

**U. S. DEPARTMENT OF COMMERCE
RADIO DIVISION**

RADIO SERVICE BULLETIN

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ABBREVIATIONS AND SYMBOLS

The necessary corrections to the list of Commercial and Government Radio Stations of the United States and to the International 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.
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.
House	=Hours of operation: N=continuous service, X=no regular hour, Y=sunrise to sunset.
Accounts	=Message accounts settled by.
I. R. T. Co.	=Interfery Radio Telegraph Co.
M. R. T. Co.	=Mackay Radio & Telegraph Co.
R. C. A.	=Radio Corporation of America.
R. M. C. A.	=Radiomarine Corporation of America.
T. R. T. Co.	=Tropical Radio Telegraph Co.
C. w.	=Continuous wave.
I. c. w.	=Interrupted continuous wave.
A. c.	=Alternating current.
V. t.	=Vacuum tube.
M. a.	=Meters-amperes.
U. S. L.	=Applies only to the list of Commercial and Government Radio Stations of the United States.
Δ	=Equipped with a radio compass (direction finder).

NEW STATIONS

Commercial land stations, alphabetically, by names of stations

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

Station	Class	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Owner
Aurora, Ill. ¹	FA, FX	WQDU	3172 (94.57), 5,600 (53).....	FA	X	Boeing Air Transport (Inc.).
Dearborn, Mich. ²	FA, FX	WQDW	278 (1,080), 420 (715).....	P	X	Ford Motor Co.
Douglas, Ariz. ³	FA, FX	KGSZ	278 (1,080), 3,088 (97.15), 3,460 (86.70), 6,350 (47.24), 8,015 (37.43), 12,180 (24.63).	P	X	Western Air Express (Inc.).
El Centro, Calif. ⁴	FA, FX	KGSY	278 (1,080), 3,088 (97.15), 3,460 (86.70), 6,350 (47.24), 8,015 (37.43), 12,180 (24.63).	P	X	Do.
New York, N. Y. Radio (telephone only). ²	FC	WOZ	3422.5 (87.66).....	PG	X	American Telephone & Telegraph Co.
Shepard Point, Alaska. ⁴	FC	KRU	212 (1,415), 219 (1,370), 274 (1,095), 425 (705), 500 (600).	PG	X	Shepard Point Pack- ing Co.

¹Loc. (approximate) 88° 196' 00" W., 41° 48' 00" N.; type, A3.

²Type, A3.

³Type, A1, A2, A3.

⁴Loc. (approximate) 145° 41' 00" W., 60° 38' 00" N.; type, A1; rates, 6 cents per word.

Commercial ship stations, alphabetically, by name of vessels

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

Name of vessel	Call signal	Rates, all services (cents)	Service	Hours	Owner	Message accounts settled by--
Cambriona.....	KGOQ				Walter O. Briggs.....	
Canahodta.....	KGOA				Merritt-Chapman & Scott Corp. of Calif.	Owner.
Charles R. Wilson.....	KGNW				J. E. Shields.....	Do.
Chester ¹	WTDI	8	PG	N	New York Shipbuilding Corp.	Do.
F. P. C. No. 2.....	KGOF				Fishermens Packing Corp.	
Gavine.....	KGOE				William F. Mitchell.....	
Harry F. Sinclair, Jr.....	KGOK				Sinclair Navigation Co.	
Herbert F. Black ¹	KGOI		PG	X	Cleveland Cliffs S. S. Co.	
John Furroy Mitchell.....	WRBE		P	X	City of New York, Fire Department.	Do.
Joseph Block ²	KGNZ		PG	X	Inland S. S. Co.	Do.
Lake Folcroft.....	KEXL		P	X	Ford Motor Co.	Do.
Lake Freeland.....	WDDU		P	X	do.	Do.
Lake Frugality.....	KEGP		P	X	do.	Do.
Listo.....	KGOB				Wilmington Transportation Co.	Do.
Michabo.....	KFYG	8	PG	X	Floyd L. Carlisle.....	R. M. C. A.
Montgomery ³	KFMH		P	X	Inland Waterways Corp.	Owner.
N. F. Leopold ³	KGNY		PG	X	Inland S. S. Co.	Do.
Norseman.....	KGOO	8	PG	X	Louis C. Decoppet.....	Do.
Sister.....	KGOC				Merritt-Chapman & Scott Corp. of Calif.	Do.
Virginia Sinclair.....	KGOJ				Sinclair Navigation Co.	
Vivo.....	KGOD				Wilmington Transportation Co.	Do.
Western Sun.....	KGOG	8	PG	X	Sun Oil Co.	R. M. C. A.
Zaca.....	KGOM				Templeton Crocker.....	

¹Type, A1, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); power, M/amp. 235/25.

²Fy., 410 (730), 425 (705); rates, Great Lakes service, 4 cents per word.

³Type, A2; fy., 375 (800), 394 (760), 410 (730), 425 (705); power, M/amp. 18/14; rates, Great Lakes service, 4 cents per word.

⁴Type, B; fy., 273 (1,099).

Commercial land and ship stations, alphabetically, by call signals

Call signal	Name of station	Call signal	Name of station
KEGP	Lake Frugality.....b	KGOJ	Virginia Sinclair.....b
KEXL	Lake Folcroft.....b	KGOK	Harry F. Sinclair, jr.....b
KFMH	Montgomery.....b	KGOM	Zaca.....b
KFYG	Michabo.....b	KGOO	Norseman.....b
KGNW	Charles R. Wilson.....b	KGOQ	Cambriona.....b
KGNY	N. F. Leopold.....b	KGSY	El Centro, Calif.....fa, fx
KGNZ	Joseph Block.....b	KGSZ	Douglas, Ariz.....fa, fx
KGOA	Canahodta.....b	KRU	Shepard Point, Alaska.....fo
KGOB	Listo.....b	WDDU	Lake Freeland.....b
KGOC	Sister.....b	WQZ	New York, N. Y.....fo
KGOD	Vivo.....b	WQDU	Aurora, Ill.....fa, fx
KGOE	Gavine.....b	WQDW	Dearborn, Mich.....fa, fx
KGOF	F. P. C. No. 2.....b	WRBE	John Furroy Mitchel.....b
KGOG	Western Sun.....b	WTDI	Chester.....b
KGOI	Herbert F. Black.....b		

Commercial aircraft stations, alphabetically, by names of craft

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

Station	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Owner
NC-842M	KHJUF		P	X	Boeing Airplane Co.
The New Arbella ¹	KHIJQ	3,106 (96.58)			B. W. Wentworth Emmons.
Travel Air ²	KHIKP	3,106 (96.58)			Empire Air Transport Co.
Trinidad	KHKPK				New York, Rio & Buenos Aires Line.

¹ Type, A3.

² Type, A1, A3.

Commercial aircraft stations, alphabetically, by call signals

Call signal	Name of station	Call signal	Name of station
KHIJQ	The New Arbella.	KHJUF	NC-842M.
KHIKP	Travel Air.	KHKPK	Trinidad.

Broadcasting stations, alphabetically, by names of States and cities

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

State and city	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)
Georgia: Thomasville.....	WQDX	1,210 (247.9).....	50
Mississippi: Tupelo.....	WQDV	1,500 (200).....	100
New York: Glen Falls.....	WBGF	1,370 (219).....	50

Broadcasting stations, alphabetically, by call signals

Call signal	Location of transmitter (mail address)	Owner	Frequency in kilocycles meters in parentheses	Power (watts)
WBGF	Glen Falls, N. Y.....	W. Neal Parker and Herbert H. Metcalfe.	1,370 (219).....	50
WQDV	Tupelo, Miss., Blair Building, Main Street.	W. A. Blair and John R. Anderson.	1,500 (200).....	100
WQDX	Thomasville, Ga.....	Stevens Luke.....	1,210 (247.9).....	50

Government land stations, alphabetically, by name of station

[Addition to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, 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
Albany, N. Y.	FA, FX	WWAH	-----	O	-----	Department of Commerce, Bureau of Lighthouses.
Murfreesboro, Tenn.	FA, FX	WWAC	-----	O	-----	Do.
Ponce, P. R. ¹	FC, FX	NWD	3,385 (88.62), 4,205 (71.34).	O	N	Treasury Department, Bureau of Customs.
San Juan, P. R. ²	FC, FX	NXA	3,385 (88.62), 4,205 (71.34).	O	N	Do.
Williamsville, N. Y. (Buffalo).	FA, FX	WWAB	-----	O	-----	Department of Commerce, Bureau of Lighthouses.

¹ Loc. 66° 37' 11" W., 17° 58' 55" N.; type, A1, A2, A3.² Loc. 66° 10' 55" W., 18° 28' 00" N.; type, A1, A2, A3.*Government ship station, by name of station*

[Addition to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, 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
Harbor Trader ¹	NUXS	3,385 (88.62)	O	N	Treasury Department, Bu- reau of Customs.
Penguin	WTDH	-----	-----	-----	Department of Commerce, Bureau of Fisheries.
U. S. Customs patrol boat No. 522. ¹	NUXZ	3,385 (88.62)	O	N	Treasury Department, Bu- reau of Customs.
U. S. Customs patrol boat No. 538. ¹	NUXB	3,385 (88.62)	O	N	Do.

¹ Type, A1, A2, A3.*Government land radiobeacon, radio compass, and ship stations, alphabetically, by call signals*

Call signal	Name of station	Call signal	Name of station
NUXB	U. S. Customs patrol boat No. 538.....b	WTDH	Penguin.....b
NUXS	Harbor Trader.....b	WWAB	Williamsville, N. Y (Buffalo).....fa, fx
NUXZ	U. S. Customs patrol boat No. 522.....b	WWAC	Murfreesboro, Tenn.....fa, fx
NWD	Ponce, P. R.....fc, fx	WWAH	Albany, N. Y.....fa, fx
NXA	San Juan, P. R.....fc, fa		

Experimental stations, alphabetically, by names of stations

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

Station	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)	Owner
New York: South Schenectady. <i>Portable</i>	W2KON	240 (1,250)	5,000	General Electric Co.
California: Los Angeles	W6XAJ	1,604 (187.03), 2,398 (125.1), 3,256 (82.5), 4,795 (62.57), 6,425 (46.7), 8,650 (34.68), 12,850 (23.35), 17,300 (17- 341).	1,000	Globe Wireless (Ltd.).
Oregon: Portland	W7XA	do	1,000	Do.
Washington: Seattle	W7XO	do	1,000	Do.

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, 1929]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)	Owner
New Jersey: Jersey City...	W2XAP	2,750 (109.1) to 2,850 (105.3)	250	Jenkins Television Corp.

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

Call signal	District and station	Call signal	District and station
W2XAP W2XCN W6XAJ	Second district: Jersey City, N. J.----- South Schenectady, N. Y.----- Sixth district: Los Angeles, Calif. (portable).	W7XA W7XC	Seventh district: Portland Oreg. (portable). Seattle, Wash. (portable).

ALTERATIONS AND CORRECTIONS

COMMERCIAL LAND STATIONS

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

- ALPENA, MICH. (WNO).—Hours, 8 a. m. to 5 p. m. daily, 9 to 12 a. m. Sundays and holidays.
- BRADENTON, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- BUTLER, PA. (WBR).—Fy., strike out 250 (1,200); add 248 (1,210).
- CHICAGO, ILL., Radio (WFL).—Fy., add 184 (1,630), 194 (1,545).
- CLEARWATER, CALIF. (LOS ANGELES), Radio.—Type, strike out B; fy., strike out 16,575 (18.099).
- DAYTONA BEACH, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- EL PASO, TEX. (KGSM).—Fy., strike out 3,070 (97.71); add 3,088 (97.15).
- FALSE PASS, ALASKA, Radio.—Type, add A1; fy., strike out 193 (1,555); add 222 (1,350); hours, N.
- FLINT, MICH.—Fy., strike out 2,416 (124.17); add 2,440 (123).
- FORT LAUDERDALE, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- FORT PIERCE, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- GARDEN CITY, N. Y., Radio.—Fy., add 11,020 (27.22), 11,080 (27.08), 11,140 (26.93); owner, Globe Wireless (Ltd.).
- GARDEN CITY, N. Y.—Fy., strike out 22,660 (13.239), add 22,700 (13.216); owner, Globe Wireless (Ltd.).
- GREENSBURG, PA.—Fy., strike out 250 (1,200); add 248 (1,210).
- HARRISBURG, PA. (WBA).—Fy., strike out 250 (1,200); add 248 (1,210).
- HAWK INLET, ALASKA.—Type, A1, A2; fy., 217 (1,380), 246 (1,220), 425 (705), 500 (600); hours, N.
- HILLSBORO, OREG., Radio.—Fy., strike out 16,575 (18.099); hours, X.
- HILO, HAWAII.—Hours, 7.30 a. m. to 12 p. m. daily, 8 to 12 a. m., 6.30 to 12 p. m. Sundays.
- HONOLULU, HAWAII (KOG).—Hours, 7.30 a. m. to 12 p. m. daily, 8 to 12 a. m., 6 to 12 p. m. Sundays.
- INDEPENDENCE, CALIF.—Fy., strike out 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- KAUNAKAKAI (MOLOKAI ISLAND), HAWAII.—Hours, 7.30 a. m. to 5.30 p. m. daily, 8 to 10.30 a. m., Sundays.
- LAKE CITY, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).

