commission adopts the following with reference to applications:

1. Where a zone has already in use its pro rata share of facilities, the commission will not allocate any further radio facilities to that zone, which would increase its quota.

2. Applications from under-quota States in zones which have already allocated to them their pro rata share of radio facilities should be for a facility already in use in that zone by an over-quota State.

3. Likewise, where a State is already over quota, the commission will not allocate any further radio facilities to that State, which would increase its quota.

4. Applications from States which now have their quotas, or from States which are over quota, should be for facilities already in use in that State.

5. An applicant from an under-quota State in an under-quota zone may apply either for facilities in use in an over-quota State in that zone or an over-quota State in an over-quota zone.

The further questions of kilocycle and mileage separations should also be considered by an applicant in selecting the frequency to be applied for.

Since the commission has classified stations in accordance with power into three classes, namely, clear channel, regional, and local stations, and has allocated certain frequencies for the use of each of these three classes of stations, applications should be for frequencies set aside by the commission for the character of station applied for.

All applications now pending before the commission which have not been heard or designated for hearing by the commission may be amended by the applicants to conform to this order.

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

#### REGULATIONS GOVERNING THE ISSUANCE OF RADIO OPERATORS' LICENSES

1. *Commercial extra first class.*—To be eligible for examination, an applicant for this class of license must have held a commercial first-class license and must have been actually engaged as an operator at stations open to public correspondence for at least 18 months during the 2 years previous to his application. A speed in transmission and reception of at least 30 words per minute, in code groups, Continental Morse Code, and 25 words per minute, in plain language, American Morse Code, 5 characters to the word, must be attained. The questions in this examination will cover the same subjects required for a commercial second-class license but considerably wider in scope. A percentage of at least 80 will constitute a passing mark. Holders of licenses of this class are authorized to act as chief operator at any licensed radio station.

2. *Commercial first class.*—To be eligible for examination, an applicant for this class of license must have been actually engaged as an operator at stations open to public correspondence for at least 12 months. Applicants for this class of license must pass code tests in transmission and reception at a speed of at least 20 words per minute in Continental Morse Code, in code groups, and 25 words per minute in Continental Morse Code, in plain language (5 characters to the word). The practical and theoretical examination will cover the same subjects as required for the commercial second-class license. A percentage of 75 will constitute a passing mark. Holders of this class of license are authorized to act as chief operator at any licensed radio station.

3. *Commercial second class.*—Applicants for this class of license must pass code tests in transmission and reception at a speed of at least 16 words per minute in Continental Morse Code, in code groups, and 20 words per minute in Continental Morse Code, in plain language (5 characters to the word). The practical and theoretical examination shall consist of comprehensive questions under the following headings:

(a) Diagram of radio installation: Applicants are required to draw a complete wiring diagram of a modern marine radio installation as used aboard American vessels. The applicant may be required to draw either a spark, arc, or vacuum tube transmitter (with radiotelephone attachment).

(b) General principles of electricity, theory, adjustment, operation, and care of modern radiotelegraph and radiotelephone apparatus.

(c) Receiving apparatus.

(d) Operation and care of storage batteries.

(e) Motors and generators.

(f) International regulations governing radio communication and the United States Radio Laws and Regulations.

(g) Experience: An allowance for experience will be made as follows: Three months' or more satisfactory service at a station open to public correspondence under a commercial license, 10 per cent; two months' satisfactory service at a station open to public correspondence under a commercial license, 7.5 per cent; one month's satisfactory service at a station open to public correspondence under a commercial license, 5 per cent; service at United States Government stations open to public correspondence, same as above; service at limited commercial or other United States Government stations of three months or more duration, 5 per cent; less than three months, in proportion; graduates of residence radio schools, 5 per cent; amateur operators or graduates of correspondence radio schools, 2 per cent. Applicants must present satisfactory written evidence of their experience in order to obtain due allowance. A percentage of 75 will constitute a passing mark for this class of license.

