

# RADIO SERVICE BULLETIN

ISSUED MONTHLY BY RADIO DIVISION

Washington, November 30, 1928—No. 140

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## ABBREVIATIONS AND SYMBOLS

The necessary corrections to the list of Commercial and Government Radio Stations of the United States and to the International List of Radiotelegraph Stations, appearing in this bulletin under the heading "Alterations and corrections," are published after the stations affected in the following order:

- Name = Name of station.
- Loc. = Geographical location. W=west longitude. N=north latitude. S=south latitude. E=east longitude.
- Call = Call signal (letters) assigned.
- Type of wave = Classified as follows: A1=continuous wave (tube), A, arc=continuous wave, A2=interrupted continuous wave, A3=phone, B=spark.
- Range = Normal range in nautical miles.
- W. l. = Wave lengths in meters; normal wave lengths in italics.
- Fy. = Frequency in kilocycles; normal frequency in italics; wave length in meters in parentheses.
- Service = Nature of service maintained: FX=point-to-point (fixed service), PG=general public (ship to shore), PR=limited public, RC=radio compass, FA=aeronautical station, AB=aviation beacon, RF=directional radiobeacon (ship work), P=private, O=Government business exclusively.
- Hours = Hours of operation: N=continuous service, X=no regular hours, Y=sunrise to sunset.
- F. T. Co. = Federal Telegraph Co.
- I. R. T. Co. = Intercity Radio Telegraph Co.
- I. W. T. Co. = Independent Wireless Telegraph Co.
- M. R. T. Co. = Mackay Radio & Telegraph Co.
- R. C. A. = Radio Corporation of America.
- R. M. C. A. = Radiomarine Corporation of America.
- T. R. T. Co. = Tropical Radio Telegraph Co.
- C. w. = Continuous wave.
- I. c. w. = Interrupted continuous wave.
- A. c. = Alternating current.
- V. t. = Vacuum tube.
- 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, 1928, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Station controlled by—
Cedar Rapids, Iowa...	KRA	2,506 (119.7), 3,010 (99.7), 3,296 (91.2), 4,188 (71.6), 5,585 (53.7), 5,990 (50.09).	FA & FX.	X	Boeing Air Transport.
Cheyenne, Wyo.....	KOE	do	do	X	Do.
Chicago, Ill.....	WBQ	do	do	X	Do.
Des Moines, Iowa.....	KQM	do	do	X	Do.
Elko, Nev.....	KKO	do	do	X	Do.
Iowa City, Iowa.....	KQQ	do	do	X	Do.
Lincoln, Nebr.....	KRF	do	do	X	Do.
North Platte, Nebr.....	KMR	do	do	X	Do.
Oakland, Calif.....	KFO	do	do	X	Do.
Omaha, Nebr.....	KMP	do	do	X	Do.
Redding, Calif.....	KTU	do	do	X	Do.
Reno, Nev.....	KJE	do	do	X	Do.
Rock Springs, Wyo.....	KQC	do	do	X	Do.
Sacramento, Calif.....	KFM	do	do	X	Do.
Salt Lake City, Utah.....	KQD	do	do	X	Do.
Seattle, Wash.....	KZJ	do	do	X	Do.

NOTE.—Type of wave for all the above-named stations is A1 and A3.

*Commercial ship stations, alphabetically, by names of vessels*

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1928, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

Name of vessel	Call signal	Rates	Service	Hours	Owner of vessel	Station controlled by—
Arizpa.....	KULN	8	PG	X	U. S. S. B.	
Bobol <sup>1</sup> .....	KZCF	8	PG		Compania Maritima	Owner of vessel.
Colraine.....	WGDT				George P. Dehardt	Do.
Dos Hermanos <sup>2</sup> .....	KZDD	8	PG		Gutierrez Hermanos	Do.
Harvard.....	WTBY	8	PG	X	Whitman, Ward & Lee Co.	R. M. C. A.
Indian <sup>3</sup> .....	KFEK	8	PG	X	Merchants & Miners Transportation Co.	Do.
Jolo <sup>4</sup> .....	KZDL	8	PG		Compania Maritima	Owner of vessel.
Josefina <sup>5</sup> .....	KZDK	8	PG		Vicente Madrigal	Do.
Mactan <sup>6</sup> .....	KZDW	8	PG		Compania Maritima	Do.
Mariposa.....	WTBZ				George D. Rosengarten	
Mayan.....	KERM	8	PG	X	Gulf-Caribbean S. S. Line	
Niliraga.....	WGDY	8	PG	X	Gano Dunn	R. M. C. A.
Nomad.....	WHDC				Demon (Inc.)	
Palawan <sup>7</sup> .....	KZDQ	8	PG		M. S. Palawan (Inc.)	Owner of vessel.
Penguin.....	KOMJ	8	PG	X	Portland Trawling Co.	R. M. C. A.
Princeton.....	KDLU	8	PG	X	Whitman, Ward & Lee Co.	Do.
Queen of Scots.....	WGDX	8	PG	X	Anthony J. Drexel, jr.	
Quincy.....	KFEF	8	PG	X	Quincy S. S. Co.	Do.
Sea Hawk.....	WHDA	8	PG	X	J. J. Kenney	Do.
Surigao Y. <sup>7</sup> .....	KZDJ	8	PG		Vicente Madrigal	Owner of vessel.
Tern.....	KUFQ	8	PG		Portland Trawling Co.	R. M. C. A.
Ulises <sup>8</sup> .....	KZDR	8	PG		Siy Cong Bieng & Co.	Owner of vessel.
Winchester.....	WHDB	8	PG	X	Russel Alger	R. M. C. A.
Yalza.....	KDJK	8	PG	X	U. S. S. B.	

<sup>1</sup> Type of wave (system), B; fy., 500 (600).

<sup>2</sup> Type of wave (system), B; fy., 396.8 (756), 500 (600); hours, 7 a. m. to 12 noon, 1 to 6 and 7 to 10.30 p. m.

<sup>3</sup> Type of wave (system), B; fy., 375 (800), 425 (706), 500 (600).

<sup>4</sup> Type of wave (system), B; fy., 396.8 (756), 500 (600); hours, 7 a. m. to 11.30 a. m., 1 to 1.30, 3 to 5.30, and 7.30 to 10.30 p. m.

<sup>5</sup> Type of wave (system), A1 and A2; fy., 500 (600); hours, 8 to 11 a. m., 3 to 5 and 9 to 11 p. m.

<sup>6</sup> Type of wave (system), B; fy., 396.8 (756), 500 (600); hours, 7 a. m. to 12 noon, 1 to 1.30 and 7 to 10.30 p. m.

<sup>7</sup> Type of wave (system), A1 and A2; fy., 500 (600); hours, 8 to 11 a. m., 3 to 5 and 9 to 11 p. m.

Commercial land and ship stations, alphabetically, by call signals

[a, aeronautical station; b, ship station; c, coast (PG) station; f, fixed station]

Call signal	Name of station	Call signal	Name of station
KDJK	Yalza.....b	KUFQ	Tern.....b
KDLU	Princeton.....b	KULN	Arizona.....b
KERM	Mayan.....b	KZCF	Bohol.....b
KFEF	Quincy.....b	KZDD	Dos Hermanes.....b
KFEK	Indian.....b	KZDJ	Surigao Y.....b
KFM	Sacramento, Calif.....f-a	KZDK	Josefina.....b
KFO	Oakland, Calif.....f-a	KZDL	Jolo.....b
KJE	Reno, Nev.....f-a	KZDQ	Palawan.....b
KKO	Elko, Nev.....f-a	KZDR	Ulises.....b
KMP	Omaha, Nebr.....f-a	KZDW	Mactan.....b
KMR	North Platte, Nebr.....f-a	KZZJ	Seattle, Wash.....f-a
KOE	Cheyenne, Wyo.....f-a	WBQ	Chicago, Ill.....f-a
KOMJ	Penguin.....b	WGDT	Colrairie.....b
KQC	Rock Springs, Wyo.....f-a	WGDY	Niliraga.....b
KQD	Salt Lake City, Utah.....f-a	WGDZ	Queen of Scots.....b
KQM	Des Moines, Iowa.....f-a	WHDA	Sea Hawk.....b
KQQ	Iowa City, Iowa.....f-a	WHDB	Winchester.....b
KRA	Cedar Rapids, Iowa.....f-a	WHDC	Nomad.....b
KRF	Lincoln, Nebr.....f-a	WTBY	Harvard.....b
KTU	Redding, Calif.....f-a	WTBZ	Mariposa.....b

Broadcasting stations, alphabetically, by names of States and cities

[Additions to the List of Radio Stations of the United States, edition of June 30, 1928]

State and city	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)
California: Westminster (Santa Ana) <sup>1</sup> .....	KPWF	1,490 (201.3).....	.....
Colorado: Trinidad.....	KGIW	1,420 (211.3).....	100
Idaho: Sandpoint.....	KGKX	1,420 (211.3).....	15
Michigan: Calumet.....	WHDF	1,370 (219).....	100
Pennsylvania: Wilksburg (Pentownship).....	WMBJ	1,500 (200).....	100

<sup>1</sup> Construction permit issued; station not in operation for some time to come.