- LAKELAND, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- LITTLE NECK, N. Y. (WJU).—Fy., strike out 15,580 (19.255).
- LOS ANGELES, CALIF. (KQT).—Fy., strike out 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- MIAMI, FLA. (WKDL).—Fy., add 8,015 (37.43).
- MIAMI, FLA. (WNH).—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- NEW LONDON, CONN. Radio.—Loc. (approximate) 72° 05' 45" W., 41° 20' 00" N.
- NEW YORK, N. Y. (WSF).—Power, M/amp. 10/7.
- NORTH BEND, OREG., Radio.—Power, M/amp. 36/5.
- OCEAN GATE, N. J., Radio.—Fy., 4,752.5 (63.13), 8,630 (34.76), 12,840 (23.36), 17,120 (17.523).
- PALATKA, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- PALO ALTO, CALIF. (near), Radio.—Loc. 122° 16' 15" W., 37° 26' 37" N.
- PHOENIX, ARIZ. (KGSJ).—Fy., strike out 3,070 (97.71); add 3,088 (97.15).
- PUNTA GORDA, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- ST. AUGUSTINE, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- SAN DIEGO, CALIF. (KGSX).—Fy., strike out 3,070 (97.71); add 3,088 (97.15).
- SANFORD, FLA.—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- SAN JUAN, P. R. (WQZ).—Fy., strike out 15,985 (18.768); add 15,460 (19.405).
- SAYVILLE, N. Y., Radio.—Fy., strike out 120 (2,500); power, M/amp. 122/45.
- TODD, ALASKA.—Owner, Peril Straits Packing Co.; accounts, R. M. C. A.
- WAHIAWA, HAWAII (ISLAND OF OAHU), Radio.—Fy., add 16,580 (18.094), 16,900 (17.751).
- WAILUKU, HAWAII.—Hours, 7.30 a. m. to 12 p. m. daily, 8 to 12 a. m., 6.30 to 12 p. m., Sundays.
- WEST PALM BEACH, FLA. (WNG).—Fy., strike out 3,160 (94.9), 3,166 (94.8), 3,172 (94.6), 3,178 (94.4), 3,238 (92.65), 3,244 (92.5).
- WEST READING, PA.—Fy., strike out 250 (1,200); add 248 (1,210).
- WYOMING, PA.—Fy., strike out 250 (1,200); add 248 (1,210).

Portable

TEXAS AND LOUISIANA (WCM).—Call changed to WCZ.

COMMERCIAL SHIP STATIONS, ALPHABETICALLY, BY NAMES OF VESSELS

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

- ABRON.—Power, M/amp. 28/17.
- ADMIRAL WILEY.—Owner, Pacific Motorship Co. (Inc.).
- AGWIPOND.—Name changed to Cities Service Boston.
- ANSONIA.—Owner, Alaska Packers Association.
- ANTIETAM.—Power, M/amp. 26/14.
- ARDMORE.—Type, A2 and A arc; fy., strike out 137 (2,190), 141 (2,130), 151 (1,985), 157 (1,910), add 153 (1,960), 159 (1,885), 468 (640); power, M/amp. 25/8.
- ARLYN.—Power, M/amp. 21.2/12.
- ASTRAL.—Power, M/amp. 26/8.
- ATLANTIC (WBCO).—Power, M/amp. 23/10.
- AURORA.—Fy., strike out 410 (730), 454 (660); power, M/amp. 23/16.
- AZALEA.—Type, A2; fy., 375 (800), 425 (705), 500 (600); power, M/amp. 26/4.
- BAKERSFIELD.—Power, M/amp. 28/14.
- BANGU.—Type, add A arc; fy., add 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875); power, M/amp. 26/10.
- BARRENFORK.—Owner, Marine Contracting & Towing Co.
- BAYOU CHICO.—Power, M/amp. 28/17.
- BETHORE.—Power, M/amp. 28/10.
- BIDWELL.—Power, M/amp. 29/10.
- BOHEMIAN CLUB.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); power, M/amp. 33.3/6.

- BRADDOCK.—Power, M/amp. 28/14.
 CALORIA.—Power, M/amp. 28/15.
 CAMARGO.—Fy., strike out 141 (2,130), 145 (2,070), 151 (1,985), 400 (750), add 157 (1,910), 159 (1,885), 410 (730); power, M/amp. 12/10.
 CARLTON.—Power, M/amp. 27/14.
 CARRABULLE.—Power, M/amp. 29/16.
 CASSIMIR.—Power, M/amp. 30.48/14.
 CAYO MAMBI.—Fy., strike out 410 (730), 454 (660); power, M/amp. 24/4.
 CECIL COUNTY.—Name changed to Cities Service Kansas.
 CEDARHURST.—Name changed to Doris Kellogg; owner, New York & Philippine Corporation.
 CERRO EBANO.—Power, M/amp. 28/11.
 CHATTANOOGA CITY.—Fy., add 454 (660); power, M/amp. 22/15.
 CHESTER SUN.—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), 425 (705), 468 (640), 500 (600); power, M/amp. 22.86/15; service, PG; hours, X; rates, 8 cents per word; accounts, R. M. C. A.
 CHILOIL.—Power, M/amp. 24/6.
 CIRCINUS.—Name changed to Vermar; owner, Calmar S. S. Corporation.
 CITIES SERVICE FUEL.—Power, M/amp. 30/13.
 CITY OF ALTON.—Power, M/amp. 27/14.
 CITY OF COLUMBUS.—Fy., strike out 410 (730), 454 (660); power, M/amp. 25/12.
 CITY OF DALHART.—Fy., strike out 125 (2,400), 137 (2,190), 141 (2,130), 145 (2,070), 149 (2,015), 151 (1,985), add 153 (1,960), 375 (800), 425 (705); power, M/amp. 27/10; hours, N (first class), X (third class).
 CITY OF JOLLET.—Power, M/amp. 20/14.
 CITY OF MONTGOMERY.—Fy., strike out 410 (730), 454 (660); power, M/amp. 26/14.
 CITY OF PHILADELPHIA.—Power, M/amp. 7.69/9; service, P.
 CLAREMONT.—Owner, W. H. Wood.
 CLEMENT SMITH.—Name changed to Cities Service Missouri.
 CLIFFWOOD.—Owner, American Scantic Line.
 COAMO.—Fy., strike out 137 (2,190), 141 (2,130); power, M/amp. 26/8.
 CODY.—Power, M/amp. 27/16.
 COLDBROOK.—Power, M/amp. 26/15.
 COMMERCIAL BOSTONIAN.—Owner, Mooremack Gulf Lines (Inc.).
 COMMERCIAL FLORIDIAN.—Power, M/amp. 18/7.5; accounts, M. R. T. Co.; owner, Mooremack Gulf Lines (Inc.).
 COMMERCIAL NAVIGATOR.—Power, M/amp. 17.6/18; owner, Mooremack Gulf Lines (Inc.).
 COMMERCIAL ORLEANIAN.—Owner, Mooremack Gulf Lines (Inc.).
 COMMERCIAL PIONEER.—Owner, Mooremack Gulf Lines (Inc.).
 COMMERCIAL QUAKER.—Owner, Mooremack Gulf Lines (Inc.).
 CORONADO.—Power, M/amp. 28/9.
 CORONET.—Fy., strike out 125 (2,400), 137 (2,190), 141 (2,130); power, M/amp. 12/10.
 COURAGEOUS.—Fy., strike out 125 (2,400), 137 (2,190), 141 (2,130), 145 (2,070), add 159 (1,885); power, M/amp. 26/10.
 CRAIGSMERE.—Power, M/amp. 16/5.
 CRUSADER.—Accounts, Radio Communication Co. (Ltd.) of London.
 CURLEW (KOSZ).—Type, add A1; power, M/amp. 20/5.
 DANIEL KERN.—Power, M/amp. 10/2.5.
 DANNEDAIKE.—Power, M/amp. 28/15.
 DEFIANCE.—Power, M/amp. 30/10; hours, X.
 DELAWARE SUN.—Power, M/amp. 28/10.
 DELEROF.—Type, B; fy., 375 (800), 425 (705), 454 (660), 500 (600); power, M/amp. 32/12; hours, N (first class), X (third class).
 DELFINA.—Fy., strike out 410 (730), 454 (660); power, M/amp. 19/10.
 DERBYLINE.—Fy., strike out 410 (730), 454 (660); power, M/amp. 25/14.
 DICKENSON.—Power, M/amp. 30/11.
 DOMINO.—Fy., strike out 410 (730), 454 (660); power, M/amp. 29/15.
 DORA.—Fy., strike out 410 (730), 454 (660); power, M/amp. 28/15.
 DOROTHY (KMIE).—Type, B; power, M/amp. 20/14; accounts, owner.
 EASTERNER.—Fy., strike out 410 (730), 454 (660); power, M/amp. 27.43/12.
 EASTERN GLEN.—Fy., strike out 410 (730), 454 (660); power, M/amp. 28/9; hours, N (first class), X (third class).
 EASTERN PLANET.—Power, M/amp. 28/10.
 EASTERN TEMPLE.—Power, M/amp. 28/10.

- ELENA.—Fy., strike out 125 (2,400), 137 (2,190), 141 (2,130), 145 (2,070), 149 (2,015); power, M/amp. 15/13.
- ELIZABETH KELLOGG.—Power, M/amp. 26/14.
- ELKHORN.—Fy., strike out 135 (2,220), 137 (2,190), 141 (2,130); power, M/amp. 27/10.
- EL SALVADOR.—Owner, Panama Mail S. S. Co. (Inc.).
- EURANA.—Name changed to Alamar; owner, Calmar S. S. Corporation.
- EVANSVILLE.—Power, M/amp. 16/10.
- EXARCH.—Fy., strike out 151 (1,985), add 159 (1,885); power, M/amp. 28/10; hours, N (first class), X (third class); accounts, R. M. C. A.
- EXIRIA.—Power, M/amp. 28/16; hours, N (first class), X (third class).
- FEDERAL (WDOO).—Power, M/amp. 29/15.
- FORDHAM.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); power, M/amp. 20/8.
- GATEWAY CITY.—Power, M/amp. 24/15.
- GEORGIAN (KJUA).—Fy., strike out 410 (730), 454 (660); power, M/amp. 30/12.
- GERTRUDE KELLOGG.—Power, M/amp. 28/17.
- GLENDOYLE.—Name changed to Eureka.
- GOVERNOR JOHN LIND.—Power, M/amp. 21/10.
- GULFBIRD.—Fy., strike out 125 (2,400), 137 (2,190), 141 (2,130), 145 (2,070), 149 (2,015); power, M/amp. 26/10.
- HADNOT.—Fy., strike out 410 (730), 454 (660); power, M/amp. 26/15.
- HALEAKALA.—Power, M/amp. 24.62/5.
- HAMPTON ROADS.—Name changed to Cities Service Oklahoma; owner, Cities Service Transportation Co. (Inc.).
- HARDI BIAOU.—Fy., strike out 125 (2,400), 137 (2,190), 141 (2,130); power, M/amp. 25/8.
- HARRY LUCKENBACH.—Power, M/amp. 23/14.
- HARVESTER.—Power, M/amp. 35/4.
- H. C. CADMUS.—Owner, Tugboat H. C. Cadmus (Inc.).
- HELEN WHITTIER.—Fy., strike out 410 (730), 454 (660); power, M/amp. 22/15.
- HENRY FORD II.—Type, add B; fy., add 394 (760).
- HERMAN F. WHITON.—Fy., strike out 410 (730), 454 (660); power, M/amp. 30/6.
- HILDA.—Owner, The Caddo Co.
- HUGH KENNEDY.—Name changed to J. F. Schoellkopf, jr.
- HUSSAR.—Power, M/amp. 12/5.
- I. J. MERRITT.—Power, M/amp. 18/7.
- INDEPENDENCE.—Power, M/amp. 29/15.
- INTERNATIONAL.—Power, M/amp. 18/14; hours, X.
- INVINCIBLE.—Fy., strike out 125 (2,400), 131 (2,290), 133 (2,255), 135 (2,220), 137 (2,190), 139 (2,160), 141 (2,130), 145 (2,070), 149 (2,015); power, M/amp. 28/10.
- IRENE L.—Owner, Alaska Packers Association.
- ISAAC T. MANN.—Power, M/amp. 26/10.
- J. A. MOFFETT, JR.—Fy., strike out 137 (2,190), 141 (2,130); power, M/amp. 24/11.
- JOHN CUDAHY.—Power, M/amp. 15.38/4; service, PG.
- KATRINA LUCKENBACH.—Power, M/amp. 28/12.
- KELVINIA.—Name changed to Mathew Luckenbach.
- KISHACOQUILLAS.—Power, M/amp. 28/14.
- KISKA.—Fy., add 1,540 (194.8), 1,708 (175.64), 2,560 (117.2); power, M/amp. 75/2.
- KVICHAK.—Power, M/amp. 20/5; hours, N (first class), X (third class).
- LAFOMO.—Power, M/amp. 22/14.
- LEHIGH (KINM).—Power, M/amp. 28/13.
- LEVIATHAN LIFEBOAT No. 31.—Fy., strike out 375 (800); power, M/amp. 3.5/1; service, P.
- LEVIATHAN LIFEBOAT No. 32.—Fy., strike out 375 (800); power, M/amp. 3.5/1; service, P.
- LIBERATOR.—Type, a arc; fy., add 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875); power, M/amp. 22/8.
- LIBERTY.—Power, M/amp. 25/13.
- LIBERTY BELL.—Power, M/amp. 28/15.
- LILLIAN LUCKENBACH.—Fy., strike out 410 (730), 454 (660); power, M/amp. 28/12.
- M. & J. TRACY.—Power, M/amp. 15/6.
- MANHATTAN ISLAND.—Fy., strike out 410 (730), 454 (660); power, M/amp. 29/11.
- MAURICE TRACY.—Power, M/amp. 15/6.