This license is valid for the operation of any licensed land or aircraft radio station or on any vessel except as indicated in the following. Holders of this class of license are not authorized to act as chief operator on a vessel in the first class. They will be authorized to act as chief operator on a vessel in the second class upon submission of written evidence at any time during the term of the license indicating six months or more satisfactory service as an operator at a station open to public correspondence.

4. *Commercial third class.*—Applicants for this class of license must pass code test in transmission and reception at a speed of 15 words per minute in Continental Morse Code, plain language (5 characters to the word) and a practical and theoretical examination consisting of comprehensive questions on the care and operation of vacuum tube apparatus and radio communication laws and regulations. A percentage of 75 will constitute a passing mark. Holders of this class of license will be authorized to operate radiotelegraph or radiotelephone installations on aircraft and such other stations which may hereafter be designated by the licensing authority.

5. *Broadcast class (unlimited).*—Applicants for this class of license must pass code tests in transmission and reception at a speed of at least 16 words per minute in Continental Morse Code, in code groups, and 20 words per minute in Continental Morse Code, in plain language (5 characters to the word). The theoretical examination will cover the same subjects as indicated for the commercial second-class license, except that under subject (a) the applicant is required to draw a diagram of a modern broadcast transmitter and under subject (b) the questions will relate strictly to broadcast apparatus. An allowance for service as an operator at a broadcast or other station will be made in accordance with the scale indicated under paragraph 3—Commercial second class. A percentage of 75 will constitute a passing mark. Holders of this class of license are authorized to act as operator only at a licensed broadcast station.

6. *Broadcast class (limited).*—No code test is required for this class of license, otherwise the requirements are the same as for the broadcast class (unlimited) license. Holders of this class of license are authorized to act as operator only at a licensed broadcast station not required to maintain a listening watch on marine distress frequencies.

7. *Radiotelephone class.*—No code test is required for this class of license. The practical and theoretical examination for this class of license shall consist of questions on adjustment and operation of radiotelephone apparatus and knowledge of international regulations governing radio communication and the United States Radio Laws and Regulations. The applicant must demonstrate his ability to enunciate and understand clearly conversation by radiotelephone. Whenever possible, a demonstration of the applicant's ability to operate radiotelephone apparatus will be required. A percentage of 75 will constitute a passing mark. Holders of this class of license are authorized to act as operator only at licensed radiotelephone stations, other than broadcast or amateur, of 300 watts or less input power. This license will only be issued to those who intend to operate this class of station.

8. *Amateur extra first class.*—To be eligible for examination, an applicant for this class of license must have had at least two years' service as a licensed radio

operator and must not have been penalized for violation of the radio laws. The applicant must pass code tests in transmission and reception at a speed of at least 16 words per minute in Continental Morse Code, in code groups, and 20 words per minute in Continental Morse Code, in plain language (5 characters to the word). An applicant must pass a special examination relating to amateur apparatus and international regulations and acts of Congress affecting amateur stations and operators. A percentage of 75 will constitute a passing mark. This license is valid for the operation of licensed amateur radio stations only.

9. *Amateur class.*—Applicants for this class of license must pass a code test in transmission and reception at a speed of at least 10 words per minute, in Continental Morse Code (5 characters to the word). An applicant must pass an examination which will develop knowledge of the adjustment and operation of the apparatus which he desires to use and of the international regulations and acts of Congress in so far as they relate to interference with other radio communications and impose duties on all classes of operators. A percentage of 75 will constitute a passing mark. This license is valid for the operation of licensed amateur radio stations only.

10. *Temporary amateur license.*—Amateurs who can not present themselves for examination may be issued temporary licenses valid for the operation of a particular station until such time as they can be examined for a regular license but not to exceed a period of one year. The applicant must submit a sworn statement attesting to his ability to transmit and receive at a speed of not less than 10 words per minute in Continental Morse Code, and must complete a questionnaire pertaining to the operation of his transmitter.