Broadcasting stations, alphabetically, by call signals

Call signal	Location of station (address)	Owner of station	Frequency in kilocycles, wave length <sup>1</sup> in parentheses	Power (watts)
KGIW	Trinidad, Colo.....	Trinidad Creamery Co.....	1,420 (211.3).....	100
KGKX	Sandpoint, Idaho.....	C. E. Twiss.....	1,420 (211.3).....	15
KPWF	Westminster, Calif. (Santa Ana).....	Pacific-Western Broadcasting Federation.....	1,490 (201.3).....	.....
WHDF	Calumet, Mich., 416 Eighth St.....	Charles C. MacLeod.....	1,370 (219).....	100
WMBJ	Wilksburg, Pa. (Pentownship).....	Rev. John W. Sproul.....	1,500 (200).....	100

Commercial aircraft stations, alphabetically, by names of stations

[Additions to the List of Radio Stations of the United States, edition of June 30, 1928, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Station controlled by—
C-269 <sup>1</sup> .....	KHBA	2,506 (119.71), 4,188 (71.62), 5,585 (53.71).....	P	X	Boeing Air Transport (Inc.)
C-270 <sup>1</sup> .....	KHBB	.....do.....	P	X	Do.
C-272 <sup>1</sup> .....	KHBC	.....do.....	P	X	Do.
C-273 <sup>1</sup> .....	KHBD	.....do.....	P	X	Do.
C-274 <sup>1</sup> .....	KHBE	.....do.....	P	X	Do.
C-275 <sup>1</sup> .....	KHBF	.....do.....	P	X	Do.

<sup>1</sup>Type of wave (system), A3.

## Commercial aircraft stations, alphabetically, by names of stations—Continued.

Station	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Station controlled by—
C-276 <sup>1</sup>	KHBQ	2,506 (119.71), 4,118 (71.62), 5,585 (53.71)	P	X	Boeing Air Transport (Inc.)
C-277 <sup>1</sup>	KHBH	do.	P	X	Do.
C-278 <sup>1</sup>	KHBI	do.	P	X	Do.
C-279 <sup>1</sup>	KHBJ	do.	P	X	Do.
C-281 <sup>1</sup>	KHBK	do.	P	X	Do.
C-282 <sup>1</sup>	KHBL	do.	P	X	Do.
C-283 <sup>1</sup>	KHBM	do.	P	X	Do.
C-284 <sup>1</sup>	KHBN	do.	P	X	Do.
C-285 <sup>1</sup>	KHBO	do.	P	X	Do.
C-286 <sup>1</sup>	KHBP	do.	P	X	Do.
C-287 <sup>1</sup>	KHBQ	do.	P	X	Do.
C-288 <sup>1</sup>	KHBR	do.	P	X	Do.
C-289 <sup>1</sup>	KHBS	do.	P	X	Do.
C-290 <sup>1</sup>	KHBT	do.	P	X	Do.
C-291 <sup>1</sup>	KHBU	do.	P	X	Do.
C-292 <sup>1</sup>	KHBV	do.	P	X	Do.
F-4 <sup>2</sup>	KHCA	6,470 (46.37)	P	X	Western Air Express.
F-5 <sup>2</sup>	KHCB	do.	P	X	Do.
F-6 <sup>2</sup>	KHCC	do.	P	X	Do.
F-7 <sup>2</sup>	KHCD	do.	P	X	Do.
F-8 <sup>2</sup>	KHCE	do.	P	X	Do.
F-9 <sup>2</sup>	KHCF	do.	P	X	Do.
F-10 <sup>2</sup>	KHCG	do.	P	X	Do.
F-11 <sup>2</sup>	KHCH	do.	P	X	Do.
F-12 <sup>2</sup>	KHCI	do.	P	X	Do.
F-14 <sup>2</sup>	KHCJ	do.	P	X	Do.
NX3903 <sup>3</sup>	KDZ	9,130 (32.86)	P	X	Carl B. Eielson (George H. Wilkins).
X7439 <sup>3</sup>	KDY	do.	P	X	Do.

<sup>1</sup> Type of wave (system), A3.    <sup>2</sup> Type of wave (system), A2.    <sup>3</sup> Type of wave (system), A1.

## Commercial aircraft stations, alphabetically, by call signals

Call signal	Name of station	Call signal	Name of station
KDY	X7439.	KHBP	C-286.
KDZ	NX3903.	KHBQ	C-287.
KHBA	C-269.	KHBR	C-288.
KHBB	C-270.	KHBS	C-289.
KHBC	C-272.	KHBT	C-290.
KHBD	C-273.	KHBU	C-291.
KHBE	C-274.	KHBV	C-292.
KHBF	C-275.	KHCA	F-4.
KHBG	C-276.	KHCB	F-5.
KHBH	C-277.	KHCC	F-6.
KHBI	C-278.	KHCD	F-7.
KHBJ	C-279.	KHCE	F-8.
KHBK	C-281.	KHCF	F-9.
KHBL	C-282.	KHCG	F-10.
KHBM	C-283.	KHCH	F-11.
KHBN	C-284.	KHCI	F-12.
KHBO	C-285.	KHCJ	F-14.

## Government ship stations, alphabetically, by names of stations

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1928, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Station controlled by—
Barnard <sup>1</sup> , West Mem- phis. <sup>1</sup>	WYDG WYCJ	429 (700) 429 (700)	O O	Y Y	U. S. Army. Do.

<sup>1</sup> Type of wave (system), A1.

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

[a, aeronautical station; b, ship station; c, coast (PG) station; f, fixed station]

Call signal	Name of station	Call signal	Name of station
WYCJ	West Memphis.....b	WYDG	Barnard.....b

*Special stations, alphabetically, by names of stations*

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1928]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)	Station controlled by—
<i>Aircraft</i>				
NC-8000.....	W4XP	2,320 (129.3).....	10	R. C. A.

*Special stations, grouped by districts*

Call signal	District and station	Call signal	District and station
W4XP	Fourth district: NC-8000 (aircraft).		

RADIOBEACON STATIONS

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1928, and to the International List of Radiotelegraph Stations published by the Berne bureau]

POINT ARENA LIGHT STATION, CALIF.—Lat. 38° 57' 19" N., 123° 44' 24" W. Transmits groups of 2 dashes and 1 dot; thus:

— — • — — • etc.  
 60 seconds
 

          
 Silent  
 120 seconds

Transmits continuously during thick or foggy weather and daily in clear weather from 9.30 to 10 a. m. and from 3.30 to 4 p. m. and during the third 15 minutes of each hour from 6.30 p. m. to 6.45 a. m. on 300 kilocycles (1,000 meters).

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, 1928, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

- CLEARWATER, CALIF. (LOS ANGELES, KNR).—Fy., 55.36 (5,416), 79.32 (3,780), 92.76 (3,232), 6,100 (49.15), 10,160 (29.5).
- FRESNO, CALIF. (KGT).—Type of wave (system), A1 and A3; fy. 2,506 (119.7), 3,010 (99.7), 3,286 (91.2), 4,188 (71.6), 5,585 (53.7), 5,990 (50.08); service. FA and FX; hours, X; station controlled by Boeing Air Transport.
- HILLSBORO, OREG. (PORTLAND, KEK).—Loc. (approximately) 122° 59' 00" W., 45° 31' 00" N.
- HILLSBORO, OREG. (PORTLAND, KGH).—Type of wave (system), A, arc and A2; fy., 34.5 (8,696), 47.5 (6,316), 71.26 (4,207), 6,380 (46.99), 8,210 (36.52).
- LANSING, ILL.—Loc. (approximately) 88° 31' 50" W., 41° 32' 30" N.
- LOS ANGELES, CALIF. (KEU).—Type of wave (system), A1 and A3; fy., 2,506 (119.7), 3,010 (99.7), 3,286 (91.2), 4,188 (71.6), 5,585 (53.7), 5,990 (50.08); service, FA and FX; hours, X; station controlled by Boeing Air Transport.

- MEDFORD, OREG.—Type of wave (system), A1 and A3; fy., 2,506 (119.7), 3,010 (99.7), 3,286 (91.2), 4,188 (71.6), 5,585 (53.7), 5,990 (50.08); service, FA and FX; hours, X; station controlled by Boeing Air Transport.
- NEW YORK, N. Y. (WPN).—Fy., 8,425 (35.61), 11,350 (26.43), 16,850 (17.8).
- PALO ALTO, CALIF. (KFS).—Fy., add 5,533 (54.22), 11,046 (27.16).
- POINT ARMSTRONG, ALASKA.—Change to read Port Armstrong, Alaska.
- PORTLAND, OREG. (KKB).—Fy., strike out 15.88 meters, add 17.762 meters.
- ROCKY POINT, N. Y. (WKO-WQO).—Disregard previous notice regarding change of call in Radio Service Bulletin No. 135—two distinct stations—particulars are as follows: WKO.—Loc. (approximately), 72° 56' 30" W., 40° 55' 45" N.; type of wave (system), A1; fy., 15,970 (18.785); service, FX; hours, N; station controlled by R. C. A.; WKQ.—Loc. (approximately) 72° 56' 30" W., 40° 55' 45" N.; type of wave (system), A1; fy., 16,000 (18.75); service, FX; hours, N; station controlled by R. C. A.
- SAN FRANCISCO, Calif. (KTK).—Fy., strike out 15.88 meters, add 17.762 meters.
- SAN PEDRO, CALIF. (KMY).—Fy., 5,800 (51.72).
- SEATTLE, WASH. (KPA).—Fy., strike out 50.82 meters, add 50.85 meters.
- SEATTLE, WASH. (KSA).—Fy., strike out 15.88 meters, add 17.62 meters.
- Strike out all particulars of the following-named stations: Bakersfield, and Palo Alto, Calif. (KPK).