- MOHEGAN.—Power, M/amp. 12/5.
 MONGOLIA.—Name changed to President Fillmore; owner, Dollar S. S. Line; accounts, owner.
 NEW JERSEY.—Fy., strike out 410 (730), add 400 (750); power, M/amp. 46.6/6.
 NORFOLK.—Name changed to Harry Bowen.
 NORTH KING.—Owner, Alaska-Portland Packers Association (Inc.).
 OAKSPRING.—Power, M/amp. 24/14.
 ONTARIO (WSBP).—Owner, Gulf Barge & Towing Co.
 ORITANI.—Owner, Dawnic S. S. Corporation.
 ORMES.—Owner, Dawnic S. S. Corporation.
 PADNSAY.—Power, M/amp. 27/15.
 PAN AMERICA.—Fy., strike out 125 (2,400), 137 (2,190) 141 (2,130), 151 (1,985), add 157 (1,910), 159 (1,885); power, M/amp. 30/10.
 PAUL LUCKENBACH.—Power, M/amp. 27/10.
 PEQUONNOCK.—Power, M/amp. 15/6.
 POINSETTIA.—Type, add A3; fy., 2,524 (118.85), 2,560 (117.18), 2,584 (116.10) 3,112 (96.40), 5,525 (54.3), 5,555 (54), 5,615 (53.42); power, M/amp. 18.46/2; service, P.
 POINT ARENA.—accounts, R. M. C. A.
 POINT FERMIN.—Owner, Gulf Pacific Line (Inc.).
 POINT GORDA.—Owner, Gulf Pacific Line (Inc.).
 POINT SUR.—Accounts, R. M. C. A.
 PRESIDENT ROOSEVELT.—Fy., strike out 151 (1,985), 157 (1,910), 159 (1,885), add 153 (1,960); power, M/amp. 31/13; accounts, R. M. C. A. (U. S. L.).
 RAJAH.—Power, M/amp. 28/7.
 RENE.—Owner, Rene Corporation of Delaware.
 ROBERT E. LEE.—Fy., strike out 137 (2,190), 141 (2,130), 151 (1,985), add 157 (1,910), 159 (1,885); power, M/amp. 28/8.
 SAGADAHOC.—Fy., add 454 (660); power, M/amp. 23/11.
 SAN DIEGO (KUBF).—Owner, W. H. Wood.
 S. A. PERKINS.—Power, M/amp. 28/12.
 SATOCO.—Power, M/amp. 27/10.
 SCHOHARIE.—Fy., strike out 410 (730), 454 (660); power, M/amp. 30/12.
 SEAFORTH.—Fy., strike out 125 (2,400), 137 (2,190) 141 (2,130); power, M/amp. 12/12.
 SEA HAWK.—Owner, North Atlantic Trawling Corporation.
 SEMINOLE (KUGP).—Fy., strike out 137 (2,190), 141 (2,130), add 159 (1,885), 160 (1,875); power, M/amp. 26/8.
 SEMINOLE (WNCX).—Type, add A, arc; fy., add 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 160 (1,875), 400 (750); power, M/amp. 26/8.
 SEWALLS POINT.—Power, M/amp. 25/5.
 SHARON.—Power, M/amp. 15.2/9.
 S. O. Co., No. 95.—Fy., add 454 (660); power, M/amp. 23/5.
 SUN.—Type, strike out B; power, M/amp. 21.3/12.
 SUSCOLANCO.—Name changed to Admiral Nulton; owner, Portland Calif. S. S. Co.; accounts, M. R. T. Co.
 SUWENDENCO.—Name changed to Admiral Halstead; owner, Anglo-California Trust Co.; accounts, M. R. T. Co.
 SWIFARROW.—Fy., strike out 125 (2,400), 137 (2,190), 141 (2,130), 400 (750), add 157 (1,910), 160 (1,875), 425 (705); power, M/amp. 28/10.
 SWIFT SCOUT.—Owner, Boat Owning & Operating Co. (Inc.).
 SWIFTWIND.—Type, A, arc & A2; 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), 468 (640); power, M/amp. 28/10.
 THOMAS TRACY.—Power, M/amp. 25/5.
 UPSHUR.—Power, M/amp. 28/8.
 VABA.—Name changed to Ruth Kellogg.
 VICTORIOUS.—Type A, arc; fy., add 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875); power, M/amp. 20/16.
 VOLUSIA.—Power, M/amp. 28/10.
 WABASH.—Owner, Wabash Railway Co.
 WACOSTA.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600); power, M/amp. 29/10.
 WAWONA.—Power, M/amp. 26/4.
 W. B. FOSHAY.—Name changed to Northland.

W. C. TEAGLE.—Fy., strike out 125 (2,400), 137 (2,190), 141 (2,130), add 157 (1,910), 159 (1,885); power, M/amp. 28/11.
 WEST CALUMB.—Power, M/amp. 24/12.
 WESTERNER.—Power, M/amp. 24/8.
 WEST HUMHAW.—Power, M/amp. 25/15.
 WEST IMBODEN.—Fy., strike out 425 (705), add 410 (730); power, M/amp. 26/10; accounts, R. M. C. A.
 WESTPORT.—Power, M/amp. 30/16.
 WILLIAM ISOM.—Power, M/amp. 28/14.
 Strike out all particulars of the following-named vessels: ADMIRAL BENSON, BANTU, CITIES SERVICE OKLAHOMA, LAKE ALLEN, LAKE CRYSTAL, LAKE LOUISE, PEARY, QUINAULT.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

KDFK, read Admiral Nulton; KDGO, read Cities Service Missouri; KDIP, read Ruth Kellogg; KDIO, read Doris Kellogg; KDLE, read Admiral Halstead; KERZ, read Cities Service Kansas; KESR, read Cities Service Oklahoma; KFAO, read Eureka; KFCJ, read J. F. Schoellkopf, jr; KFG, notice of deletion in Bulletin for last month should have read KFQ; KFKP, read Cities Service Boston; KOPK, read Vermar; WCCF, read Alamar; WCM, read WCZ; WCCN, read President Fillmore; WMDG, read Northland; WTIU, read Mathew Luckenbach; WZUA; read Harry Bowen; strike out all particulars following the call signals, KDND, KGGK, KLAO, KLEI, KOJT, WDCU, WPCR, WQOA.

COMMERCIAL AIRCRAFT STATIONS, ALPHABETICALLY, BY NAMES OF CRAFT

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

BAHIA.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 HAITI.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 MENDOZA.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 MONTEVIDEO.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 PERNAMBUCO.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 PORTO ALEGRE.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 RIO DE LA PLATA.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 SALTA.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 SANTIAGO.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).
 TAMPA.—Type, A2; fy., 333 (900), 375 (800), 500 (600), 3,106 (96.58).

BROADCASTING STATIONS, BY CALL SIGNALS

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

KEJK (Beverly Hills, Calif.).—Notice of call changed to KMPC in Bulletin for last month incorrectly cited old call as KFJK.
 KFKA (Greeley, Colo.).—Owner, The Mid-Western Radio Corporation.
 KFVD (Culver City, Calif.).—Loc. 118° 24' 08" W., 34° 02' 15" N.
 KFWM (Richmond, Calif.).—Call changed to KROW.
 KGAR (Tucson, Ariz.).—Power, 100 night, 250 day.
 KGDM (Stockton, Calif.).—Power, 250.
 KID (Idaho Falls, Idaho).—Owner, KID Broadcasting Co.
 KPCB (Seattle, Wash.).—Fy., 650 (462).
 KSAT (Fort Worth, Tex.—Birdville).—Call changed to KTAT.
 KTSL (Shreveport, La.).—Loc. 93° 44' 11" W., 32° 32' 17" N.
 KTW (Seattle, Wash.).—Owner, First Presbyterian Church of Seattle, Wash.
 WAAT (Jersey City, N. J.).—Fy., 940 (319).
 WABI (Bangor, Me.).—Owner, Pine Tree Broadcasting Corporation.
 WCGU (Brooklyn, N. Y.).—Owner, U. S. Broadcasting Corporation.
 WEBC (Superior, Wis.).—Power, 1,000 night, 2,500 day.
 WEBE (Cambridge, Ohio).—Call changed to WALR.
 WEBW (Beloit, Wis.).—Owner, Wisconsin State Journal Co.
 WEHS (Evanston, Ill.).—Loc. changed to Cicero, Ill.
 WGBC (Memphis, Tenn.).—Owner, Memphis Broadcasting Co.
 WGST (Atlanta, Ga.).—Power, 250 night, 500 day.
 WICC (Easton, Conn.).—Fy., 600 (500); power, 250.
 WKBB (Joliet, Ill.).—Owner, Sanders Bros. radio station.
 WMAN (Columbus, Ohio).—Owner, the Columbus Broadcasting Corporation.

WMAQ (Addison, Ill.).—Owner, WMAQ (Inc.).
 WMC (Memphis, Tenn.).—Loc. changed to Bartlett, Tenn. (studio at Memphis);
 loc. (approximate) 89° 50' 00" W., 35° 12' 02" N.
 WMIL (Long Beach, N. Y.).—Call changed to WCLB.
 WNBR (Memphis, Tenn.).—Owner, Memphis Broadcasting Co.
 WQBC (Vicksburg, Miss.).—Owner, Delta Broadcasting Co. (Inc.).
 WRAK (Erie, Pa.).—Loc. changed to Williamsport, Pa.; loc. (approximate)
 77° 00' 00" W., 41° 70' 00" N.
 WRBT (Wilmington, N. C.).—Owner, Wilmington Radio Association (Inc.).
 Strike out all particulars of the following-named station: KFQZ (Hollywood,
 Calif.).

GOVERNMENT LAND STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alteration and correction to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, and to the International List of Fixed and Land Stations, published by the Berne bureau]

ATLANTA, GA. (sixth district reserve unit).—*Read* Atlanta, Ga. (sixth district U. S. N. R.).
 BALBOA, CANAL ZONE (fifteenth district reserve unit).—*Read* Balboa, Canal Zone (fifteenth district U. S. N. R.).
 BALTIMORE, MD. (fifth district reserve unit).—Loc. changed to Portsmouth, Va. (fifth district U. S. N. R.).
 BOSTON, MASS. (WVO).—Fy., add 4,445 (67.49), 6,990 (42.92).
 CAMDEN, N. J. (fourth Naval reserve district).—*Read* Camden, N. J. (fourth district U. S. N. R.).
 CHICAGO, ILL. (WVT).—Fy., add 6,990 (42.92).
 FORT FRANCIS E. WARREN, WYO.—Fy., add 192 (1,565).
 FORT HAYES (COLUMBUS), OHIO.—Fy., add 6,990 (42.92).
 FORT HOWARD (BALTIMORE), MD.—Fy., add 6,990 (42.92).
 FORT KAMEHAMEHA (HONOLULU), HAWAII.—Fy., add 16,320 (18.38).
 FORT LEAVENWORTH (LEAVENWORTH), KANS.—Fy., add 187 (1,605).
 FORT MCPHERSON, GA.—Fy., add 6,990 (42.92).
 FORT MONMOUTH, N. J. (WTW).—Fy., add 185 (1,620), 6,990 (42.92).
 FORT OMAHA, NEBR.—Fy., add 6,990 (42.92).
 FORT RUGER, HAWAII.—Fy., add 16,320 (18.38).
 FORT SAM HOUSTON (SAN ANTONIO), TEX.—Fy., add 6,990 (42.92).
 FORT SHAFTER, HAWAII (HONOLULU).—Fy., add 16,320 (18.38).
 GOVERNORS ISLAND, N. Y.—Fy., add 6,990 (42.92).
 JACKSONVILLE, FLA. (seventh district reserve unit).—*Read* Jacksonville, Fla. (seventh district U. S. N. R.).
 KANSAS CITY, MO. (ninth district reserve unit).—*Read* Kansas City, Mo. (ninth district U. S. N. R.).
 LOS ANGELES, CALIF. (eleventh district reserve unit).—*Read* Los Angeles, Calif. (eleventh district U. S. N. R.).
 LUKE FIELD (PEARL HARBOR), HAWAII.—Fy., add 16,320 (18.38).
 NEW ORLEANS, LA. (eighth district reserve unit).—*Read* New Orleans, La. (eighth district U. S. N. R.).
 NEW YORK, N. Y. (third district reserve unit).—*Read* New York, N. Y. (third district U. S. N. R.).
 NORFOLK, VA. (fifth district reserve unit).—Loc. changed to Baltimore, Md. (fifth district U. S. N. R.).
 OAKLAND, CALIF. (twelfth district reserve unit).—*Read* Oakland, Calif. (twelfth district U. S. N. R.).
 PENSACOLA, FLA. (eighth district reserve unit).—*Read* Pensacola, Fla. (eighth district U. S. N. R.).
 QUARRY HEIGHTS, CANAL ZONE.—Fy., add 24,510 (12.24), 24,540 (12.22).
 SAN DIEGO, CALIF. (eleventh district reserve unit).—*Read* San Diego, Calif. (eleventh district U. S. N. R.).
 SAN FRANCISCO, CALIF. (twelfth Naval district reserve unit).—*Read* San Francisco, Calif. (twelfth district U. S. N. R.).
 SAN FRANCISCO, CALIF. (Presidio of San Francisco).—Fy., add 6,990 (42.92), 8,600 (34.88).
 SCHOFIELD BARRACKS, HAWAII.—Fy., add 16,320 (18.38).
 SEATTLE, WASH. (thirteenth district reserve unit).—*Read* Seattle, Wash. (thirteenth district U. S. N. R.).
 SEATTLE, WASH. (WVD).—Fy., add 8,170 (36.72).