11. *Renewals.*—(a) Commercial extra first class: These licenses may be renewed without examination provided the record shows 12 months' satisfactory service in a land or ship station open to general public service, at least 6 months of which must have been during the last 12 months of the license period. Holders of these licenses employed as radio inspectors, radio instructors, or in similar occupations requiring exceptional qualifications, where the duties require the testing, or demonstrating, or otherwise using commercial radio apparatus and the telegraph codes, may be issued renewals of their licenses without examination, provided such employment has covered a period of 18 months out of the 2-year license period. Where the applicant has not regularly used the telegraph codes, he will be given the code examination as for an original license, and if he has used only one code, he will be examined in the code not used.

(b) Other renewals: Renewal licenses may be issued to operators of other classes without examination, provided the operator has had three months' satisfactory service during the last six months of the license term. One year's satisfactory service out of two years of the license term may be accepted for renewal at the discretion of the examining officer. Holders of broadcast unlimited licenses will be required to pass the code test given for an original broadcast license in order to obtain renewals.

(c) Holders of commercial first class or commercial second class radio operator licenses who have not had sufficient service at commercial stations to permit the unconditional renewal of such licenses, but indicate satisfactory service at broadcasting stations for the length of time necessary for renewal, and are unable to pass the required code test or to present themselves for a code test, may be issued restricted renewals of their existing licenses. The licenses so issued should bear across their face, preferably in red, the following restrictions: "This license not valid for the operation of any limited or general public station or the operation of a broadcasting station which is required to maintain a listening watch on the marine distress frequency."

Applicants holding restricted commercial operators' licenses, broadcast or radiotelephone operators' licenses may be issued renewals of such licenses provided the service records indicate three months' satisfactory service during the last six months of the license term. One year's satisfactory service out of the 2-year term of the license may be accepted at the discretion of the examining officer. Renewal commercial first class or commercial second class licenses so issued shall bear the indorsement, "This license not valid for the operation of any limited or general public station or the operation of a broadcasting station which is required to maintain a listening watch on the marine distress frequency."

Holders of restricted licenses may have this restriction removed at any time during the term of this license by passing the code test required for the class of license held by them. This restriction will be removed by the supervisor of radio or examining officer canceling the restricted license and issuing a new unrestricted license. The expiration date of the license will remain the same.

Applicants who have passed the regular commercial examination but who hold renewal commercial licenses indorsed, "This license is not valid for the operation of any limited or general public station or the operation of a broadcasting station which is required to maintain a listening watch on the marine distress frequency," may be issued unconditional renewals of such licenses provided they have the required service as indicated above and pass the code test required by the regulations for the class of license held by them.

(d) Renewals or new licenses may be issued a reasonable length of time previous to the expiration of existing licenses but must bear the exact date of issue, which must correspond with the date on Form 756 forwarded to the radio division. Operators who fail to apply for renewal of their licenses on or prior to the date of expiration must be reexamined. If, because of circumstances over which the applicant has no control, an operator is unable to apply for renewal of license on or prior to the date of expiration, an affidavit may be submitted to the radio division through the supervisor of radio or examining officer, attesting to the facts, which will be considered by the radio division, which will advise the supervisor of radio or examining officer in regard to the issue of a renewal of the license. Service records must be completed and signed only by masters, employers, or the duly authorized agents of either. Any improper alteration of the service record or the forgery of masters' or employers' signatures constitutes a violation of the regulations for which the operator may suffer suspension of license for a period not exceeding two years, at the discretion of the Secretary of Commerce.

12. *Duplicate licenses.*—Any operator applying for duplicate license to replace an original which has been lost, mutilated, or destroyed will be required to submit an affidavit to the radio division through a supervisor of radio or examining officer, attesting to the facts regarding the manner in which the original was lost. The director of radio will consider the facts in the case and advise the supervisor of radio or examining officer in regard to the issuance of a duplicate license. The duplicate will be issued under the same serial number as the original and will be marked "duplicate" in red on the face of the license.