#### 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, 1928, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

- CATHLAMET.—Owner, American-West African Line.
- CHILORE.—Owner, Ore S. S. Corporation.
- CITY OF NEW YORK.—Rates, 8 cents per word.
- CLONTARF.—Name changed to Exermont.
- COMMERCIAL QUAKER.—Owner, Commercial Pioneer S. S. Co.
- CORSON.—Name changed to Exiria.
- GEMMA.—Service, PG; hours, X; rates, 8 cents per word; station controlled by R. M. C. A.
- HOLY CROSS.—Owner, Trawler Holy Cross (Inc.).
- IOLANDA.—Type of wave (system), A1 and B; fy., 375 (800), 425 (706), 500 (600); service, PG; hours, N; owner, Edith Bishop Taylor; station controlled by owner of vessel.
- JOSEPHINE.—Owner, Uzal H. McCarter.
- LAKE TREBA.—Owner, Lake Treba Transportation Co.
- LIBERTY GLO.—Owner, South Atlantic S. S. Co.
- LURLINE.—Owner, Alaska Packers Association.
- MAGMERIC.—Owner, South Atlantic S. S. Co.
- MARORE.—Owner, Ore S. S. Corporation.
- NAAMHOK.—Name changed to Exarch; owner, Export S. S. Corporation; station controlled by R. M. C. A.
- NOBLES.—Name changed to Exmoor.
- SANGAMON.—Name changed to Exton.
- SANTA LUISA.—Name changed to El Salvador.
- SEABORN.—Type of wave (system), A1 and B; fy., 125 (2,400), 137 (2,190), 141 (2,128), 143 (2,098), 151 (1,987), 160 (1,875), 375 (800), 425 (706), 500 (600); service, PG; rates, 8 cents per word; station controlled by owner of vessel.
- SIERRA (WKCM).—Owner, Arctic Transport Co.
- SINSINAWA.—Name changed to Examiner.
- VIRGINIA (WSBW).—Station controlled by R. M. C. A.
- WEST IRMO.—Owner, American-West African Line.
- WEST KEDRON.—Owner, American-West African Line.
- WEST MINGO.—Owner, California & Eastern S. S. Co.
- YALE.—Service, PG; hours, X; rates, 8 cents per word; station controlled by R. M. C. A.

The following named vessels are no longer controlled by the Intercity Radio Telegraph Co.: *A. A. Augustus, A. E. R. Schneider, Amazon, Angeline, Bethlehem, Cadillac, Cambria, Charles L. Hutchinson, Chippewa, City of Buffalo, City of Erie, Cletus Schneider, Colonel, Daniel J. Morrell, David P. Thompson, D. E. Callender, Edward J. Berwind, Edward Y. Townsend, E. G. Mathiott, Emory L. Ford, Fontana, Frank Billings, Frank Seither, Frontenac, G. A. Tomlinson, Goodtime, Grand Island, Ishpeming, James E. Ferris, James Mac-*

*Naughton, James P. Walsh, J. E. Savage, J. H. Sheadle, John A. Donaldson, John Anderson, John McCartney Kennedy, John S. Manuel, Joseph G. Butler, jr., Lackawanna, Lebanon, L. E. Block, Lehigh (WCDN), Marquette, Martin Mullen, Maryland, Michael Gallagher, Michigan (KFLN), M. J. Bartelme, Munising, Negaunee, Peter White, Philip D. Block, Pioneer (KFMK), Pontiac, Presque Isle, Robert J. Paisley, Sandmaster, Saucun, S. B. Coolidge, S. B. Way, Seandbee, Senator, Sonora, Steelton, Sulphite, W. D. Calverly, jr., W. G. Pollock, W. H. McGean, William A. Paine, William C. Atwater, William G. Mather, William Nelson, Yosemite.*

Strike out all particulars of the following named stations: Chantier, Levisa.

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

KDC, read, Casper, Wyo.; KDNE, read Exarch; KIH, read Skellytown, Tex.; KIQV, read Exiria; KIV, read Puerto Princesa, P. I. (Palawan); KJEU, read El Salvador; KJF, correct call KJP; KODB, read Exmoor; KOJD, read Examiner; KSE, read Torrance, Calif. (Los Angeles); KUD, read Bacharof, Alaska; KUDP, read Exermont; WJAA, read Exton; strike out all particulars following the call signals KDAL, KEGK, KKA, KWV, KRK.

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

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1928, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

C-268.—Type of wave (system), A3; fy., 2,506 (119.71), 4,188 (71.62), 5,585 (53.71); hours, X.  
 C-4458.—Type of wave (system), A2; fy., 6,470 (46.37); service, P; hours, X.  
 C-5170.—Type of wave (system), A2; fy., 6,470 (46.37); service, P; hours, X.  
 C-5358.—Type of wave (system), A2; fy., 6,470 (46.37); service, P; hours, X.

#### 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, 1928]

KDKA (East Pittsburgh, Pa.).—Power: Normally, 25,000; experimentally, 50,000.  
 KDLR (Devils Lake, N. Dak.).—Power, 100.  
 KEX (Portland, Oreg.).—Power, 5,000.  
 KFBB (Havre, Mont.).—Power, 250 night, 500 day; owner, Buttrey Broadcast (Inc.); fy., 1,360 (220.6).  
 KFBL (Everett, Wash.).—Fy., 1,370 (219).  
 KFCB (Phoenix, Ariz.).—Power, 100.  
 KFDM (Beaumont, Tex.).—Fy., 560 (536).  
 KFEL (Denver, Colo.).—Fy., 940 (319).  
 KFEQ (St. Joseph, Mo.).—Power, 2,000; fy., 560 (536); daytime only.  
 KFEY (Kellogg, Idaho).—Fy., 1,210 (247.9).  
 KFGQ (Boone, Iowa).—Power, 100.  
 KFH (Wichita, Kans.).—Power, 1,000.  
 KFIO (Spokane, Wash.).—Fy., 1,230 (243.9); daytime only.  
 KFJB (Marshalltown, Iowa).—Power, 100.  
 KFJF (Oklahoma City, Okla.).—Power, 1,000.  
 KFJZ (Fort Worth, Tex.).—Power, 100.  
 KFKA (Greeley, Colo.).—Power, 500; fy. 880 (341).  
 KFKB (Milford, Kans.).—Power, 5,000.  
 KFKU (Lawrence, Kans.).—Fy., 1,220 (245.9).  
 KFKX (Chicago, Ill.).—Power, 5,000; fy., 1,020 (294.1).  
 KFKZ (Kirksville, Mo.).—Fy., 1,200 (250).  
 KFLV (Rockford, Ill.).—Owner, A. T. Frykman.  
 KFLX (Galveston, Tex.).—Fy., 1,370 (219).  
 KFMX (Northfield, Minn.).—Fy., 1,250 (240).  
 KFNF (Shenandoah, Iowa).—Power, 500 night, 1,000 day.  
 KFOA (Seattle, Wash.).—Fy., 1,270 (236.2).  
 KFPL (Dublin, Tex.).—Fy., 1,310 (229).  
 KFPY (Spokane, Wash.).—Fy., 1,390 (215.8).  
 KFQD (Anchorage, Alaska).—Fy., 1,230 (243.9).  
 KFQU (Holy City (Alma), Calif.).—Fy., 1,420 (211.3).  
 KFSD (San Diego, Calif.).—Power, 500 night, 1,000 day.