- SEWARD, ALASKA, Radio.—Fy., add 13,095 (22.91).
 SOUTH MANCHESTER, CONN. (third district reserve unit).—Read South Manchester, Conn. (third district U. S. N. R.).
 WASHINGTON, D. C. (Washington District Reserve Unit).—Read Washington, D. C. (Washington district U. S. N. R.).
 WASHINGTON, D. C. (WAR).—Fy., add 4,255 (70.51), 6,990 (42.92).
 WELLESLEY, MASS. (first district reserve unit).—Loc. changed to Medford, Mass. (first district U. S. N. R.).
 WHEELER FIELD, HAWAII (OAHU).—Fy., add 16,320 (18.38).
 WILMINGTON, DEL. (fourth Naval district reserve).—Read Wilmington, Del. (fourth district U. S. N. R.).
 WINNETKA, ILL. (ninth district reserve unit).—Read Winnetka, Ill. (ninth district U. S. N. R.).
 WINTER PARK, FLA. (seventh district reserve unit).—Loc. changed to Orlando, Fla. (seventh district U. S. N. R.).

GOVERNMENT SHIP STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

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

Strike out all particulars of the following-named vessels: *Eagle 1, Eagle 2, Eagle 3, Eagle 4, Eagle 5, Eagle 18, Eagle 23, Eagle 24, Eagle 28, Eagle 29, Eagle 33, Eagle 37, Eagle 41, Eagle 42, Eagle 45, Eagle 50.*

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, 1929, and to the International List of Stations Performing Special Services, published by the Berns bureau]

- PORTLAND LIGHTSHIP, ME.—Power, M/amp. 70.
 BOSTON LIGHTSHIP, MASS.—Power, M/amp. 55.
 VINEYARD SOUND LIGHTSHIP, MASS.—Power, M/amp. 70.
 CANAL BREAKWATER LIGHT STATION (CAPE COD BAY), MASS.—Loc. 70° 29' 00'' W., 41° 47' 00'' N; type, A2; power, M/amp. 15.
 POLLOCK RIP BLUE LIGHTSHIP, MASS.—Type, strike out B, add A2; fy., strike out 300 (1,000), add 290 (1,034); power, M/amp. 45; hours, operating periods changed to 3.30 to 4, 9.30 to 10 a. m. and p. m. Operator stands watch for the first 15 minutes from 8 a. m. to 5 p. m.
 NANTUCKET SHOALS LIGHTSHIP, MASS.—Power, M/amp. 100; hours, operating periods changed to second 15 minutes of each hour. Operator stands watch for the first 15 minutes of each hour from 8 a. m. to 10.15 p. m.
 LITTLE GULL ISLAND LIGHT STATION, N. Y.—Power, M/amp. 15.
 STRATFORD SHOAL (MIDDLE GROUND) LIGHT STATION, N. Y.—Power, M/amp. 15.
 EXECUTION ROCKS LIGHT STATION, N. Y.—Type, A2; power, 15; hours, add 12 to 12.30 p. m., 5 to 6.30 a. m., 6.30 to 7.30 p. m.
 FIRE ISLAND LIGHTSHIP, N. Y.—Loc. 73° 11' 26'' W., 40° 28' 30'' N. power, M/amp. 45; hours, daily in clear weather from 5.30 to 6 and 11.30 to 12 a. m. and p. m. Operator stands watch for the first 15 minutes of each hour from 8 a. m. to 9.15 p. m. in clear weather.
 AMBROSE CHANNEL LIGHTSHIP, N. Y.—Power, M/amp. 45; hours, daily in clear weather during the second 15 minutes of each hour. Operator stands watch for the first 15 minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.
 BARNEGAT LIGHTSHIP, N. J.—Power, M/amp. 50; hours, operator stands watch for the first 15 minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.
 WINTER QUARTER SHOALS LIGHTSHIP, VA.—Power, M/amp. 120; hours, operating period changed to 12 to 12.30 and 6 to 6.30 a. m. and p. m. Operator stands watch for the first 15 minutes each hour from 8 a. m. to 9.15 p. m.
 SMITH POINT LIGHT STATION, VA.—Loc. 76° 11' 02'' W., 37° 52' 47'' N.; type, A2; power, M/amp 25; hours, add operator stands watch for the first 15 minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.
 CHESAPEAKE LIGHTSHIP, VA.—Type, strike out B, add A2; power, M/amp 140; hours, continuously during thick and foggy weather from 1. to 1.30 and 7 to 7.30 a. m. and p. m. Operator stands watch for the first 15 minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.
 CAPE HENRY LIGHT STATION, VA.—Power, M/amp. 90; hours, add operator stands watch for the first 15 minutes of each hour in clear weather from 8 a. m. to 8.15 p. m.

- COVE POINT LIGHT STATION, MD.—Power, M/amp. 25; hours, operating period changed to 5 to 5.30, 11 to 11.30 a. m. and p. m. Operator stands watch for the first 15 minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.
- DIAMOND SHOALS LIGHTSHIP, N. C.—Power, M/amp. 120; hours, daily in clear weather the third 15 minutes of each hour. Operator stands watch for the first 15 minutes of each hour in clear weather from 8 a. m. to 9.15 p. m.
- CAPE LOOKOUT SHOALS LIGHTSHIP, N. C.—Power, M/amp. 125.
- FRYING PAN SHOALS LIGHTSHIP, N. C.—Loc. $77^{\circ} 33' 45''$ W., $33^{\circ} 28' 00''$ N.; power, M/amp. 85; fy., add 500 (600); hours, add operates the second 15 minutes of each hour.
- DRY TORTUGAS LIGHT STATION, FLA.—Loc. $82^{\circ} 55' 12''$ W., $24^{\circ} 37' 59''$ N.; power, M/amp. 160.
- ST. JOHNS RIVER LIGHT STATION, FLA.—Loc. $81^{\circ} 18' 00''$ W., $30^{\circ} 30' 00''$ N.; power, M/amp. 25.
- JUPITER INLET LIGHT STATION, FLA.—Power, M/amp. 70.
- SAND ISLAND LIGHT STATION, ALA.—Loc. $88^{\circ} 03' 00''$ W., $30^{\circ} 11' 00''$ N.; type, A2; power, M/amp. 50.
- SOUTH PASS WEST JETTY RANGE FRONT LIGHT STATION, LA.—Type, A2; power, M/amp. 160.
- SOUTHWEST PASS EAST JETTY, LA.—Type, A2; power, M/amp. 50.
- ARANSAS PASS LIGHT STATION, TEX.—Type, A2; power, M/amp. 100; hours, operating period changed to the third 15 minutes every 3 hours beginning at 2.30 a. m.
- SABINE PASS LIGHT STATION, TEX.—Loc. $93^{\circ} 51' 00''$ W., $29^{\circ} 43' 00''$ N.; type, A2; power, 50.
- BUFFALO LIGHT STATION, N. Y.—Power, M/amp. 100; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- ASHTABULA LIGHT STATION (ASHTABULA HARBOR), OHIO.—Type, A2; power, M/amp. 50; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- DETROIT RIVER LIGHT STATION, MICH.—Fy., strike out 310 (968), add 306 (980); power, M/amp. 20; hours, operating period changed to the last 15 minutes of each hour. Continuously during thick and foggy weather.
- LAKE HURON LIGHTSHIP, MICH.—Loc. $82^{\circ} 24' 50''$ W., $43^{\circ} 02' 47''$ N.; fy., strike out 310 (968), add 306 (980); power, M/amp. 30; hours, add Continuously during foggy and thick weather.
- THUNDER BAY ISLAND LIGHT STATION, MICH.—Fy., strike out 300 (1,000), add 286 (1,049); power, M/amp. 70; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- POW REEF LIGHT STATION, MICH.—Type, A2; power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- DETOUR LIGHT STATION, MICH.—*Read* Detour Point Light Station, Mich.; fy., strike out 290 (1,034), add 286 (1,050); power, M/amp. 70; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- WHITEFISH POINT LIGHT STATION, MICH.—Power, M/amp. 70; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- MARQUETTE LIGHT STATION, MICH.—Fy., strike out 305 (984), add 302 (993); power, M/amp. 70; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- MANITOU LIGHT STATION, MICH.—Fy., strike out 290 (1,034), add 302 (993); power, M/amp. 70; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- LA POINTE LIGHT STATION, WIS.—Fy., strike out 310 (968), add 314 (955); power, M/amp. 30; hours, operating period changed to the last 15 minutes of each hour. Continuously during thick and foggy weather.
- DEVILS ISLAND LIGHT STATION, WIS.—Fy., strike out 300 (1,000), add 286 (1,050); power, M/amp. 70; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- EAGLE HARBOR LIGHT STATION, MICH.—Loc. $88^{\circ} 10' 00''$ W., $47^{\circ} 28' 00''$ N.; type, A2; power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- DULUTH RANGE FRONT LIGHT STATION, MINN.—Type, A2; power, M/amp. 20; hours, operating period changed to the last 15 minutes of each hour. Continuously during thick and foggy weather.

- MICHIGAN ISLAND LIGHT STATION, WIS.—Type, A2; power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- HURON ISLAND LIGHT STATION, MICH.—Loc. 88° 00' 00'' W., 46° 58' 00'' N.; type, A2; power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- ROCK OF AGES LIGHT STATION, MICH.—Loc. 89° 19' 00'' W., 47° 52' 00'' N.; type, A2; power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- PASSAGE ISLAND LIGHT STATION, MICH.—Power, M/amp. 45; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- POINT BETSIE LIGHT STATION, MICH.—Fy., strike out 295 (1,017), add 314 (955); power, M/amp. 45; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- GRAYS REEF LIGHTSHIP, MICH.—Loc. 85° 11' 00'' W., 45° 47' 00'' N; type, A2; power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- LUDINGTON NORTH BREAKWATER LIGHT STATION, MICH.—Power, M/amp. 10; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- GRAND HAVEN PIERHEAD RANGE FRONT LIGHT STATION, MICH.—Loc. 86° 15' 00'' W., 49° 03' 00'' N.; fy., strike out 310 (968), add 302 (993); hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- CALUMET HARBOR LIGHT STATION, ILL.—Power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- CHICAGO HARBOR LIGHT STATION, ILL.—Fy., strike out 305 (984), add 286 (1,049); power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- MILWAUKEE BREAKWATER LIGHT STATION, WIS.—Fy., strike out 300 (1,000), add 286 (1,050); power, M/amp. 50; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- MANITOWOC BREAKWATER LIGHT STATION, WIS.—Fy., strike out 290 (1,034), add 302 (993); power, M/amp. 25; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- LANSING SHOAL LIGHTSHIP, MICH.—Loc. 85° 33' 40'' W., 45° 54' 15'' N.; power, M/amp. 15; hours, operating period changed to the last 15 minutes of each hour. Continuously during foggy and thick weather.
- CAPE ST. ELIAS LIGHT STATION, ALASKA.—Power, M/amp. 15; hours, add No. regular hours of operation.
- CAPE SPENCER LIGHT STATION, ALASKA.—Power, M/amp. 105.
- SENTINEL ISLAND LIGHT STATION (LYNN CANAL), ALASKA.—Loc. 134° 55' 00'' W., 58° 33' 00'' N.; type, A2; power, M/amp. 50.
- SWIFTSURE BANK LIGHTSHIP, WASH.—Power, M/amp. 100.
- UMATILLA REEF LIGHTSHIP, WASH.—Loc. 124° 50' 25'' W., 48° 10' 03'' N.; power, M/amp. 85.
- GRAYS HARBOR LIGHT STATION, WASH.—Power, M/amp. 45.
- COLUMBIA RIVER LIGHTSHIP, OREG.—Power, M/amp. 65.
- CAPE BLANCO LIGHT STATION, OREG.—Power, M/amp. 80; hours, operating period changed to 10.30 to 11 a. m., 4.30 to 5 p. m.; third 15 minutes of each even hour from 10 p. m. to 6.45 a. m.
- BLUNTS REEF LIGHTSHIP, CALIF.—Loc. 124° 30' 15'' W., 40° 26' 04'' N.; power, M/amp. 50; hours, operator stands watch for the first 15 minutes of each hour from 8 a. m. to 9.15 p. m.
- POINT ARENA LIGHT STATION, CALIF.—Type, A2; power, M/amp. 50.
- SAN FRANCISCO LIGHTSHIP, CALIF.—Power, M/amp. 50.
- POINT SUR LIGHT STATION, CALIF.—Power, M/amp. 100.
- POINT ARGUELLO LIGHT STATION, CALIF.—Power, M/amp. 100.
- LOS ANGELES HARBOR LIGHT STATION, CALIF.—Power, M/amp. 70.
- MAKAPUU POINT LIGHT STATION, HAWAII (OAHU ISLAND).—Fy., strike out 300 (1,000), add 290 (1,034); power, M/amp. 145.
- CAPE MALA LIGHT STATION, PANAMA.—Loc. 79° 59' 30'' W., 07° 27' 30'' N.; type, A2; power, M/amp. 100; fy., strike out 290 (1,034), add 295 (1,017).
- CRISTOBAL MOLE (COLON), CANAL ZONE.—Loc. 79° 55' 03'' W., 09° 21' 23'' N.; type, A2; power, M/amp. 100; hours, operating period changed to twice hourly for a period of 10 minutes beginning on the hour and half hour.