13. *Reexamination.*—No applicant who fails to qualify will be reexamined within three months from date of the previous examination. However, when an applicant for the commercial first-class license fails in the code examination he may be reexamined the same day for any other one class of license desired. Those who fail in the code examination for the broadcast-class license may be examined the same day for the broadcast limited, radiotelephone, or amateur class license, if desired. All examination papers, except amateur, whether the applicant qualifies or not, will be forwarded to the Department of Commerce, radio division, for filing.

#### INTERNATIONAL ICE-PATROL SERVICE

The Coast Guard cutters *Mojave* and *Pontchartrain* have been detailed for the season of 1931 to carry on the international ice-observation and ice-patrol service provided for by the International Convention for the Safety of Life at Sea at London in 1929.

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

During the months of March, April, May, and June, and as much longer as necessary, these two vessels will base on Halifax, Nova Scotia. The patrol will be continuous, and the vessel on patrol will not leave her station until relieved by the other vessel unless it is absolutely necessary to do so.

Having located the ice, the vessel on patrol will transmit four daily radio broadcasts, giving ice information, for the benefit of shipping, each broadcast being repeated two times with an interval of two minutes between each repeat. Each broadcast will be preceded by the general call CQ on 500 kilocycles (600 meters) from the vessel on patrol NIDK, immediately followed by the ice broadcast on the frequency specified as follows:



Time			Frequency in kilocycles, meters in parentheses
G. C. T.	Forty-fifth meridian	Seventy-fifth meridian	
0000.....	2100	1900	175 (1,715).
1100.....	0800	0600	425 (705).
1200.....	0900	0700	175 (1,715).
2300.....	2000	1800	425 (705).

The radio procedure will be in accordance with the provisions of the International Radiotelegraph Convention of Washington, 1927, which went into effect January 1, 1929.

Ice information will be given by radio at any time to any ship with which the patrol vessel can communicate. Such information will be furnished as regular radio traffic (without charge) on commercial traffic frequencies.

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

The ice-patrol vessels' general radio call letters are NIDK. This is a special call for the vessel actually on patrol and should not be confused with the regular radio call letters assigned to the individual vessels.

The radio messages from the ice-patrol vessel and from other sources will be given publicity by the Hydrographic Office, as follows:

Station	Call signal	Time		Frequency in kilocycles, meters in parentheses	Type of wave
		G. C. T.	Seventy-fifth meridian-standard		
Washington, D. C.....	NAA	1700	1200	(113 2, 655)	ACW
		0200	2100	113 (2, 655)	ACW
Boston, Mass.....	NAD	1600	1100	102 (2, 940)	CW
		2200	1700	102 (2, 940)	CW
New York, N. Y.....	NAH	1530	1030	102 (2, 940)	CW
		2130	1630	102 (2, 940)	CW
Norfolk, Va.....	NAM	0900	0400	122 (2, 460)	CW
		1800	1100	122 (2, 460)	CW
		2100	1600	122 (2, 460)	CW

<sup>1</sup> Ice data follows the hydrographic bulletin.

INTERNATIONAL RADIOTELEGRAPH CONVENTION VIOLATED

The department recently has received a number of complaints of violation of article 17, paragraph 2, subparagraph 1 of the General Regulations Annexed to the International Radiotelegraph Convention by radio operators at land stations and station on shipboard. This article provides that "In order to increase safety of life at sea (ships) and over the sea (aircraft), all stations in the mobile maritime service must, during their hours of service, take the necessary measures to assure the watch on the distress wave (500 kc/s-600 m.) for three minutes twice per hour, beginning at the fifteenth minute and at the forth-fifth minute after each hour Greenwich Mean Time."

Operators are cautioned that accuracy must be maintained by their clocks in order that transmissions during the above-cited periods may be avoided. They should be frequently checked against time signals transmitted by reliable stations.

Offenders may be penalized under law.