- KFUM (Colorado Springs, Colo.)—Fy., 1,270 (236.2).  
 KFUO (Clayton, Mo.)—Power, 500.  
 KFUP (Denver, Colo.)—Fy., 1,310 (229).  
 KFUR (Ogden, Utah.)—Fy., 1,370 (219).  
 KFVS (Cape Girardeau, Mo.)—Power, 100.  
 KFWM (Oakland, Calif.)—Power, 500.  
 KFWO (Avalon, Calif.)—Power, 100.  
 KFXD (Jerome, Idaho.)—Power, 50.  
 KFXF (Denver, Colo.)—Fy., 940 (319).  
 KFXJ (Edgewater, Colo.)—Fy., 1,310 (229).  
 KFXR (Oklahoma City, Okla.)—Power, 100.  
 KFYO (Abilene, Tex.)—Changed to Breckenridge, Tex.  
 KFYR (Bismark, N. Dak.)—Power, 500.  
 KGA (Spokane, Wash.)—Power, 5,000.  
 KGB (San Diego, Calif.)—Fy., 1,360 (2206).  
 KGBU (Ketchikan, Alaska.)—Fy., 900 (333).  
 KGBX (St. Joseph, Mo.)—Fy., 1,370 (219).  
 KGBZ (York, Nebr.)—Owner, Dr. George R. Miller; power, 500 night, 1,000 day.  
 KGCA (Decorah, Iowa.)—Power, 50, daytime only.  
 KGCB (Oklahoma City, Okla.)—Changed to Enid, Okla.; fy., 1,370 (219).  
 KGCC (Vida, Mont.)—Fy., 1,420 (211.3).  
 KGDA (Dell Rapids, S. Dak.)—Fy., 1,370 (219).  
 KGDR (San Antonio, Tex.)—Power, 15.  
 KGEN (El Centro, Calif.)—Call changed to KXO.  
 KGEW (Fort Morgan, Colo.)—Power, 100.  
 KGFG (Oklahoma City, Okla.)—Owner, Faith Tabernacle Association.  
 KGGF (Picher, Okla.)—Power, 100; fy., 1,010 (297).  
 KGGH (Cedar Grove, La.)—Fy., 1,310 (229).  
 KGGM (Albuquerque, N. Mex.)—Fy., 1,370 (219).  
 KGHG (McGehee, Ark.)—Fy., 1,310 (229).  
 KGLH (Billings, Mont.)—Power, 500.  
 KGJF (Little Rock, Ark.)—Fy., 890 (337).  
 KGKB (Goldthwaite, Tex.)—Power, 50.  
 KGKL (Georgetown, Tex.)—Change to San Angelo, Tex.; owner, KGKL (Inc.).  
 KGKO (Wichita Falls, Tex.)—Owner, Wichita Falls Broadcasting Co.; fy., 570 (526).  
 KGO (Oakland, Calif.)—Power, 7,500.  
 KGRC (San Antonio, Tex.)—Owner, Eugene J. Roth; fy., 1,370 (219).  
 KGRS (Amarillo, Tex.)—Power, 1,000.  
 KGTT (San Francisco, Calif.)—Fy., 1,420 (211.3).  
 KGU (Honolulu, Hawaii.)—Power, 500.  
 KGW (Portland, Oreg.)—Fy., 620 (484).  
 KGY (Lacey, Wash.)—Power, 10 night, 50 day; fy., 1,200 (250).  
 KHQ (Spokane, Wash.)—Fy., 590 (509).  
 KICK (Red Oak, Iowa.)—Fy., 1,420 (211.3).  
 KJBS (San Francisco, Calif.)—Fy., 1,100 (272.7), day only.  
 KJR (Seattle, Wash.)—Power, 5,000.  
 KKP (Seattle, Wash.)—Fy., 1,370 (219).  
 KLCN (Blytheville, Ark.)—Owner, C. L. Lintzenich.  
 KLDS (Independence, Mo.)—Power, 1,000 night, 2,500 day.  
 KLRA (Little Rock, Ark.)—Fy., 1,390 (215.8).  
 KLS (Oakland, Calif.)—Fy., 1,440 (208.3), day only.  
 KLX (Oakland, Calif.)—Fy., 880 (341).  
 KMA (Shenandoah, Iowa.)—Power, 500.  
 KMBC (Independence, Mo.)—Power, 1,000 night, 2,500 day.  
 KMJ (Fresno, Calif.)—Power, 100.  
 KMMJ (Clay Center, Nebr.)—Power, 1,000.  
 KNRC (Santa Monica, Calif.)—Call changed to KTM.  
 KOA (Denver, Colo.)—Power, 12,500.  
 KOAC (Corvallis, Oreg.)—Fy., 560 (536).  
 KOB (State College, N. Mex.)—Power, 10,000.  
 KOCW (Chickasha, Okla.)—Power, 100.  
 KOIL (Council Bluffs, Iowa.)—Power, 1,000.  
 KOMO (Seattle, Wash.)—Fy., 920 (326).  
 KORE (Eugene, Oreg.)—Power, 100.  
 KOW (Denver, Colo.—near)—Owner, Associated Industries (Inc.); power, 500.  
 KPLA (Los Angeles, Calif.)—Power, 1,000.



- KPO (San Francisco, Calif.)—Power, 5,000.  
 KPOF (Bellevue College, Colo.)—Fy., 880 (341).  
 KPRC (Houston, Tex.)—Fy., 920 (326).  
 KRE (Berkeley, Calif.)—Fy., 1,370 (219).  
 KRGV (Harlingen, Tex.)—Fy., 1,260 (238.1).  
 KRLD (Dallas, Tex.)—Owner, KRLD Radio Corporation.  
 KRMD (Shreveport, La.)—Fy., 1,310 (229).  
 KSAC (Manhattan, Kans.)—Fy., 580 (517).  
 KSCJ (Sioux City, Iowa.)—Power, 1,000.  
 KSL (Salt Lake City, Utah.)—Power, 5,000.  
 KSOO (Sioux Falls, S. Dak.)—Power, 500; fy., 1,110 (270.3).  
 KSTP (Westcott, Minn.)—Power, 10,000.  
 KTAB (Oakland, Calif.)—Fy., 1,280 (234.4).  
 KTAP (San Antonio, Tex.)—Power, 100; fy., 1,420 (211.3).  
 KTNT (Muscatine, Iowa.)—Power, 5,000.  
 KTSA (San Antonio, Tex.)—Owner, Lone Star Broadcast Co.; power, 1,000  
 night, 2,000 day.  
 KTUE (Houston, Tex.)—Fy., 1,420 (211.3).  
 KWV (Seattle, Wash.)—Fy., 1,270 (236.2).  
 KUOA (Fayetteville, Ark.)—Fy., 1,390 (215.8).  
 KUOM (Missoula, Mont.)—Fy., 570 (526).  
 KUSD (Vermillion, S. Dak.)—Power, 500.  
 KVL (Seattle, Wash.)—Fy., 1,370 (219).  
 KVOO (Bristow, Okla.)—Change to Tulsa, Okla.—near; fy., 1,140 (263.2).  
 KVOB (Bellingham, Wash.)—Power, 100; fy., 1,200 (250).  
 KWEA (Shreveport, La.)—Power, 100; fy., 1,210 (247.9).  
 KWG (Stockton, Calif.)—Fy., 1,200 (250).  
 KWJJ (Portland, Oreg.)—Power, 500; fy., 1,060 (283).  
 KWK (St. Louis, Mo.)—Power, 1,000.  
 KWKH (Kennonwood, La.)—Power, 5,000.  
 KWSC (Pullman, Wash.)—Fy., 1,390 (215.8).  
 KWWG (Brownsville, Tex.)—Fy., 1,260 (238.1).  
 KXL (Portland, Oreg.)—Power, 500.  
 KXRO (Aberdeen, Wash.)—Fy., 1,420 (211.3).  
 KYA (San Francisco, Calif.)—Fy., 1,230 (243.9).  
 KYW (Chicago, Ill.)—Power, 5,000; fy., 1,020 (294.1).  
 WAAD (Cincinnati, Ohio.)—Fy., 1,420 (211.3).  
 WAAF (Chicago, Ill.)—Fy., 920 (326), daytime only.  
 WAAM (Newark, N. J.)—Power, 500.  
 WAAT (Jersey City, N. J.)—Fy., 1,070 (280.4), daytime only.  
 WABC (Richmond Hill, N. Y.)—Consolidated with WBOQ, New York, N. Y.  
 WABO (Rochester, N. Y.)—Power, 500.  
 WADC (Akron, Ohio.)—Fy., 1,320 (227.3).  
 WAFD (Detroit, Mich.)—Fy., 1,500 (200).  
 WAIU (Columbus, Ohio—near.)—Power, 500.  
 WBBC (Brooklyn, N. Y.)—Power, 250; fy., 1,400 (214.3).  
 WBBM (Glenview, Ill.)—Owner, Atlas Co.; power, 10,000.  
 WBCN (Chicago, Ill.)—Power, 5,000.  
 WBET (Medford, Mass.)—Fy., 1,360 (220.6).  
 WBNY (New York, N. Y.)—Power, 250.  
 WBOQ (New York, N. Y.)—Consolidated with WABC (Richmond Hill, N. Y.).  
 WCAD (Canton, N. Y.)—Power, 500, daytime only.  
 WCAE (Pittsburgh, Pa.)—Fy., 1,220 (245.9).  
 WCAH (Columbus, Ohio.)—Fy., 1,430 (209.8).  
 WCAL (Northfield, Minn.)—Power, 1,000; fy., 1,250 (240).  
 WCBD (Zion, Ill.)—Fy., 1,080 (277.8).  
 WCBM (Baltimore, Md.)—Owner, Baltimore Broadcasting Corporation.  
 WCBS (Springfield, Ill.)—Power, 100.  
 WCCO (Anoka-Minneapolis-St. Paul, Minn.)—Power, 7,500.  
 WCFL (Chicago, Ill.)—Fy., 970 (309).  
 WCLS (Joliet, Ill.)—Owner, WCLS (Inc.).  
 WCOH (Greenville, N. Y.)—Power, 100.  
 WCWK (Fort Wayne, Ind.)—Call changed to WGL; owner, Allen-Wayne Co.;  
 power, 500; fy., 1,230 (243.9).  
 WCX (Pontiac, Mich.)—Owner, WJR (Inc.).  
 WDAE (Tampa, Fla.)—Power, 1,000.  
 WDAY (Fargo, N. Dak.)—Power, 500.