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, 1929, and to the International List of Stations Performing Special Services, published by the Berne Bureau]

- BELLEFONTE, PA.—Loc. 77° 42' 27'' W., 40° 53' 22'' N.
- BOSTON, MASS.—Loc. 71° 02' 06'' W., 42° 22' 03'' N.
- CICERO (CHICAGO), ILL.—Loc. (approximate) 0.87° 46' 30'' W., 41° 48' 00'' N.
- CLEVELAND, OHIO.—Loc. (approximate) 81° 51' 04'' W., 41° 25' 00'' N.
- DES MOINES, IOWA.—Loc. 93° 32' 07'' W., 41° 39' 54'' N.
- GOSHEN, IND.—Loc. (approximate) 0.85° 50' 00'' W., 41° 37' 00'' N.
- KEY WEST, FLA.—Loc. 81° 47' 44'' W., 24° 32' 50'' N.
- NEW BRUNSWICK (HADLEY FIELD), N. J.—Loc. 74° 26' 05'' W., 40° 33' 16'' N.
- STERLING, ILL.—Loc. 89° 41' 36'' W., 41° 48' 57'' N.

GOVERNMENT, RADIOBEACON, RADIO-COMPASS LAND AND SHIP STATIONS ALPHABETICALLY BY CALL SIGNALS

NDA, read Medford, Mass. (first district U. S. N. R.); NDB, read New York, N. Y. (third district U. S. N. R.); NDC, read Wilmington, Del. (fourth district U. S. N. R.); NDD, read Pensacola, Fla. (eighth district U. S. N. R.); NDE, read Baltimore, Md. (fifth district U. S. N. R.); NDF, read South Manchester, Conn. (third district U. S. N. R.); NDG, read Balboa, C. Z. (fifteenth district U. S. N. R.); NDH, read San Francisco, Calif. (twelfth district U. S. N. R.); NDJ, read Atlanta, Ga. (sixth district U. S. N. R.); NDK, read Portsmouth, Va. (fifth district U. S. N. R.); NDL, read Orlando, Fla. (seventh district U. S. N. R.); NDM, read Camden, N. J. (fourth district U. S. N. R.); NDN, read Washington, D. C. (Washington district U. S. N. R.); NDO, read Oakland, Calif. (twelfth district U. S. N. R.); NDP, read Kansas City, Mo. (ninth district U. S. N. R.); NDQ, read Seattle, Wash. (thirteenth district U. S. N. R.); NDS, read Winnetka, Ill. (ninth district U. S. N. R.); NDT, read San Diego, Calif. (eleventh district U. S. N. R.); NDU, read Jacksonville, Fla. (seventh district U. S. N. R.); NDV, read Los Angeles, Calif. (eleventh district U. S. N. R.); NDZ, read New Orleans, La. (eight district U. S. N. R.); strike out all particulars following the call signals, NEJB, NEJC, NEJD, NEJF, NEJG, NEJZ, NEKG, NEKJ, NEXM, NEXN, NIBB, NIBM, NIBJ, NIBL, NIBR, NIBZ.

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, 1929]

NEW YORK: Jamaica (W2XE).—Loc. changed to Cross Hassock Bay, N. Y.

Portable

COLORADO (W9XE).—Loc. changed to Golden, Colo.

HAWAII: Honolulu (K6XAK).—Fy., 1,604 (187.03), 2,398 (125.1), 3,256 (92.5), 4,795 (62.57), 6,425 (46.7), 8,650 (34.68), 12,850 (23.35), 17,300 (17,341); owner, Globe Wireless (Ltd.).

MISCELLANEOUS

LIST OF VESSELS EQUIPPED WITH A RADIOCOMPASS

The following-named vessels are additions to the lists published in Commercial and Government Radio Stations of the United States, edition June 30, 1929, and the International List of Ships Stations published by the Berne Bureau:

Name	Call signal	Owner
COMMERCIAL		
Cities Service Boston.....	KFKP	Cities Service Transportation Co.
Cities Service Kansas.....	KERZ	Do.
Cities Service Missouri.....	KDGO	Do.
Cities Service Oklahoma.....	KESR	Do.
Losmar.....	KOQB	Calmar S. S. Corp.
Maryland.....	WCDQ	Bethlehem Transportation Corp.
Santa Clara.....	WMDB	Grace S. S. Co.
Susan V. Luckenbach.....	WQIO	Luckenbach S. S. Co.

The radiocompass has been removed from the vessels *Kairina Luckenbach*, *President Polk*, and *Isaac T. Mann*.

GENERAL ORDERS OF THE FEDERAL RADIO COMMISSION

[Revised amateur regulations (General Order No. 84, April 4, 1930).—Under the provisions of section 4 of the radio act of 1927, as amended, the Federal Radio Commission establishes the following regulations for amateur radio stations; effective on and after April 5, 1930. General Orders Nos. 24 and 67 are hereby repealed.]

SECTION I: *Definitions.*—As used in these regulations.

(a) An amateur is a person interested in radio technique solely with a personal aim and without pecuniary interest.

(b) An amateur operator is a person holding a valid license from the Secretary of Commerce as a radio operator who is authorized under the regulations of the Secretary of Commerce to operate amateur radio stations.

(c) An amateur station is all the apparatus controlled from one location used for amateur radio communication.¹

(d) Amateur radio communication is radio communication between amateur radio stations by telegraph, telephone, facsimile, or television solely with a personal aim and without pecuniary interest.

(e) A fixed station is a station permanently located.

(f) A mobile station is a station permanently located upon a mobile unit and ordinarily used while in motion.

(g) A portable station is a station so constructed that it may conveniently be moved about from place to place for communication and is in fact so moved about from time to time, but not ordinarily used while in motion.

SECTION II: *Classification of amateur stations.*—The public interest, convenience, and necessity will be served by the operation of amateur stations. Save as restricted by and subject to the provisions of, treaty, law, or regulations of the commission and with the exception of individual cases where the public interest, convenience, or necessity requires otherwise, all applications from amateurs for amateur station licenses will be granted.

SECTION III: *Prescription of the nature of service to be rendered.*

(a) For the present, amateur mobile stations will not be licensed.

(b) Amateur stations are to communicate only with similar stations. In emergencies or for testing purposes they may communicate with commercial or Government stations. They may also communicate with mobile craft and expeditions which do not have general public service licenses and which may have difficulty in establishing communication with commercial or Government stations.

(c) Amateur stations shall not broadcast news, music, lectures, sermons, or any form of entertainment to the general public.

(d) Amateur stations shall not transmit or receive messages for hire nor engage in communication for material compensation, direct or indirect, paid or promised.

(e) Except as otherwise herein provided, amateur radio stations shall be used only for amateur radio communication, as defined in section I, paragraph (d) above.

SECTION IV: *Assignment of bands of frequencies.*

(a) The following bands of frequencies (kilocycles) are assigned exclusively to amateur stations: 1,715 to 2,000, 3,500 to 4,000, 7,000 to 7,300, 14,000 to 14,400, 28,000 to 30,000, 56,000 to 60,000, 400,000 to 401,000.

(b) All bands of frequencies so assigned may be used for continuous wave telephony.

(c) The following bands of frequencies (kilocycles) may also be used for radio telephony: 1,715 to 2,000, 3,500 to 3,550, 56,000 to 60,000.

(d) Upon application, amateurs who hold operators' licenses from the Secretary of Commerce of the extra first-class amateur grade, or higher, or who show special technical qualifications, satisfactory to the licensing authority, will also be licensed for radiotelephony in the band of frequencies (kilocycles); 14,100 to 14,300.

(e) The following bands of frequencies (kilocycles) may also be used for television, facsimile, and picture transmission: 1,715 to 2,000, 56,000 to 60,000.

(f) Licenses to individual amateur stations shall permit the use of all frequencies within the service bands above assigned which the licensee may be entitled to use and shall not specify individual frequencies.

SECTION V. *Location.*—An amateur radio station shall not be located upon premises controlled by an alien.

SECTION VI. *Regulations concerning the kind of apparatus to be used with reference to its external effects.*

(a) Amateur stations shall not use apparatus transmitting damped waves.

(b) The frequency of the waves emitted by amateur stations must be as constant and as free from harmonics as the state of the art permits. For this purpose they must use circuits loosely coupled to the radiating system or devices that will produce equivalent effects to minimize keying impacts and harmonics. Conductive coupling to the radiating antenna, even though loose, is not permitted but this restriction does not apply against the employment of transmission-line feeder systems to Hertzian antennas.

(c) Amateur stations must use adequately filtered direct-current power supply or arrangements that produce equivalent effects to minimize frequency modulation and prevent the emission of broad signals.²

(d) Amateur stations are authorized to use a maximum power input into the last stage of a transmitter of 1 kilowatt.

SECTION VII. *Regulations deemed necessary to prevent interference.*

(a) In the event that the operation of an amateur station causes general interference with broadcast reception in receiving apparatus of modern design, that amateur station shall not operate during the hours from 8 o'clock p. m. to 10.30 p. m., and on Sundays from 10.30 a. m. until 1 p. m., local time, upon such frequency or frequencies as cause such interference.

(b) An amateur station shall transmit its assigned call at the end of each transmission, but in any event at least once during each 15 minutes of operation.

SECTION VIII. *Other regulations.*

(a) Amateur station licenses shall be issued only to persons who are amateurs, as defined in Section I, paragraph (a) above.

(b) Amateur station licenses shall be issued only to persons who are amateur operators, as defined in Section I, paragraph (b) above: *Provided, however,* That if an applicant is not such an operator, an amateur

¹ As a matter of licensing procedure in all cases of remotely controlled transmitters, the location of the station shall be assumed to be that of the control point, save that, where such control point is more than 5 miles from the radiating antenna, the location shall be assumed to be that of the radiating antenna.

² The use of unrectified alternating-current power supply will be considered satisfactory in the amplifier stages of oscillator-amplifier transmitter so arranged that variations in plate voltage can not affect the frequency of the oscillator.

station license shall be issued him upon the presentation of affirmative evidence that the station, when licensed, will be operated by an amateur operator.

(c) Amateur station licenses shall not be issued to corporations or associations: *Provided, however,* That in the case of a bona fide amateur radio society, a license may be issued to an authorized official of such society as trustee therefor.

(d) The licensee of a portable station shall give advance notice to the supervisor of radio in the district where application was made for said portable station license of all locations in which the station will be operated.

(e) The licensee of an amateur station shall keep an accurate log of station operation, in which shall be recorded the time of each transmission, the station called, the input power to the last stage of the transmitter, and the frequency band used.

SECTION IX. Administration.—For the purpose of administering these regulations and under the findings of public interest, convenience, and necessity herein made, all ministerial and routine duties in connection with the licensing of amateur radio stations will be performed by the radio division of the Department of Commerce. That division will issue on behalf of and in the name of the commission all licenses the applications for which disclose no question involving discretion and which require no determination of controverted questions of fact. All applications tendering such questions shall be referred by the radio division to the commission.

[Regulations governing the issuance of construction permits and licenses and the operation of radio stations by police departments (General Order No. 85, April 8, 1930).]

It is ordered: I. That General Order 74 be amended so as to provide for emergency police radio service as hereinafter set forth.

II. *Definition.*—Emergency police radio service is the broadcasting of emergency communications from central police headquarters to squad cars or other mobile units.

To whom licenses will be issued.—Licenses for emergency police radio service will be authorized only for municipally controlled stations.

Assignment of frequencies.—The following frequencies (kilocycles) are designated for emergency police service: 1,712, 2,410, 2,416, 2,422, 2,440, 2,462, 2,468, 2,470. No specific frequency will be assigned for the exclusive use of any licensee. One frequency may be shared by a number of municipalities in the same geographical area.

Prerequisites to authorization.—Construction permits and licenses will be granted on condition: 1. That the station be operated only for the purpose of transmitting dispatches of an emergency nature to squad cars or other mobile units: *Provided, however,* That the frequency may be used for the transmission of test messages not to exceed two minutes in each half-hour period; and further, that before testing the station shall make certain that no interference will result to reception in other locations.