INTERNATIONAL CALL LIST AVAILABLE

The international list of call signals of land and ship stations, edition of November, 1930, is now available for distribution by the International Bureau of the Telegraph Union, Radiotelegraph Service, Berne, Switzerland. The price of the ordinary stitched copy, without index, is \$1.41 and a list on heavy paper with

cardboard cover and index may be obtained for \$1.93. The price includes all supplements which will appear up to the time the next edition is printed, postage, and packing.

All remittances should be forwarded direct to the Berne bureau by international money order.

**GENERAL ORDERS OF THE FEDERAL RADIO COMMISSION APPLICABLE TO BROADCASTING STATIONS**

The list of these orders published in the RADIO SERVICE BULLETIN for last month, should be amended to show that General Order No. 43, September 8, 1928, was rescinded by General Order No. 81, December 20, 1929.

**RATIFICATIONS OF THE INTERNATIONAL RADIOTELEGRAPH CONVENTION**

On February 12, 1930, the Polish diplomatic representative at Washington notified the Secretary of State, that upon instructions of his Government the Free City of Danzig adheres to the convention and the general regulations thereto.

On January 3, 1931, the ambassador of Great Britain notified the Secretary of State of the desire of the Vatican State to accede to the convention.

**RATES FOR REPLIES TO QTG SIGNALS BY BRITISH STATIONS**

The charge is at the rate of 5 shillings (\$1.20) per minute.

**CHANGE IN FREQUENCIES AND TIMES OF TRANSMISSION OF STORM SIGNALS BY NORDEICH, GERMANY**

The frequencies are now 500 kc. (600 m.) and 400 kc. (750 m.), type A2. The hours, 0515, 1020, 1630, and 2130.

Storm warnings for the North Sea will be prefaced by the signal CQ CT Funksturm (radio storm warning), the message in plain language following immediately after. Every storm warning issued will be transmitted on 500 kc. on receipt and repeated on 400 kc. at the three scheduled times which follow, unless canceled in the meantime. At 1020 and 2130, the storm warning follows the weather bulletin. Cancellation of the storm warning will be broadcast immediately on receipt, and repeated at the first scheduled time following.

**CHANGES IN LE HAVRE LIGHT VESSEL, FRANCE, RADIOBEACON**

The characteristic has been changed to transmit two groups of the letter "L" (. . .) followed by a series of dashes (— — — — — etc.) every 30 seconds, thus:

. . .	Silent	. . .	Silent
2.8 sec.	1 sec.	2.8 sec.	1.25 sec.
16 one-second dashes (— — — — — etc.) at intervals of .25 sec.			Silent
19.75 sec.			2.4 sec.

During fog commencing at 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, and 55 minutes of each hour, four successive repetitions of the above group of signals will be transmitted. In clear weather, from two hours before, to two hours after, the time of high water at Le Havre, the signal will be transmitted, commencing at the same times and in the same manner.

The submarine fog bell has been discontinued and replaced by a submarine oscillator, which transmits one group of signals consisting of the letter "L," every 30 seconds, thus:

. . .	Silent
9 sec.	21 sec.

During fog, this signal will be transmitted continuously and during clear weather from two hours before to two hours after, the time of high water at Le Havre.

The commencement of the first dot of the letter "L" will coincide with the transmission of the end of the last dot in the second letter "L" of the radio-

beacon fog signal. The number of dashes emitted by the radiobeacon fog signal which are received before hearing the first dot of the submarine signal, will indicate the distance in miles, approximately, of the ship from the light vessel. Loc., latitude 49° 32' N., longitude 0° 09' W. (approximately). Fy., 307.5 (975), type, A2.