- WDBO (Orlando, Fla.).—Power, 1,000.  
 WDEL (Wilmington, Del.).—Fy., 1,410 (212.8).  
 WDGY (Minneapolis, Minn.).—Power, 500 night, 1,000 day.  
 WDSU (New Orleans, La.).—Power, 1,000.  
 WDWL (Cranston, R. I.).—Power, 100.  
 WEAJ (Bellmore, N. Y.—New York City).—Power, 25,000 normally, 50,000 experimentally.  
 WEAM (North Plainfield, N. J.).—Owner, W. J. Buttfield; fy., 1,370 (219).  
 WEAN (Providence, R. I.).—Power, 250; fy., 550 (545).  
 WEAO (Columbus, Ohio).—Fy., 550 (545).  
 WEBC (Superior, Wis.).—Power, 1,000.  
 WEBR (Buffalo, N. Y.).—Power, 100.  
 WEBW (Beloit, Wis.).—Power, 350, daytime only.  
 WEMC (Berrien Springs, Mich.).—Fy., 590 (509), daytime only.  
 WENR (Chicago, Ill.).—Power, 5,000.  
 WFAA (Dallas, Tex.).—Owner, Dallas News and Dallas Journal.  
 WFBE (Cincinnati, Ohio).—Power, 100.  
 WFBL (Syracuse, N. Y.).—Operates on 900 (333), power, 750 and 1,490 (201.3); power, 1,000.  
 WFBM (Indianapolis, Ind.).—Operates on 1,050 kc. (285.7 m.), power, 1,000 and 1,230 kc. (243.9 m.); power, 500.  
 WFBR (Baltimore, Md.).—Power, 250.  
 WFCI (Pawtucket, R. I.).—Call changed to WPAW; fy., 1,210 (247.9).  
 WFJC (Akron, Ohio).—Fy., 1,450 (206.9).  
 WFLA (Clearwater, Fla.).—Fy., 900 (333).  
 WGBB (Freeport, N. Y.).—Power, 100.  
 WGBF (Evansville, Ind.).—Power, 500.  
 WGBS (Astoria, N. Y.).—Owner, General Broadcasting System (Inc.).  
 WGCM (Gulfport, Miss.).—Fy., 1,210 (247.9); power, 100.  
 WGHP (Fraser, Mich.—near).—Owner, American Broadcasting Corporation; fy., 1,240 (241.9).  
 WGMS (Minneapolis, Minn.).—Fy., 1,250 (240).  
 WGN (Elgin, Ill.—Chicago).—Power, 25,000.  
 WGR (Buffalo, N. Y.).—Power, 1,000.  
 WGST (Atlanta, Ga.).—Power, 250 night, 500 day.  
 WHAD (Milwaukee, Wis.).—Power, 250.  
 WHAS (Louisville, Ky.).—Fy., 820 (366); power, 5,000.  
 WHB (Kansas City, Mo.).—Power, 1,000.  
 WHBL (Sheboygan, Wis.).—Power, 500; fy., 1,410 (212.8).  
 WHBP (Johnstown, Pa.).—Power, 100.  
 WHBU (Anderson, Ind.).—Power, 15.  
 WHBY (West De Pere, Wis.).—Power, 100.  
 WHEC (Rochester, N. Y.).—Power, 500.  
 WHFC (Chicago, Ill.).—Power, 100.  
 WHK (Cleveland, Ohio).—Power, 1,000.  
 WHN (New York, N. Y.).—Power, 250.  
 WHO (Des Moines, Iowa).—Fy., 1,000 (300).  
 WIAD (Philadelphia, Pa.).—Call changed to WELK; fy., 1,370 (219).  
 WIAS (Ottumwa, Iowa).—Fy., 1,420 (211.3).  
 WIBO (Desplains, Ill.).—Power, 1,000 night, 1,500 day; fy., 570 (526).  
 WIBR (Steubenville, Ohio).—Fy., 1,420 (211.3).  
 WIBU (Poynette, Wis.).—Owner, William C. Forrest; power, 100.  
 WIBW (Topeka, Kans.).—Power, 1,000.  
 WIBX (Utica, N. Y.).—Power, 100 night, 300 day; fy., 1,200 (250).  
 WIL (St. Louis, Mo.).—Power, 100; fy., 1,420 (211.3).  
 WILL (Urbana, Ill.).—Power, 250 night, 500 day; fy., 890 (337).  
 WINR (Bay Shore, N. Y.).—Power, 100.  
 WISN (Milwaukee, Wis.).—Owner, Evening Wisconsin Co.  
 WJAD (Waco, Tex.).—Power, 1,000.  
 WJAG (Norfolk, Nebr.).—Fy., 1,060 (283); power, 500.  
 WJAM (Waterloo, Iowa).—Call changed to WMT; power, 100 night, 250 day.  
 WJAR (Providence, R. I.).—Power, 250.  
 WJAS (Pittsburgh, Pa.).—Power, 1,000.  
 WJAX (Jacksonville, Fla.).—Fy., 1,260 (238.1).  
 WJAY (Cleveland, Ohio).—Fy., 1,450 (206.9).  
 WJBB (Sarasota, Fla.).—Call changed to WSIS; owner, Sarasota County Chamber of Commerce; fy., 1,010 (297).  
 WJBL (Decatur, Ill.).—Power, 100.

- WJBT (Glenview, Ill.-Chicago).—Owner, Atlass Co.; power, 10,000.  
 WJJD (Mooseheart, Ill.).—Power, 20,000; fy., 1,180 (254.2).  
 WJKS (Gary, Ind.).—Power, 500 night, 1,250 day.  
 WJR (Pontiac, Mich.).—Owner, WJR (Inc.).  
 WJSV (Mount Vernon Hills, Va.).—Fy., 1,460 (205.5).  
 WJZ (Bound Brook, N. J.-New York City).—Power, 25,000 normally, 30,000 experimentally.  
 WKAR (East Lansing, Mich.).—Power, 500, daytime only.  
 WKAU (Laconia, N. H.).—Power, 100.  
 WKBN (Youngstown, Ohio).—Fy., 570 (526).  
 WKBZ (Ludington, Mich.).—Power, 50.  
 WKEN (Grand Island, N. Y.).—Power, 1,000; fy., 1,040 (288.5).  
 WKJC (Lancaster, Pa.).—Power, 100; fy., 1,200 (250).  
 WLAC (Nashville, Tenn.).—Owner, Life & Casualty Insurance Co.; power, 5,000; strike-out call WDAD, as Dad's Auto Accessories (Inc.) no longer is joint licensee.  
 WLB (Minneapolis, Minn.).—Fy., 1,250 (240).  
 WLBK (Kansas City, Kans.).—Power, 100; fy., 1,420 (211.3).  
 WLBL (Stevens Point, Wis.).—Power, 2,000, daytime only.  
 WLEX (Lexington, Mass.).—Power, 100.  
 WLIB (Elgin, Ill.-Chicago).—Power, 25,000.  
 WLS (Crete, Ill.-Chicago).—Owner, Agricultural Broadcasting Co.  
 WLSI (Cranston, R. I.).—Power, 100.  
 WLW (Harrison, Ohio).—Changed to Mason, Ohio; power, 25,000 normally, 50,000 experimentally.  
 WMAC (Cazenovia, N. Y.).—Power, 250; fy., 570 (526).  
 WMAF (South Dartmouth, Mass.).—Fy., 1,360 (220.6).  
 WMAK (Martinsville, N. Y.).—Owner, WMAK Broadcasting System (Inc.).  
 WMAL (Washington, D. C.).—Power, 250.  
 WMAZ (Macon, Ga.).—Power, 250 night, 500 day.  
 WMBG (Richmond, Va.).—Power, 100.  
 WMBH (Joplin, Mo.).—Power, 100 night, 250 day; fy., 1,420 (211.3).  
 WMBI (Addison, Ill.).—Fy., 1,080 (277.8).  
 WMBS (Lemoyne, Pa.).—Power, 500.  
 WMC (Memphis, Tenn.).—Power, 500.  
 WMPC (Lapeer, Mich.).—Fy., 1,500 (200).  
 WMSG (New York, N. Y.).—Power, 250.  
 WNAD (Norman, Okla.).—Fy., 1,010 (297).  
 WNAX (Yankton, S. Dak.).—Fy., 570 (526).  
 WNBH (New Bedford, Mass.).—Power, 100; fy., 1,310 (229).  
 WNEW (Newport News, Va.).—Call changed to WGH; owner, Virginia Broadcasting Co.; fy., 1,310 (229).  
 WOAN (Lawrenceburg, Tenn.).—Owner, James D. Vaughan.  
 WOC (Davenport, Iowa).—Fy., 1,000 (300).  
 WOI (Ames, Iowa).—Power, 3,500; fy., 560 (536), daytime only.  
 WOL (Washington, D. C.).—Power, 100; fy., 1,310 (229).  
 WOQ (Kansas City, Mo.).—Power, 1,000.  
 WOWO (Fort Wayne, Ind.).—Power, 5,000.  
 WPAP (Cliffside, N. J.).—Power, 250.  
 WPCC (Chicago, Ill.).—Fy., 570 (526).  
 WPTF (Raleigh, N. C.).—Fy., 680 (441).  
 WQAO (Cliffside, N. J.).—Power, 250.  
 WQBC (Utica, Miss.).—Power, 300; fy., 1,360 (220.6).  
 WQBZ (Weirton, W. Va.).—Fy., 1,420 (211.3).  
 WRAK (Erie, Pa.).—Power, 50.  
 WRBC (Valparaiso, Ind.).—Power, 500, daytime only.  
 WRBQ (Greenville, Miss.).—Fy., 1,210 (247.9).  
 WRBU (Gastonia, N. C.).—Power, 100.  
 WREN (Lawrence, Kans.).—Power, 1,000; fy., 1,220 (245.9).  
 WRHM (Fridley, Minn.).—Fy., 1,250 (240).  
 WRJN (Racine, Wis.).—Power, 100; fy., 1,370 (219).  
 WRK (Hamilton, Ohio).—Fy., 1,310 (229).  
 WRNY (Coytesville, N. J.).—Power, 250.  
 WRR (Dallas, Tex.).—Fy., 1,280 (234.4).  
 WSAI (Mason, Ohio-Cincinnati).—Fy., 800 (375).  
 WSAJ (Grove City, Pa.).—Power, 100.  
 WSBT (South Bend, Ind.).—Fy., 1,230 (243.9).  
 WSKC (Bay City, Mich.).—Call changed to WBCM.