2. That a survey has been completed to determine the most suitable location from which the lowest possible power with highest percentage of modulation will afford coverage over the desired service area: *Provided, however,* That in no case will the commission authorize an amount of power in excess of that shown in the subjoined table of the following paragraph, or a modulating capacity of transmitter less than 85 per cent on peaks. Furthermore, no transmitter will be permitted to operate unless the applicant can show that the carrier frequency will be kept within 0.025 per cent of the assigned frequency by automatic frequency control.

Power.—The maximum amount of power to be assigned for the use of stations will be based on the latest Census Bureau population figures for cities or State subdivisions in accordance with the following table:

Population	Power (watts)	Population	Power (watts)
Under 100,000	50	400,000 to 500,000	250
100,000 to 200,000	100	500,000 to 600,000	300
200,000 to 300,000	150	600,000 to 700,000	400
300,000 to 400,000	200	Over 700,000	500

In the event that the amount of power allocated above is insufficient to afford reliable coverage over the desired service area, the commission will, upon proper showing being made, authorize the use of additional transmitters of duplicate power.

[Regulations governing the operation of radio stations by power companies (General Order No. 86, April 8, 1930).]

It is ordered: I. That General Order 74 be amended in so far as it provides for emergency service for power companies.

II. (a) That emergency radio service for power companies is service providing for emergency radio communication between power company stations when all forms of wire communication fail.

(b) That the frequency 3,184 kilocycles with maximum power of 500 watts type A-1 (CW) emission be authorized for use by power companies for the purpose of handling dispatches of an emergency nature during times when such traffic can not be otherwise delivered because of the breakdown of established means of communication.

(c) That the frequency may be used for testing purposes not to exceed 10 minutes per day: *Provided, however,* That before testing, the station shall ascertain that the frequency is clear and that no interference will result to other stations or services.

III. That all licenses heretofore issued to power companies for emergency service be so modified as to conform with this general order.

[Frequencies assigned for broadcasting stations—Certain frequencies reserved for exclusive use of Canada.—shared frequencies (General Order No. 87, April 7, 1930, and amendment thereto dated April 25, 1930).]

It is ordered, That, effective 3 a. m., Eastern standard time, April 30, 1930, General Order No. 40, dated August 30, 1928, be, and the same is hereby, amended, to read as follows:

The commission has determined that the definite assignment of a band of frequencies for broadcasting, the maintenance of a separation of 10 kilocycles between frequencies used in broadcasting, the reservation of certain frequencies for exclusive use by stations in the Dominion of Canada, and the setting aside of a

certain number of other frequencies for shared use by the United States and the Dominion of Canada, all as hereinafter specified in this order, will serve public interest, convenience, or necessity.

The commission has further determined, after careful consideration, that the allocation of frequencies, of time for operation, and of station power for use by broadcasting stations to the respective zones, as hereinafter specified in this order:

(a) It is necessary, in order to comply in part with the requirements of section 9 of the radio act of 1927 as amended by section 5 of the act of Congress of March 23, 1923, in so far as it requires that the licensing authority shall as nearly as possible make and maintain an equal allocation of bands of frequency or wave lengths, of periods of time for operation, and of station power to each of the zones when and in so far as there are applications therefor, and

(b) Will promote public interest and convenience and will serve public necessity, in so far as this can be done in a manner consistent with the requirements of said section 9 of the radio act of 1927 as amended by section 5 of the act of Congress, March 23, 1923, and will greatly improve reception conditions in the broadcast band, by the elimination of a large portion of the interference which now exists.

It is therefore ordered: PARAGRAPH 1. That a band of frequencies extending from 550 to 1,500 kilocycles, both inclusive, be, and the same is hereby, assigned to and for the use of broadcasting stations, said band of frequencies being hereinafter referred to as the broadcast band. This order is not to be construed as prohibiting the licensing of maritime mobile services on the frequency of 1,365 kilocycles, as provided by the International Radio Telegraph Convention of 1927.

PAR. 2. That within said broadcast band a separation of 10 kilocycles be maintained between the frequencies assigned for use by broadcasting stations.

PAR. 3. That, of the frequencies within said broadcast band, (a) the frequencies of 690, 730, 840, 910, 960, and 1,030 kilocycles, be, and the same are hereby, reserved for use by broadcasting stations located in the Dominion of Canada, and shall not be assigned to any broadcasting station licensed by this commission; (b) the frequencies of 580, 600, 630, 780, 880, 890, 930, 1,010, 1,120, 1,200, and 1,210 kilocycles be, and the same are hereby, set aside for simultaneous use by broadcasting stations located both in the Dominion of Canada and in the United States, its Territories and possessions, and no station will be authorized by this commission on any of these frequencies with an authorized power which will cause interference at the boundary line between the Dominion of Canada and the United States of America, or in excess of 500 watts at any place within the United States of America or the Territories of Alaska and Porto Rico.

PAR. 4. That the frequencies within said broadcast band (subject to the foregoing), and periods of time for operation and station power to be used by broadcasting stations on said frequencies be, and the same are hereby, allocated equally to the zones as follows:

A. The following frequencies are allocated to the first, second, third, fourth, and fifth zones, respectively, as below indicated for use by broadcasting stations, the amount of power to be used by such stations to be determined by further order of the commission:

First zone: 660, 710, 760, 860, 990, 1,060, 1,100, and 1,160 kilocycles.

Second zone: 700, 750, 820, 980, 1,020, 1,080, 1,140, 1,150 kilocycles.

Third zone: 650, 740, 800, 850, 1,040, 1,070, 1,130, and 1,190 kilocycles.

Fourth zone: 670, 720, 770, 810, 870, 1,000, 1,110, and 1,180 kilocycles.

Fifth zone: 640, 680, 790, 830, 970, 1,050, 1,090, and 1,170 kilocycles.

B. The following frequencies are allocated each for use by not less than two zones, with broadcasting stations in these zones being permitted to operate simultaneously, each station to have an authorized power not to exceed 5 kilowatts, the particular zone entitled to share in the allocation of any particular frequency to be determined by further order of the commission: 1,460, 1,470, 1,480, and 1,490 kilocycles.

C. The following frequencies are allocated for use by not less than two nor more than three zones, the broadcasting stations in those zones being permitted to operate simultaneously, and to have an authorized power not to exceed 1,000 watts, the particular zones entitled to share in the allocation of any particular frequency to be determined by further order of the commission: 580, 590, 600, 610, 620, 630, 780, 880, 890, 900, 920, 930, 940, 950, 1,010, 1,120, 1,220, 1,230, 1,240, 1,250, 1,260, 1,270, 1,280, 1,290, 1,300, 1,320, 1,330, 1,340, 1,350, 1,360, 1,380, 1,390, 1,400, 1,410, and 1,430 kilocycles.

(Except that in those cases where the station locations and powers are such that interference will not be caused, four or five zones instead of three zones may share one or more of the foregoing frequencies where practicable.)

D. The following frequencies are allocated for use in all five zones with broadcasting stations permitted to operate simultaneously, each station to have an authorized power not to exceed 1,000 watts: 550, 560, 570, 1,440, and 1,450 kilocycles.

E. The following frequencies are allocated for use in all five zones by broadcasting stations in simultaneous operation with an authorized power not to exceed 100 watts, the number of such stations to be permitted to operate simultaneously in each zone on each of said frequencies to be determined by further order of the commission: 1,200, 1,210, 1,310, 1,370, 1,420, and 1,500 kilocycles.

F. Whenever the word "frequency" is used in the preceding subparagraphs A, B, C, D, and E of this paragraph, it is to be understood as connecting periods of full-time operation, that is to say, 24 hours daily, and every allocation herein of a frequency to a particular zone is to be considered as carrying with it an assignment of full-time operation on that frequency to that zone.

PAR. 5. That the allocation hereinbefore ordered in paragraph 4 of this order be, and the same is hereby, declared to be effective on April 30, 1930, at the hour of 3 o'clock a. m., eastern standard time; and that the provisions of paragraphs 1, 2, and 3, be, and the same are hereby declared to be, effective as of the date of the issuance of this order.

Amendment to General Order No. 87

Whereas a temporary restraining order has been granted in the Supreme Court of the District of Columbia in the case of Stromberg-Carlson Telephone Manufacturing Co., a plaintiff, v. Charles McK. Saltzman, et al. defendants, from putting into effect General Order No. 87 so far as it affects WHAM owned by the plaintiff in the above-entitled cause, and

Whereas this temporary restraining order will affect all other stations specified in the said General Order No. 87 and all frequencies involved therein, and will make it impractical to carry out the plan as provided in General Order No. 87 (and as provided for in the minutes of the commission of April 7, 1930); now therefore,

It is hereby ordered. That the effective date of the said order which reads "3 a. m., eastern standard time, April 30, 1930," be postponed and the same is hereby postponed until 3 a. m., eastern standard time, July 31, 1930, and it is further ordered that the following stations which were affected by the proposed general order shall have their present licenses extended and all their present frequencies and all other terms and conditions are hereby extended until 3 a. m., eastern standard time, July 31, 1930, to wit:

Call letters	Frequency	Call letters	Frequency
<i>Clear channel stations</i>		<i>Limited time and day stations</i>	
WHAS.....	820	WMBI-WCBD (limited time).....	1,080
KYW.....	1,020	WJJD (limited time).....	1,130
KTHS-KRLD.....	1,040	WHDI-WDGY (limited time).....	1,180
WTAM.....	1,070	WKEN (limited time).....	1,040
WBT.....	1,080	WKAZ (day).....	1,070
KMOX.....	1,090	WCAZ-WDZ (day).....	1,040
WRVA.....	1,110	KSOO (limited time).....	1,110
KSL.....	1,130	KTNT (limited time).....	1,170
WAPI-KVOO.....	1,140		
WHAM.....	1,150		
WOWO-WVVA.....	1,160		
WCAU.....	1,170		
KOB-KEX.....	1,180		

It is further ordered, That the said hearing of the stations as affected by General Order No. 87 and as provided for in the minutes of the commission of April 7, 14, 23, and 25, 1930, shall be held in accordance therewith and as scheduled therein on the 17th day of June, 1930, and all stations affected by the said order and desiring to be heard shall show cause at that time why said frequencies should not be changed in accordance with the provisions of General Order No. 87 and the action of the commission dated April 7, 1930.

It is further ordered, That the extension of the existing licenses of the various stations as above provided for shall not be taken or construed as a finding or findings by the commission that the operation of said broadcasting stations or either or any of them would serve public interest, convenience or necessity, but that such extensions are granted by reason of the said temporary restraining order of the Supreme Court of the District of Columbia, in the case of Stromberg-Carlson Telephone Co., plaintiff, v. Charles McK. Saltzman, et al., in Equity No. 51325.

[Visual broadcasting, relay broadcasting, and telephone channels restricted to certain widths (General Order No. 88, April 14, 1930). IT IS ORDERED that General Order No. 62 is hereby repealed.]

That in the frequencies exceeding 1,500 kilocycles per second a channel of radio communication shall be regarded as a band of frequencies, the width of which varies according to its position in the spectrum. The width of these channels increases with the frequency according to the following table:

Frequency (kilocycles)	Channel width (kilocycles)	Frequency (kilocycles)	Channel width (kilocycles)
1,500 to 2,199.....	4	8,210 to 10,960.....	20
2,200 to 3,313.....	6	10,990 to 16,405.....	30
3,316 to 4,400.....	8	16,420 to 21,900.....	40
4,405 to 5,490.....	10	21,980 to 32,780.....	60
5,495 to 8,202.5.....	15		

NOTE.—A visual broadcasting channel shall not be more than 100 kilocycles in width. A commercial telephone channel below 3,313 kilocycles shall be regarded as 6 kilocycles in width. A relay broadcasting channel between 6,000 and 9,600 kilocycles shall be regarded as 20 kilocycles in width.

In granting licenses, the Federal Radio Commission will specify the frequency in the center of the particular channel license to be used, but the licensee may occupy the center frequency and in addition such adjacent frequencies (within the limit indicated on the above table) as may be permitted by the frequency maintenance tolerance and required by the type of emission the station may be authorized to use, all of which will be specified in the instrument of authorization.

Licensees of fixed stations who have been granted the use of a channel for communications with specified points upon application to the commission for licenses may be granted the use of the same channel for communications with other points on the condition that the public interest, convenience, and necessity will be served by such a grant.

From and after the adoption of this general order no licenses or renewals thereof for operation in the frequencies herein above named shall be granted for a longer period than December 31, 1930.

[Application for renewal license of station must be filed at least 30 days prior to date of expiration—station must cease operation provided no action is taken upon renewal by commission (General Order No. 89, April 21, 1930)—it is ordered, effective May 1, 1930]

1. All applications for renewal of license must 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.

2. That in no case where an applicant fails to meet the foregoing requirements shall any temporary extension of license be granted pending action of the commission upon the application for renewal of license. And in any case where the applicant has failed to meet the foregoing requirements, and no action is taken by the commission on the application for renewal of license before the expiration date of the license sought to be renewed, the licensee shall cease operating in accordance with the terms of said license.

TRANSMISSION OF WEATHER REPORTS FOR GREAT LAKES

The United States Weather Bureau in this city has available for distribution Circular No. 15, Radio, April 1, 1930, which gives the names, call signals, frequencies, and hours of operation of radio stations transmitting weather information, forecasts, and warnings for the benefit of navigation on the Great Lakes.