#### RADIOBEACON ESTABLISHED AT MIZEN HEAD, IRELAND

This beacon located in latitude 50° 27' N., longitude 9° 49' W. (approximately), call signal EIW, transmits on a frequency of 300 (1,000). During thick weather when the explosive signal is in operation the radiobeacon fog signal will be transmitted for one minute, every 5 minutes, thus: four repetitions of call signal (. . . — —) in 8 seconds, a series of dashes (— — — —) in 48 seconds, 2 repetitions of call signal in 4 seconds, total duration 60 seconds. During clear weather in order to afford facilities to mariners for obtaining bearings, the complete signal will be emitted three times at 5-minute intervals every hour, commencing at the hour.

#### INCREASE IN NUMBER OF STATIONS INSPECTED AND FREQUENCY MEASUREMENTS

During the six months ended December 31, 1930, the radio division inspected the radio installations of 8,127 United States and foreign vessels in comparison with 7,314 for the corresponding period of 1929.

These inspections revealed a total of 161 defects against 191 in the same period of 1929. The majority of defects were found in the auxiliary emergency apparatus.

Nine hundred and sixty-six inspections were made at broadcasting stations in comparison with 629.

Thirty thousand and ten frequency measurements were made of broadcasting stations to determine whether these stations were operating on their assigned frequency (wave length). Of these measurements there were 597 stations deviating with a total of 922 deviations. During the corresponding period of 1929 the figures totaled 19,041 measurements, 613 stations deviating and 713 deviations. From these figures it readily appears that in the face of an increase of over 50 per cent in measurements, there was a slight decrease in the number of stations deviating and only an increase of 30 per cent in the number of deviations. Methods of maintaining a constant frequency therefor are improving.

Inspections of ship-to-shore, point-to-point, aircraft, and other classes of stations also increased.

#### NUMBER OF APPLICANTS FOR RADIO OPERATOR EXAMINATION INCREASING

For the six months ended December 31, 1930, the radio division examined 2,785 applicants for commercial radio operator against 2,552 during the same period of 1929. Two thousand four hundred and seventy-two were licensed against 2,602.

Applicants for the amateur operator examination rose from 1,468 to 2,367, and the number of licenses issued increased from 3,876 to 5,642. The larger number of licenses issued in comparison with the number of applicants examined is due to the issuance of temporary licenses pending the time when a full regular examination can be given.

## List of Mexican broadcasting stations

Call signal	Location	Frequency in kilocycles, meters in parentheses	Power (watts)
XEA	Gaudalajara.....	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.....	1,030 (291)	2,000
XEH	Monterrey.....	1,132 (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 (357)	500
XEN	Mexico City.....	705 (425)	1,000
XEO	do.....	675 (445)	100
XEQ	Ciudad Juarez.....	760 (400)	1,000
XER	Mexico City.....	675 (445)	100
XES	Tampico.....	890 (337)	500
XET	Monterrey.....	890 (337)	1,500
XETA	Nogales.....	273 (1,100)	1,000
XEU	Vera Cruz.....	800 (375)	50
XEV	Puebla.....	1,035 (290)	100
XEW	Mexico City.....	780 (385)	5,000
XEX	do.....	1,300 (231)	500
XEY	Merida.....	547 (549)	100
XEZ	Mexico City.....	588 (510)	500
XFA	do.....	0-21, 429 (0-14) 500-600 (600-500)	50
XFC	Jalapa.....	6,977-7,143 (43-42) 804 (373)	350
XFD	Mexico City.....	6,667 (45) 11,111 (27) 9,091 (38)	50
XFE	Villahermosa.....	804 (373)	350
XFF	Chihuahua.....	923 (325)	250
XFG	Mexico City.....	638 (470)	2,000
XFH	do.....		250
XFI	do.....	817 (367)	1,000
XFZ	do.....	859 (349)	500

## PROGRESS IN AERONAUTIC RADIO RESEARCH

The Bureau of Standards has completed an intensive research on the vibrating reed indicator used with the 4-course visual type radio range beacon. These indicators are now in commercial production. The objects of the investigation were: (1) To improve the electrical performance of the reed indicator, (2) to determine the tolerances to which it must be constructed in order to give the desired performance, and (3) to set up standard methods and tests for adjusting and calibrating the reed indicator after construction. These objects were all satisfactorily accomplished. Through improvements in the design of the permanent magnet and the use of a nickel-steel alloy known as Allegheny metal for the reed material, the sensitivity of the reed indicator was increased by approximately 100 per cent. This results in increased useful distance range of reception on a radio range beacon of given power and in greater freedom from interference. The determination of the required tolerances in construction made possible securing the desired electrical performance without undue expense in the adjustment and calibration of the reed indicator. Standard methods of tests were developed which insure uniform performance of reed indicators.