WSPD (Toledo, Ohio).—Fy., 1,340 (223.9).  
 WSUI (Iowa City, Iowa).—Fy., 580 (517).  
 WSUN (St. Petersburg, Fla.).—Fy., 900 (333).  
 WSYR (Syracuse, N. Y.).—Power, 250; fy., 570 (526).  
 WTAD (Quincy, Ill.).—Power, 500.  
 WTAM (Cleveland, Ohio).—Power, 3,500.  
 WTAQ (Eau Claire, Wis.).—Changed to Washington, Wis.; power, 1,000.  
 WTBQ (Wilmington, Del.).—Fy., 1,500 (200).  
 WTIC (Hartford, Conn.).—Owner, Travelers Broadcasting Service Corporation; power, 250; fy., 600 (500).  
 WTMJ (Brookfield, Wis.).—Power, 1,000 night, 2,500 day; fy., 620 (284).  
 WWJ (Detroit, Mich.).—Fy., 920 (326).  
 WWNC (Asheville, N. C.).—Owner, Asheville Chamber of Commerce.  
 WWVA (Wheeling, W. Va.).—Fy., 1,160 (258.6).  
 Strike out all particulars of the following-named stations: KOCH (Omaha, Nebr.), WBAO (Decatur, Ill.), WKBT (New Orleans, La.), WLBR (Rockford, Ill.), WMCO (Saginaw, Mich.), WQJ (Chicago, Ill.), WRBH (Manchester, N. H.), WRBX (Richmond, Va.), WSBF (St. Louis, Mo.). The following-named stations have been consolidated with other stations: KGES (Central City, Nebr.), KGDW (Humboldt, Nebr.), KGCH (Wayne, Neb.), KGEO (Grand Island, Nebr.), KGBY (Columbus, Nebr.), WEBH (Chicago, Ill.), WTAS (Elgin, Illinois-Chicago).

NOTE.—On page 97 of the list of Commercial and Government Radio Stations of the United States, the heading of the list of broadcasting stations by wave lengths should have the columns headed wave length and frequency (kilocycles) transposed.

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

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1928, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

AMAGANSETT, N. Y.—Loc. 72° 07' 39" W., 40° 58' 20" N.  
 ATLANTA, GA.—Read Atlanta, Ga. (Sixth district reserve unit) (U. S. L.).  
 BAR HARBOR, ME. (NQC).—Loc. 68° 11' 40" W., 44° 18' 51" N.  
 BETHANY BEACH, DEL.—Loc. 75° 05' 26" W., 38° 47' 35" N.  
 CAPE ELIZABETH (PORTLAND), ME.—Loc. 70° 12' 08" W., 43° 33' 54" N.  
 CAPE HATTERAS, N. C. (CAPE HATTERAS RG GROUP).—Loc. 75° 31' 36" W., 35° 16' 26" N.  
 CAPE HINCHENBROOK, ALASKA.—Loc. 146° 39' 08" W., 60° 14' 07" N.  
 CAPE MAY, N. J.—Loc. 75° 05' 26" W., 38° 47' 35" N.  
 CATTLE POINT, WASH.—Loc. 122° 57' 41" W., 48° 27' 17" N.  
 CHESAPEAKE LIGHTSHIP, VA.—Call changed to WRS; type of wave (system), B; fy., 375 (800), 410.4 (731), 500 (600); hours, first 15 minutes every hour between 8 a. m. and 9.15 p. m.  
 DESTRUCTION ISLAND, WASH.—Loc. 124° 29' 00" W., 47° 40' 30" N.  
 DETROUR POINT, MICH.—Loc. 83° 54' 44" W., 45° 57' 28" N.  
 EAGLE HARBOR, MICH.—Loc. 88° 08' 48" W., 47° 27' 48" N.  
 EMPIRE, OREG.—Loc. 124° 18' 29" W., 43° 22' 55" N.  
 EUREKA, CALIF. (NPW) (RG STATION).—Loc. 124° 16' 19" W., 40° 41' 45" N.  
 FARALLON ISLAND, CALIF.—Loc. 123° 00' 00" W., 37° 41' 52" N.  
 FIRE ISLAND, N. Y.—Loc. 73° 13' 00" W., 40° 37' 59" N.  
 FOLLY ISLAND, S. C.—Loc. 79° 53' 20" W., 32° 41' 07" N.  
 FORT KAMEHAMEHA, HAWAII.—Type of wave (system), Al.  
 FORT McARTHUR, TEX.—Hours, Y.  
 FORT STEVENS, OREG.—Loc. 123° 58' 28" W., 46° 11' 38" N.  
 GALVESTON, TEX.—Loc. 94° 45' 12" W., 29° 20' 01" N.  
 GRAND MARAIS, MICH.—Loc. 84° 57' 22" W., 46° 46' 09" N.  
 IMPERIAL BEACH, CALIF.—Loc. 117° 07' 54" W., 32° 35' 14" N.  
 JUPITER, FLA.—Loc. 80° 05' 02" W., 26° 56' 54" N.  
 KLIPSAN BEACH, WASH.—Loc. 124° 03' 11" W., 46° 27' 54" N.  
 LAKEHURST, N. J.—Loc. 74° 19' 49" W., 40° 02' 16" N.  
 LANSING SHOAL LIGHTSHIP, MICH.—Loc. 85° 33' 50" W., 45° 54' 18" N.  
 MADISON, WIS.—Read Madison, Wis. (Ninth District Reserve Unit) (U. S. L.).  
 MANASQUAN, N. J.—Loc. 73° 13' 00" W., 40° 37' 59" N.  
 NEW DUNGENESS, WASH. (JUAN DE FUCA STRAIT RG GROUP).—Loc. 123° 08' 06" W., 48° 10' 26" N.

- NORTH ISLAND, S. C.—Loc. 79° 11' 11" W., 33° 13' 22" N.  
 NORTH TRURO, MASS.—Loc. 70° 03' 43" W., 42° 02' 27" N.  
 PENSACOLA, FLA. (AIRCRAFT ONLY).—Loc. 87° 16' 10" W., 30° 20' 53" N.  
 POINT ARGUELLO, CALIF.—Loc. 120° 38' 41" W., 34° 34' 38" N.  
 POINT FERMIN, CALIF.—Loc. 118° 17' 36" W., 33° 42' 22" N.  
 POINT HUENEME, CALIF.—Loc. 119° 12' 12" W., 34° 08' 43" N.  
 POINT MONTARA, CALIF.—Loc. 122° 31' 05" W., 37° 32' 04" N.  
 POINT REYES, CALIF.—Loc. 122° 59' 36" W., 38° 02' 10" N.  
 POINT ST. GEORGE, CALIF.—Loc. 124° 15' 05" W., 41° 47' 00" N.  
 POLLOCK RIP SLUE LIGHTSHIP, MASS.—Loc. 69° 51' 05" W., 41° 36' 05" N.  
 POYMER'S HILL, N. C.—Loc. 75° 47' 49" W., 36° 17' 18" N.  
 RELIEF LIGHTSHIP No. 76.—Strike out beacon wave 1,000 (U. S. L.).  
 RELIEF LIGHTSHIP No. 78.—Strike out beacon wave 1,000 (U. S. L.).  
 RELIEF LIGHTSHIP No. 80.—Strike out beacon wave 1,000 (U. S. L.).  
 RELIEF LIGHTSHIP No. 85.—Strike out beacon wave 1,000 (U. S. L.).  
 RELIEF LIGHTSHIP No. 92.—Strike out beacon wave 1,000 (U. S. L.).  
 SANDY HOOK, N. J.—Loc. 73° 13' 00" W., 40° 37' 59" N.  
 SMITH ISLAND, WASH.—Loc. 122° 50' 35" W., 48° 19' 12" N.  
 SOAPSTONE POINT, ALASKA.—Loc. 136° 29' 44" W., 58° 05' 39" N.  
 SOUTH PASS, LA.—Loc. 89° 09' 36" W., 29° 00' 43" N.  
 SWIFTSIDE (NANTUCKET ISLAND), MASS.—Loc. 70° 05' 55" W., 41° 14' 40" N.  
 TATOOSH, WASH.—Loc. 124° 44' 04" W., 48° 23' 28" N.  
 THATCHER ISLAND, MASS.—Read Thatchers Island, Mass.  
 TORO POINT, C. Z.—Loc. 79° 46' 24" W., 9° 07' 12" N.  
 VIRGINIA BEACH, VA. (CHESAPEAKE BAY RG GROUP).—Loc. 75° 58' 54" W.,  
 36° 50' 20" N.  
 WHITEFISH POINT, MICH.—84° 57' 22" W., 46° 46' 09" N.