CHANGES IN RADIO TIME-SIGNAL CODE BY UNITED STATES NAVAL RADIO STATIONS

The notice published in this bulletin for last month is incorrect in that the 56th second of the 3d minute which is also omitted was not so published. See page 22, seventh line from bottom of page.

RATIFICATIONS OF THE INTERNATIONAL RADIOTELEGRAPH CONVENTION

On February 27, 1930, Chile deposited at the Department of State its ratification dated December 18, 1929.

By note of February 12, 1930, the Free City of Danzig advised the Department of State of its adherence to the convention.

Greece deposited its ratification on April 16, 1930.

Italy, including its possessions, deposited its ratification on January 18, 1929.

TIME SIGNALS BY PERUVIAN STATIONS

Lima-El Progreso (OAZ) transmits on 85.71 kc/s. (3,500 m.), type, A1, at 1,900 G. M. T., corresponding to 1,400 S. T.

La Punta (OBE) transmits on 13,043 kc/s. (23 m.) and 250 kc/s. (1,200 m.) simultaneously at 1,900 G. M. T., corresponding to 1,400 G. M. T., daily except Sunday.

The signals consist of a series of dots sent at every second, commencing at 18h. 55m. Ols., except that the dots at the 29th second of each minute, the 55th, 56th, 57th, 58th, and 59th seconds of the first 4 minutes and the 50th, 51st, 52d, 53d, 54th, 55th, 56th, 57th, 58th, and 59th seconds of the last minute are omitted. The final signal consists of a one-second dash which commences exactly at 1,900. The signals are controlled by the astronomical clock in the time laboratory of the naval school at Peru. The error of the time signal rarely exceeds one-tenth of a second.

MEDICAL ADVICE BY SWEDISH STATIONS

The following-named stations are available for transmission of free medical advice to all ships at sea: Boden (SAI), Hernosand (SAH), Vaxholm (SAF), Karlskrona (SAA), and Gotegorg (SAB); frequency of all these stations is 454 kc/s. (660 m.).

The master of a vessel is required to send in either Swedish, English, French, or German a message giving a brief description of the illness. This message will then be forwarded to the local public hospital the doctor of which will give the necessary advice for dispatch by the radio station to the vessel concerned. No charges will be incurred for this service.

IMPROVEMENT OF TRAFFIC FACILITIES OF PORTISHEAD (BRITISH) RADIO

In order to accommodate seasonal traffic and to accelerate the service given by Portishead Radio (GKU), a fourth receiving point was brought into use on April 1, 1930. It will remain in operation until October 31st, 1930, from 1330 to 2100 G. M. T. on weekdays.

This station now has the following transmitting and receiving facilities:

No. of transmitter	Transmitting			Receiving			Hours of service, and working arrangements
	Kc/s.	Meters	Power	No. of receiver	Kc/s.	Meters	
1	149	2,013	<i>Kw.</i> 25	1	149	2,013	Open always. Calls made on the frequency of 149 kc/s.; either by GKU or by ships should be answered on the same frequency. 1230-2000 G. M. T., except Sundays. This frequency is prohibited for traffic. During the above hours calls made by ships on 143 kc/s. are answered on the same frequency, and the frequencies to be used for working traffic and for listening for replies are then arranged. 0900-2400 G. M. T. daily. During these hours calls made by ships on 125 kc/s. will be answered on 121 kc/s. The 121 kc/s. transmitter is also used in conjunction with the 143 kc/s. receiver.
2	143	2,098	10	2	143	2,098	
3	121	2,479	10	3	125	2,400	
-----	-----	-----	-----	4	(1)	(1)	1330-2100 G. M. T., except Sundays. During these hours the fourth receiver is used in conjunction with the 149 kc/s. channel, ships' frequencies being indicated by GKU.

¹ No fixed frequency.

Portishead Radio calls ships for which there is traffic on hand every alternate hour on a frequency of 149 kc/s. (2,013 m.) at 30 minutes past the hour G. M. T., that is, at 0030, 0230, 0430, etc., and assigns the frequencies on which communications will take place.

Ships must normally call Portishead Radio on the frequency of 149 kc/s. (2,013 m.) and pass traffic on the frequencies assigned. If Portishead is engaged on 149 kc/s. (2,013 m.) ships may call on other frequencies on which the station keeps watch during the hours notified above.

If the traffic demands it, a second, third, or fourth receiving point will be opened during nonpeak hours, at any time of the year.

Portishead Radio (GKT) short-wave station is open continuously for commercial traffic. Watch is maintained on 16,844 kc/s. (17.81 m.) from 1,000 to 1,500 G. M. T. and from 0000 to 1,000 and 1,500 to 2,400 G. M. T. on 8,210 kc/s. (36.54 m.).

List of Australian amateur and experimental radio stations

AUCKLAND

Call signal	Licensee	Address
ZL1AA	C. N. Edwards	7 Arnold St. Grey Lynn, Auckland.
ZL1AB	S. G. Waite	84 Marlborough Street, Dominion Road, Auckland.
ZL1AC	C. L. Button	Devonport, Auckland, 20 Tainui Road.
ZL1AD	Leys Institute	St. Marys Road, Ponsonby, Auckland.
ZL1AE	R. V. Roberts	59 Hepburn Street, Ponsonby, Auckland.
ZL1AG	F. Roberts	24 Kimberley Road, Epsom, Auckland.
ZL1AH	Messrs. Hartie and Gray	7 Alten Road, Auckland.
ZL1AJ	N. C. Shepherd	1 Norths Road, Whangarei, Auckland.
ZL1AK	W. H. Claxton	Parawai, Thames, Auckland.
ZL1AL	R. G. Bartrum	5 Russell Street, Devonport, Auckland.
ZL1AM	J. C. Isherwood	17 Clyde Street, Whangarei, Auckland.
ZL1AN	H. B. M. Arthur	24 Lawrence Street, Herne Bay, Auckland.
ZL1AO	R. G. White	9 Veronica Avenue, Mount Albert, Auckland.
ZL1AP	N. J. Winch	Broady Street, Te Awamutu, Auckland.
ZL1AQ	White Island Products (Ltd.)	Sulphur Point, Tauranga, Auckland.
ZL1AR	L. M. Mellars	18 Station Road, Remuera, Auckland.
ZL1AS	W. A. Penton	69 Grange Road, Mount Eden, Auckland.
ZL1AT	G. S. Swain	Mahoe Street, Te Awamutu, Auckland.
ZL1AV	F. C. Reardon	154A Hobson Street, Auckland.
ZL1AW	R. R. Lyons	Mangatawhiri Valley, Auckland.
ZL1AX	R. J. Orbell	10 Beaconsfield Street, Devonport, Auckland.
ZL1AY	N. S. Barnaby	51 Grange Road, Mount Eden, Auckland.
ZL1AZ	J. R. Sherson	14 Stanley Street, Claudelands, Hamilton.
ZL1BA	R. J. Taylor	2 Fremont Street, Parnell, Auckland.
ZL1BB	R. Beazley	19 Alexandra Avenue, Mount Albert, Auckland.
ZL1BC	W. E. F. Mickelborough	204 Great North Road, Grey Lynn, Auckland.
ZL1BD	W. H. Wadhwan	16 Dunkerron Avenue, Epsom, Auckland.
ZL1BE	E. K. McKay	Selwyn Road, Kohimarama, Auckland.
ZL1BF	A. L. Partelow	52 Brighton Road, Parnell, Auckland.
ZL1BG	Dr. B. G. Thompson	Sanatorium Grounds, Rotorua.
ZL1BH	A. H. Hudson	15 Mount Hobson Road, Remuera, Auckland.
ZL1BI	J. R. Turnbull	47 Beresford Street, Bayswater, Auckland.
ZL1BJ	R. M. Jackson	National Bank of New Zealand (Ltd.), Queen Street, Onehunga, Auckland.
ZL1BK	A. G. Reid	5 Marine Terrace, Bayswater, Auckland.
ZL1BL	J. S. Lynch	Ngaruawahia, Auckland.
ZL1BN	D. W. M. Tapp	Commonwealth Hotel, Rotorua.
ZL1BO	G. D. Gerken	Cape Maria Van Dieman, Auckland.
ZL1BP	J. D. Surman	3 Ashton Road, Mount Eden, Auckland.
ZL1FA	White Island Products (Ltd.)	White Island, Auckland.
ZL1FB	G. T. Guide	Hospital Hill, Opotiki, Auckland.
ZL1FC	N. G. Gulde	Hospital Hill, Opotiki, Auckland.
ZL1FD	F. R. Booth	28 Rosstrevor Street, Hamilton.
ZL1FE	A. F. Wood	P. W. Station, Waibou, Auckland.
ZL1FF	L. W. White	3 Veronica Avenue, Mount Albert, Auckland.
ZL1FG	J. Lonsdale	11 Anne Street, Devonport, Auckland.
ZL1FH	J. Steele	Linwood Earnock Avenue, Takapuna, Auckland.
ZL1FI	C. S. Goodwill	Jocelyn Street, Te Puke, Auckland.
ZL1FJ	W. J. Sexton	14 Ethel Street, Edendale, Auckland.
ZL1FK	S. M. Y. Hamlin	Mount Wellington Highway, Ellerslie, Auckland.
ZL1FM	J. E. B. Warn	Gorrie Avenue, Epsom, Auckland.
ZL1FO	E. R. Cooper	8 London Street, Ponsonby, Auckland.
ZL1FP	G. S. Anchor	8 Queen's Avenue, Frankton Junction, Auckland.
ZL1FR	L. W. Harris	103 Princess Street, Onehunga, Auckland.
ZL1FS	L. H. Dickson	3 Glory Avenue, Epsom, Auckland.
ZL1FT	N. N. Waidling	84 Hepburn Street, Ponsonby, Auckland.
ZL1FU	G. D. White	Bridge Street, Opotiki, Auckland.
ZL1FV	A. Evans	Wairoa Road, Papekura, Auckland.
ZL1FV	E. Whitely	1 Halston Road, Dominion Road, Auckland.
ZL1FX	J. H. L. Trenwith	19 Bellwood Avenue, Mount Eden, Auckland.
ZL1FY	N. C. Curtis	Whataro Northern Wairoa, Auckland.
ZL1FZ	Auckland Grammar School, (G. McB. Salt, Science Master).	Mountain Road, Mount Eden, Auckland.
ZL1XI	Auckland University College.	Princess Street, Auckland.