Attention was given, during the investigation, to the problem of magnetic shielding of the reed indicator. Because of the strong permanent magnet used in the reed indicator and the crowded condition of the average airplane instrument board, it was found difficult to place the reed indicator in a suitable location without affecting the reading of the magnetic compass, unless magnetic shielding were provided. By construction the indicator mounting case of magnetic material, a good degree of shielding was effected. This makes possible locating the reed indicator within a few inches of the magnetic compass without affecting the compass indication. More recently, in tests of the visual radio range beacon by an air transport company, it has been found desirable to reduce even this

required distance of separation from the compass. Experiments indicate that this result may be attained by changing the shape of the reed mounting case to a cylinder. A further advantage of this arrangement will be that provision may be made for turning the reed indicator over when passing over a beacon without necessitating its removal from the mounting case; this should prove helpful when flying "blind" or in rough weather.

Specifications for construction of the reed indicators may be obtained upon application addressed to Bureau of Standards, Washington, D. C. A scientific paper on the theory of operation of the reed indicators has been prepared. When issued, it will be announced in these columns.

Mention was made in these columns three months ago of an automatic volume device developed by the bureau for use with the visual type radio range beacon; a full description was given in the December 1 issue of the Air Commerce Bulletin. In this description it was shown that complete automatic volume control operation could be obtained, so that no manipulation of the control is required on the part of the pilot over the entire useful distance range of the visual type beacon. Using this device, however, a simple switch is necessary for throwing over to manual volume control, whenever speech reception is desired, since the device does not operate satisfactorily on speech signals. A new semiautomatic volume control device has now been developed which permits operation on speech signals as well as on signals from the visual type radio range beacon. With this device, automatic control action does not hold over as great a range of input voltages to the receiving set as with the complete automatic volume control device. Its function is to reduce the number of times the pilot needs to operate the manual volume control to from one-fifth to one-tenth of that required with normal control operation. It therefore answers the purpose of making the visual type beacon easy to use, particularly within the first few miles from the beacon station. At the same time, since the ear permits considerable change in signal without apparent notice, the ratio of input voltages over which automatic control operation occurs is not sufficient to prevent the necessary changes in speech modulation required in satisfactory speech reception. A number of flight tests made on this new semiautomatic volume control device have demonstrated its successful operation. Its field of usefulness will probably be as great as that of the complete automatic volume control device. In certain commercial aircraft receiving sets, it is somewhat easier to apply, although the amount of receiving set modification required for either device is small.

The development of the simultaneous radiotelephone and visual type radio range beacon transmitter has been advanced through an oscillographic study of the combined signal received from this transmitter. The oscillograph was connected in the output of an aircraft receiving set tuned to the carrier frequency of the combined transmitter, and the wave shape of the received signal studied as a function of different adjustments of the transmitting circuit arrangement. In this way it became possible to determine closely the optimum values for the transmitter plate voltages, grid voltages, power transfer between stages, time phase displacement between the carrier voltages applied to the radiobeacon and radiotelephone units, and relative percentage modulation for the radiobeacon and radiotelephone signals. As a result of this study it was found that the percentage modulation previously employed for the radiobeacon signals was unnecessarily high, thereby revealing the reason why the quality of the received speech signals was not entirely satisfactory. Adjustment of the percentage modulation resulted in good speech reception, rendering unnecessary the use of specially designed receiving sets for receiving the signals from the combined transmitter.