Strike out all particulars of the following named stations: Cape Charles Lightship (Phare); Fort Drum, P. I. (El Fraile Island); Fort Sheridan, Ill.; Fort Tilden, N. Y.; Fort Travis, Tex.; Fort Williams, Me.; Metuchen, N. J. (Riantan Arsenal); Sea Girt Light Station, N. J. (Phare); West Memphis, Ark.

#### 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, 1928, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

- ALDEBARAN.—Type of wave (system), A1; fy., 273 (1,100), 429 (700); hours, Y.  
 A. MACKENZIE.—Type of wave (system), A1; fy., 429 (700); hours, Y.  
 B. M. HARROD.—Type of wave (system), A1; hours, Y.  
 CAMBRIA.—Type of wave (system), A1; fy., 125 (2,400), 139.5 (2,150), 315 (952), 375 (800), 425 (706), 500 (600); service, PG; hours, N; rates, 8 cents per word.  
 CAPTAIN CLARENCE M. CONDON.—Type of wave (system), A1; fy., 396 (760), 429 (700), 480 (625); hours, Y.  
 CAPTAIN JAMES FORNANCE.—Type of wave (system), A1; fy., 275 (1,090), 429 (700); hours, Y.  
 CAPTAIN EDWARD P. NONES.—Type of wave (system), A1; fy., 396 (760), 480 (625); hours, Y.  
 CHATEAU THIERRY.—Type of wave (system), A1; fy., 250 (1,200), 307 (977), 429 (700), 500 (600); service, PG; hours, N; rates, 8 cents per word.  
 COLONEL GEORGE ARMISTEAD.—Type of wave (system), A1; fy., 275 (1,090), 396 (760), 429 (700), 480 (625); hours, Y.  
 COLONEL GEORGE F. E. HARRISON.—Type of wave (system), A1; fy., 396 (760), 480 (625); hours, Y.  
 CUBA.—Type of wave (system), A1; fy., 250 (1,200), 400 (750), 450 (667), 500 (600); hours, Y.  
 CULEBRA.—Type of wave (system), A1; hours, Y.  
 DAN C. KINGMAN.—Type of wave (system), A1; fy., 429 (700); hours, Y.  
 DELLWOOD.—Type of wave (system), A1; fy., 307 (977), 425 (706); service, PG; hours, N; rates, 8 cents per word.  
 DELTA.—Type of wave (system), A1; fy., 429 (700); hours, Y.  
 ED. J. HOWARD.—Type of wave (system), A1; hours, Y.  
 F. H. HILLIARD.—Type of wave (system), A1; fy., 429 (700); hours, Y.  
 FINCH.—Owner, U. S. Navy (U. S. L.).  
 FORT CHARTRES.—Type of wave (system), A1; fy., 2,610 (114.9); hours, Y.  
 FORT GARE.—Type of wave (system), A1; fy., 2,610 (114.9); hours, Y.  
 GAMA.—Hours, Y.

- GENERAL ABSALOM BAIRD.—Type of wave (system), A1; fy., 396 (760), 429 (700), 480 (625); hours, Y.
- GENERAL ED. O. C. ORD.—Type of wave (system), A1; fy., 250 (1,200); hours, Y.
- GENERAL GEORGE H. WEEKS.—Type of wave (system), A1; fy., 429 (700), 225 (1,333); hours, Y.
- GENERAL G. W. GETTY.—Type of wave (system), A1; fy., 250 (1,200), 429 (700); hours, Y.
- GENERAL J. FRANKLIN BELL.—Type of wave (system), A1; fy., 396 (760), 429 (700), 480 (625); hours, Y.
- GENERAL JOHN M. SCHOFIELD.—Type of wave (system), A1; fy., 67 (4,480), 273 (1,100), 396 (760); hours, Y.
- GENERAL MIFFLIN.—Type of wave (system), A1; fy., 396 (760), 429 (700); hours, Y.
- GENERAL RICHARD ARNOLD.—Type of wave (system), A1; fy., 396 (760), 429 (700); hours, Y.
- GENERAL R. N. BATCHELDER.—Type of wave (system), A1; fy., 396 (760), 429 (700); hours, Y.
- GENERAL ROBERT ANDERSON.—Type of wave (system), A1; fy., 396 (760), 429 (700); hours, Y.
- GENERAL ROYAL T. FRANK.—Type of wave (system), A1; fy., 273 (1,100), 480 (625); hours, Y.
- GENERAL WILLIAM M. GRAHAM.—Type of wave (system), A1; fy., 396 (760), 450 (666), 480 (625); hours, Y.
- GRANT.—Type of wave (system), A1; fy., 250 (1,200), 307 (977), 425 (706); service, PG; hours, N; rates, 8 cents per word.
- HENRY FLAD.—Type of wave (system), A1; fy., 429 (700); hours, Y.
- H. S. TABER.—Type of wave (system), A1; hours, Y.
- INSPECTOR.—Type of wave (system), A1; fy., 273 (1,100); hours, Y.
- IOTA.—Type of wave (system), A1; hours, Y.
- JOHN EWENS.—Type of wave (system), A1; hours, Y.
- JOSEPH HENRY.—Type of wave (system), A1; fy., 396 (760), 480 (625); hours, Y.
- JUPITER.—Type of wave (system), A1; fy., 429 (700); hours, Y.
- KAPPA.—Type of wave (system), A1; hours, Y.
- KENOWIS.—Type of wave (system), A1; fy., 250 (1,200), 307 (977), 425 (706), 500 (600); service, PG; hours, N; rates, 8 cents per word.
- LIEUT. COL. HERMAN C. SCHUMM.—Type of wave (system), A1; fy., 480 (625), 396 (760); hours, Y.
- MAJOR ALBERT G. JENKINS.—Type of wave (system), A1; fy., 396 (760), 480 (625); hours, Y.
- MAJOR EVEN THOMAS.—Type of wave (system), A1; fy., 250 (1,200), 307 (977), 425 (706); hours, Y.
- MAJOR WILLIAM P. PENCE, JR.—Type of wave (system), A1; fy., 396 (760), 480 (625); hours, Y.
- MARINDUQUE.—Correct call, NIGV (U. S. L.).
- McKEE.—Correct call, NACQ (U. S. L.).
- MEIGS.—Type of wave, A1; fy., 125 (2,400), 250 (1,200), 307 (977), 425 (706); 500 (600); service, PG; hours, N; rates, 8 cents per word.
- MERRITT.—Type of wave (system), A1; fy., 250 (1,200), 307 (977), 500 (600); service, PG; hours, N; rates, 8 cents per word.
- MILEY.—Type of wave (system), A1; fy., 396 (760), 450 (666), 480 (625); hours, Y.
- MISSISSIPPI (WYCT).—Type of wave (system), A1; hours, Y.
- MORGAN-LEWIS.—Type of wave (system), A1; fy., 429 (700); hours, Y.
- O-8.—Correct call, NAND (U. S. L.).
- OMEGA.—Type of wave (system), A1; hours, Y.
- RENO (WYAN).—Type of wave (system), A1; fy., 429 (700); hours, Y.
- SAN PABLO.—Type of wave (system), A1; hours, Y.
- SAN PEDRO.—Type of wave (system), A1; fy., 396 (760), 480 (625); hours, Y.
- SATURN.—Type of wave (system); A1; hours, Y.
- SLOCUM.—Type of wave, A1; fy., 429 (700); hours, Y.
- SOMME.—Type of wave (system), A1; fy., 125 (2,400), 250 (1,200), 307 (977), 425 (706), 500 (600), 1,429 (2,100); service, PG; hours, N; rates, 8 cents per word.
- SPRIGG-CARROLL.—Type of wave (system), A1; fy., 429 (700); hours, Y.
- St. MIHIEL.—Type of wave (system), A1; fy., 142 (2,100), 375 (800), 425 (706), 500 (600); service, PG; hours, N; rates, 8 cents per word.
- TECUMSEH.—Type of wave (system), A1; fy., 396 (760); hours, Y.
- THOMAS (WUAI).—Type of wave (system), A1; fy., 250 (1,200), 307 (977), 375 (800), 500 (600); service, PG; hours, N; rates, 8 cents per word.