List of Australian amateur and experimental radio stations—Continued

WELLINGTON

Call signal	Licensee	Address
ZL2AA	A. S. Brown.....	14 Grant Street, Dannevirke.
ZL2AB	D. Wilkinson.....	Waerenga Road, Otaki.
ZL2AC	I. H. O'Meara.....	Bushmere Road, Gisborne.
ZL2AD	P. R. Stevens.....	258 Gladstone Road, Gisborne.
ZL2AE	R. J. Patty.....	55 Salisbury Road, Gisborne.
ZL2AF	W. J. Sinclair.....	Hirini Street, Gisborne.
ZL2AG	S. W. S. Strong.....	12A Parau Street, Gisborne.
ZL2AH	R. V. Roberts.....	39 Scarborough Terrace, Wellington.
ZL2AJ	V. H. Parminter.....	41 Drummond Street, Wellington.
ZL2AK	A. McD. Cooper.....	Care of M. V. "Paupa" Shell Co., Wellington.
ZL2AL	S. E. Brown.....	32 Owens Street, Wellington.
ZL2AM	W. F. Buist.....	Corner Collins and High Streets, Hawera.
ZL2AN	M. L. Weston.....	47 Barraud Street, Dannevirke.
ZL2AO	G. A. J. Burnette.....	Maip Road, Lower Hutt.
ZL2AP	J. L. Armstrong.....	Maungataniwha, Wairoa.
ZL2AQ	M. W. Coutts.....	Goldfinch Street, Taihape.
ZL2AR	A. B. McB. Rennie.....	67 Campbell Street, Wanganui.
ZL2AS	H. R. Boyle.....	370 Main Road, Karori, Wellington.
ZL2AV	R. G. Chatfield.....	42 Raroa Road, Kelburn, Wellington.
ZL2AW	C. R. Clarke.....	91 Apu Crescent, Lyall Bay, Wellington.
ZL2AX	J. V. Kyle.....	30 Waldegrave Street, Palmerston North.
ZL2AY	F. D. Bitossi.....	49 Durham Street, Wellington.
ZL2BA	F. T. Cropp.....	17 Mason Street, Lower Hutt, Wellington.
ZL2BB	J. A. Lynn.....	414 Lyndon Road, Hastings.
ZL2BC	S. H. Perry.....	89 Tiber Street, Wellington.
ZL2BE	J. C. Mills.....	311 Queen Street, Hastings.
ZL2BF	P. H. Matthews.....	The Ridgway, Mornington, Wellington.
ZL2BG	J. G. Tinney.....	74 Kainui Road, Hataitai, Wellington.
ZL2BH	W. M. Hall.....	46 Tarakaka Street, Naglo, Wellington.
ZL2BI	C. G. Liddell.....	Lyall Bay, Wellington.
ZL2BJ	A. V. Jury.....	Papawai, Greytown.
ZL2BN	S. J. Hislop.....	4 Park Road, Napier.
ZL2BO	H. C. Dixon.....	36 Devon Street, Wellington.
ZL2BP	W. N. Macklin.....	75 Waipapa Road, Hataitai, Wellington.
ZL2BR	K. A. Lambert.....	Belmont, Tayforth, Wanganui.
ZL2BT	R. A. Tanner.....	Karere Road, Longburn.
ZL2BU	J. F. Donald.....	27 Marion Street, Wellington.
ZL2BV	F. J. K. Lane.....	31 Manawatu Street, Palmerston North.
ZL2BX	R. G. Black.....	21 Karepa Street, Brooklyn, Wellington.
ZL2BY	C. T. Berry.....	20 Rata Street, Wanganui.
ZL2BZ	O. W. Gillion.....	17 Wilson Street, Hawera.
ZL2DA	L. H. Halcrow.....	2 Thane Road, Wellington.
ZL2DB	C. W. Morrison.....	27 Momo Street, Seatoun, Wellington.
ZL2DC	A. T. Mitchell.....	15 Naughton Terrace, Kilbirnie, Wellington.
ZL2DD	J. P. Boyer.....	Aubrey Street, New Plymouth.
ZL2DF	R. A. Patchett.....	Motor ship "Otokia," Wellington.
ZL2DG	C. R. H. Taylor.....	326 The Terrace, Wellington.
ZL2DI	P. R. McMahon.....	14 Marne Street, Palmerston North.
ZL2DJ	E. A. Petersen.....	Farnham Street, Mornington, Wellington.
ZL2DL	R. A. J. Carr.....	195 Sutherland Road, Lyall Bay, Wellington.
ZL2GA	J. Johnson.....	Fortunatus Street, Brooklyn, Wellington.
ZL2GC	A. Howarth.....	12 High Street, Dannevirke.
ZL2GD	B. R. Adair.....	120 Sheehan Street, Gisborne.
ZL2GE	G. E. Tyler.....	61 Vigor Brown Street, Napier.
ZL2GF	J. O. Taylor.....	248 The Terrace, Wellington.
ZL2GG	C. H. Brown.....	70 Wallace Street, Wellington.
ZL2GH	J. V. Berry.....	74 Harrison Street, Wanganui.
ZL2GI	E. L. MacGregor.....	Windsor Hill, Waipawa.
ZL2GJ	K. L. Elliott.....	92 West Street, Feilding.
ZL2GK	S. R. Perkin.....	42 Puru Crescent, Lyall Bay, Wellington.
ZL2GL	M. T. Gabriel.....	80 Gray Street, Palmerston North.
ZL2GO	H. G. G. Fownes.....	110 Riddiford Street, Wellington South.
ZL2GQ	F. I. R. Hunt.....	221 Clifford Street, Gisborne.
ZL2GR	W. S. Green.....	13 Washington Avenue, Brooklyn.
ZL2GS	H. E. H. Green.....	Clifford Road, Johnsonville.
ZL2GT	R. K. Duncan.....	6 Mount Street, Wellington.
ZL2GU	J. C. East.....	270 The Terrace, Wellington.
ZL2GV	A. R. C. Claridge.....	13 Rawhiti Street, Dannevirke.
ZL2GW	S. G. Taylor.....	Beach Road, Levin.
ZL2GX	P. A. Tipping.....	80 Hataitai Road, Wellington.
ZL2GY	L. H. Wass.....	11 King Street, Petone.
ZL2GZ	E. A. McConnell.....	551 Childers Road, Gisborne.
ZL2KA	E. A. Shrimpton.....	38 Rongotai Terrace, Wellington.
ZL2XP	W. M. Dawson.....	2 Rata Road, Wellington.
ZL2XS	Standard Telephones & Cables (Australasia) Ltd.	24-26 Ballance Street, Wellington.

List of Australian amateur and experimental radio stations—Continued

CANTERBURY

Call signal	Licensee	Address
ZL3AA	W. S. Purton.....	Waitua.
ZL3AB	L. C. Evans.....	26 Malcolm Avenue, Christchurch.
ZL3AC	Radio Society of Christchurch.	St. Asaph Street, Christchurch.
ZL3AE	R. K. Venables.....	163 Moorhouse Avenue, Christchurch.
ZL3AH	H. B. Courtis.....	25 Harper Street, Timaru.
ZL3AI	J. E. Strachan.....	High School, Rangiora, Christchurch.
ZL3AJ	R. G. F. Blake.....	Station Road, Southbrook.
ZL3AN	S. S. Edwards.....	26 Patten Street, Avonside, Christchurch.
ZL3AR	D. W. Buchanan.....	74 Wills Street, Ashburton, Christchurch.
ZL3AS	N. W. Laugeson.....	44 Hills Road, St. Albans, Christchurch.
ZL3AT	L. J. Marquet.....	20 Chichester Street, Woolston, Christchurch.
ZL3AU	H. O. Hills.....	97 White Street, Rangiora, Christchurch.
ZL3AW	R. W. Mintrom.....	Fire Brigade Station, Woolston, Christchurch.
ZL3AZ	R. J. Gibbs.....	180 Bolleston Street, Christchurch.
ZL3BA	E. B. Buckhurst, jr.....	98 Office Road, Merivale, Christchurch.
ZL3BC	J. Harrison.....	Scargill, Christchurch.
ZL3BD	J. C. East.....	326 Papanui Road, Christchurch.
ZL3BE	G. J. Lancaster.....	Boys' High School, Christchurch.
ZL3BF	E. Prince.....	78 Cobham Road, Spreydon, Christchurch.
ZL3BG	L. W. Hurrell.....	134 Fisher Street, Beckenham, Christchurch.
ZL3BH	J. F. Gabites.....	445 Marsland Road, Marshlands, Christchurch.
ZL3CB	C. R. H. Taylor.....	7 Rutland Street, St. Albans, Christchurch.
ZL3CD	G. H. S. Clarkson.....	Springfield, Christchurch.
ZL3CE	B. G. Henderson.....	100 Rugby Street, Christchurch.
ZL3CF	A. E. H. Simpson.....	99 Abberley Road, St. Albans, Christchurch.
ZL3CG	H. F. V. Brown.....	10 Merivale Lane, Christchurch.
ZL3CI	R. M. Kay.....	17 Nelson Terrace, Timaru.
ZL3CJ	A. E. S. Hanau.....	32 Beverley Road, Timaru.
ZL3CM	W. T. Toon.....	73 Cannon Street, St. Albans, Christchurch.
ZL3CN	I. A. B. More.....	48 Hackthorne Road, Christchurch.
ZL3CO	G. Seton-Kellaway.....	Waikari, Canterbury.
ZL3CP	G. W. Parton.....	69 Hackthorne Road, Christchurch.
ZL3CR	C. R. Harvey.....	30 Peterborough Street, Christchurch.
ZL3CT	J. R. Tabley.....	113 Milton Street, Spreydon, Christchurch.
ZL3CU	G. E. McCurdy.....	66 Wills Street, Ashburton, Christchurch.
ZL3CV	R. W. Sanderson.....	223 Camaron Street, Ashburton.
ZL3CX	J. D. Stewart.....	112 Alford Forest Road, Ashburton, Christchurch.
ZL3CY	W. T. Smith.....	26 Derby Street, St. Albans, Christchurch.

OTAGO

ZL4AA	F. D. Bell.....	Shag Valley Station, Waikare.
ZL4AC	R. E. Robinson.....	3 Chatham Avenue, Dunedin.
ZL4AD	A. E. Jordon.....	41 Venus Street, Invercargill.
ZL4AE	G. E. Brown.....	32 Ardwick Street, Gore.
ZL4AL	A. H. M. Grubb.....	Gore or elsewhere.
ZL4AM	W. M. Crockett.....	Tiverton Street, Palmerston.
ZL4AO	H. N. Shrimpton.....	Coneu Hill Road, Dunedin.
ZL4AP	L. R. Stroud.....	6 Heriot Row, Dunedin.
ZL4AR	W. G. Wilkinson.....	21 Melrose St., Dunedin.
ZL4AT	J. Stone.....	34 Grove Street, Dunedin.
ZL4AV	J. L. Milnes.....	39 Lees Street, Dunedin.
ZL4AX	F. P. Earland.....	33 Waverley Street, Dunedin.
ZL4AZ	T. K. S. Sidey.....	11 Constopphine Road, Caversham, Dunedin.
ZL4BA	J. G. Smith.....	7 Crosby Street, Dunedin.
ZL4BB	J. E. Brooks.....	12 Prince Albert Road, Dunedin.
ZL4BC	L. C. Bates.....	306 George Street, Dunedin and elsewhere.
ZL4BD	A. Swann.....	Botting Street, Opoho, Dunedin.
ZL4BE	N. H. Shepherd.....	81 Warden Street, Dunedin.
ZL4BG	W. C. Baird.....	6 Young Street, Dunedin.
ZL4BH	S. W. Boon.....	26 Avon Street, Oamaru.
ZL4BI	S. R. Hitchcock.....	14 Rewa Street, Dunedin.
ZL4BL	D. G. Kennedy.....	Derwent Street, Oamaru.
ZL4BM	V. G. Whiteman.....	Puysegur Point Lighthouse, Otago.
ZL4BN	H. G. Bremner.....	Port Chalmers Hotel, Port Chalmers.
ZL4BO	W. V. Macauley.....	122 Harbour Terrace, Dunedin.
ZL4BP	W. G. Collett.....	30 Calder Avenue, N.E. Valley, Dunedin.

NEW FUNDAMENTAL FREQUENCY STANDARD

The Bureau of Standards has recently installed equipment which materially advances the accuracy of the frequency standard. The new equipment comprises essentially a group of four piezo oscillators, each having the frequency 100 kilocycles. Three are alternative standards, the fourth is a reference point against which to check the others. Beats between each of the first three and the fourth are automatically counted by three telephone message registers. An automatic camera takes a picture of the counters each 1,000 seconds, from which

record the number of beats per 1,000 seconds of each standard against the reference point can be obtained. In 1,000 seconds, each oscillator makes 100,000,000 oscillations, so that variations in frequency within the group can be measured to 1 part in 100,000,000.

To obtain the absolute frequency, the output of one oscillator is fed into a submultiple generator from which currents of 10 kilocycles and 1 kilocycle may be drawn, these frequencies being as accurate as the original oscillations. The 1-kilocycle frequency drives a synchronous motor clock, which is geared to keep exact mean solar time when the input frequency is exactly 1,000 cycles.

The rate of the clock is obtained by checks with Arlington time signals. The percentage gain or loss then is numerically equal to the deviation of the oscillator from 100 kilocycles; that is, if the clock gained 1 second per day, it would be fast 1 part in 86,400, so the frequency of the piezo oscillator is 100,001.16 cycles per second.

The crystals are of 30° cut, and vibrate on a thickness frequency. They are doughnut-shaped, that shape being chosen as giving a low temperature coefficient. The temperature and atmospheric pressure in which the crystals operate are carefully regulated, as are the filament and plate voltages. Stand-by batteries take care of power failures.

Measurements show that the average short time variations of each of the crystals are less than 1 part in 10,000,000. The standard maintains an absolute value of frequency which is known to 1 part in 10,000,000.

A TUNED-REED COURSE INDICATOR FOR THE 4 AND 12 COURSE AIRCRAFT RADIO RANGE

A paper by the above title by F. W. Dunmore was published in the April issue of the Bureau of Standards Journal of Research. This gives data on the reed indicator unit which was developed for use with the 12-course radio range system described in papers in the March issue. There are three reeds in this visual indicator, each reed being tuned to one of the modulation frequencies sent out by the radio range, namely, 65, 86.7, and 108.3 cycles. A simple shutter with windows, in front of the vibrating reeds, exposes any two at a time. Further details are given in the paper, which will also be available separately as Bureau of Standards Research Paper No. 160, obtainable by purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C.

AERONAUTIC RADIOBEACON IMPROVEMENTS

Recent work by the Bureau of Standards has made improvements in the characteristics of the vibrating reed course indicator resulting in a 20 per cent increase in sensitivity and at the same time reducing the required constancy to which the modulation frequencies at the beacon station must be held. A variation of ± 0.75 per cent in these frequencies is now permissible. These improvements have been obtained through the use for the reed material of a high-permeability nickel-steel alloy, called "A" metal, rather than elinvar which was previously employed.

A small filter unit was designed permitting the simultaneous connection of the reed indicator and the head telephones in the receiving set output without materially affecting the performance of the reed indicator. This unit operates to reduce to a negligible degree the low-frequency hum heard in the ear phones when visual-type beacon signals are received. It therefore permits the pilot to wear the head-telephones while the reeds are in operation, if desired, so that when the visual range beacon is interrupted for transmitting a radiotelephone broadcast the pilot will hear the broadcast begin.

A receiving-set installation was made to permit night flights on the College Park beacon. On one night flight, made from College Park, Md., to Philadelphia, Pa., and return, no course variations were observed. The distance from College Park to Philadelphia, is 115 miles. In a number of previous tests made on the ground at Media, Pa., 105 miles from College Park, some perceptible night course variations had been obtained. At a distance of 200 miles from College Park, on the ground at Boonton, N. J., large variations have been observed, which might seriously limit the usefulness of the beacon at night at this distance. The result of the night test flight to Philadelphia appeared to show that variations in the air are less than ground tests indicate. A series of night flights are planned to secure more data on dependable distance ranges at night.