- TUSCUMBIA.**—Type of wave (system), A1; fy., 115.1 (2,607), 396 (760); hours, Y.  
**UMPQUA.**—Insert in lieu of second Unadilla, call NATS; owner, U. S. Navy (U. S. L.).  
**WILLETS POINT.**—Type of wave (system), A1; fy., 273 (1,100), 429 (700), 545 (550); hours, Y.  
**W. L. MARSHALL.**—Type of wave (system), A1; fy., 429 (700); hours, Y.  
**WM. T. ROSSELL.**—Type of wave (system), A1; fy., 429 (700); hours, Y.  
**WOLCOTT.**—Owner, U. S. Coast Guard (U. S. L.).

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

Insert NBH, Staten Island, N. Y.—c; NEN, correct call, NFN; NBE, read Thatchers Island, Mass.; WWAY, call changed to WRS, read Chesapeake Lightship, Va.; strike out all particulars following the calls NABD, WUAN, WUAL, WUBY, WUBR, WUCU, WTX, WY CJ.

**GOVERNMENT AIRCRAFT STATIONS, ALPHABETICALLY, BY NAMES OF VESSELS**

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1928, and to the International List of Radiotelegraph Stations, published by the Borne Bureau]

The calls of the aircraft named hereunder have been changed to the call shown opposite their names.

- (U. S. S.) Arizona.—Any aircraft attached to, NVMGY.  
 (U. S. S.) Arkansas.—Any aircraft attached to, NVMHL.  
 (U. S. S.) California.—Any aircraft attached to, NVMBC.  
 (U. S. S.) Cincinnati.—Any aircraft attached to, NVMAC.  
 (U. S. S.) Colorado.—Any aircraft attached to, NVMFA.  
 (U. S. S.) Concord.—Any aircraft attached to, NVMDK.  
 (U. S. S.) Detroit.—Any aircraft attached to, NVMKS.  
 Eighth Naval District.—Any aircraft attached to, NVMGJ.  
 Eleventh Naval District.—Any aircraft attached to, NVMGL.  
 Fifteenth Naval District.—Any aircraft attached to, NVMGN.  
 Fifth Naval District.—Any aircraft attached to, NVMGD.  
 First Naval District.—Any aircraft attached to, NVMGA.  
 (U. S. S.) Florida.—Any aircraft attached to, NVMOT.  
 Fourth Naval District.—Any aircraft attached to, NVMGC.  
 Fourteenth Naval District.—Any aircraft attached to, NVMGQ.  
 Guam Naval District.—Any aircraft attached to, NVMGS.  
 Guantanamo Naval District.—Any aircraft attached to, NVMGT.  
 (U. S. S.) Idaho.—Any aircraft attached to, NVMCH.  
 (U. S. S.) Jason.—Any aircraft attached to, NVMAD.  
 (U. S. S.) Landley.—Any aircraft attached to, NVMVR.  
 (U. S. S.) Lexington.—Any aircraft attached to, NVMPO.  
 (U. S. S.) Marblehead.—Any aircraft attached to, NVMDF.  
 (U. S. S.) Maryland.—Any aircraft attached to, NVMDJ.  
 (U. S. S.) Medusa.—Any aircraft attached to, NVMWM.  
 (U. S. S.) Memphis.—Any aircraft attached to, NVMFL.  
 (U. S. S.) Milwaukee.—Any aircraft attached to, NVMWB.  
 (U. S. S.) Mississippi.—Any aircraft attached to, NVMHD.  
 (U. S. S.) Nevada.—Any aircraft attached to, NVMHC.  
 (U. S. S.) New Mexico.—Any aircraft attached to, NVMJK.  
 (U. S. S.) New York.—Any aircraft attached to, NVMKL.  
 Ninth Naval District.—Any aircraft attached to, NVMGK.  
 (U. S. S.) Oklahoma.—Any aircraft attached to, NVMBF.  
 (U. S. S.) Omaha.—Any aircraft attached to, NVMQG.  
 (U. S. S.) Patoka.—Any aircraft attached to, NVMHB.  
 (U. S. S.) Raleigh.—Any aircraft attached to, NVMVC.  
 (U. S. S.) Richmond.—Any aircraft attached to, NVMNS.  
 (U. S. S.) Saratoga.—Any aircraft attached to, NVMUF.  
 Seventh Naval District.—Any aircraft attached to, NVMGH.  
 Sixteenth Naval District.—Any aircraft attached to, NVMGR.  
 Sixth Naval District.—Any aircraft attached to, NVMGF.  
 (U. S. S.) Tennessee.—Any aircraft attached to, NVMLN.  
 (U. S. S.) Texas.—Any aircraft attached to, NVMAB.  
 Third Naval District.—Any aircraft attached to, NVMGB.  
 Thirteenth Naval District.—Any aircraft attached to, NVMGP.  
 (U. S. S.) Trenton.—Any aircraft attached to, NVMXA.  
 Twelfth Naval District.—Any aircraft attached to, NVMGM.

- (U. S. S.) Utah.—Any aircraft attached to, NVMVP.  
 (U. S. S.) West Virginia.—Any aircraft attached to, NVMNP.  
 (U. S. S.) Wright.—Any aircraft attached to, NVMND.  
 (U. S. S.) Wyoming.—Any aircraft attached to, NVMKN.

## GOVERNMENT AIRCRAFT STATIONS, BY CALL SIGNALS

Calls changed

From—	To—	From—	To—	From—	To—
NMAB	NVMAB	NMGJ	NVMGJ	NMKN	NVMKN
NMAC	NVMAC	NMGK	NVMGK	NMKS	NVMKS
NMAD	NVMAD	NMGL	NVMGL	NMLN	NVMLN
NMBC	NVMBC	NMGM	NVMGM	NMND	NVMND
NMBF	NVMBF	NMGN	NVMGN	NMNP	NVMNP
NMCH	NVMCH	NMGP	NVMGP	NMNS	NVMNS
NMDF	NVMDJ	NMGQ	NVMGQ	NMOT	NVMOT
NMDJ	NVMDJ	NMGR	NVMGR	NMPO	NVMPO
NMDK	NVMDK	NMGS	NVMGS	NMQG	NVMQG
NMFA	NVMFA	NMGT	NVMGT	NMUF	NVMUF
NMFL	NVMFL	NMGY	NVMGY	NMVC	NVMVC
NMGA	NVMGA	NMHB	NVMHB	NMVP	NVMVP
NMGB	NVMGB	NMHC	NVMHC	NMVR	NVMVR
NMGC	NVMGC	NMHD	NVMHD	NMWB	NVMWB
NMGD	NVMGD	NMHL	NVMHL	NMWM	NVMWM
NMGF	NVMGF	NMJK	NVMJK	NMXA	NVMXA
NMGH	NVMGH	NMKL	NVMKL		

## SPECIAL STATIONS, BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1928]

- LOS ANGELES, CALIF. (W6XAM).—Power, 500.  
 SAYVILLE, N. Y. (2XBL).—Owner, Mackay Radio & Telegraph Co.  
 Aircraft.—In column headed "Station" insert "Unnamed" for W8XA (U. S. L.).

## 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, 1928, and to the International List of Radiotelegraph Stations published by the Berne bureau]

- SEA GIRT LIGHT STATION, N. J.—Strike out all particulars.

## MISCELLANEOUS

## GENERAL ORDERS OF THE FEDERAL RADIO COMMISSION

*Regulations governing picture and television transmission (General Order No. 50, October 31, 1928).*—Picture and television transmission for general reception by the public will be referred to herein by the commission as picture broadcasting and television broadcasting.

Picture broadcasting and television broadcasting will be permitted (but only upon written application to, and formal authority from, the commission) on frequencies above 1,500 kilocycles, the exact frequencies, or bands of frequencies, to be determined by further order of the commission.

Between the date of this order and January 1, 1929, picture broadcasting and television broadcasting will be permitted to a limited extent (but only upon written application to, and formal authority from, the commission) in the broadcast band between 550 and 1,500 kilocycles, subject, however, to rigid conditions designed to prevent interference with the reception from broadcasting stations. Among such conditions will be the following: (1) That the band of frequencies occupied by any such transmission shall be not wider than 10 kilocycles, and (2) that such picture broadcasting and television broadcasting be limited to periods of not more than one hour per day at a time of the day other than between 6 and 11 p. m.

The extent to which picture broadcasting and television broadcasting in the broadcast band of frequencies will be permitted to take place after January 1, 1929, if at all, will be determined by later orders of the commission, which will



depend on investigation by the commission of the results of permitting such operation with respect to interference and the popularity of such transmission with the general public, and will further depend upon the interpretation which the commission shall be advised is proper of the obligations of the United States under the International Radio Telegraph Convention of 1927, with respect to permitting anything other than telephonic transmission in the broadcast band.

*Discontinuance of use of apparatus employing damped wave emissions (General Order No. 51, October 31, 1928).*—On and after January 1, 1929, no license will be issued for the operation of any radio station (other than ship stations) having a transmitter employing damped wave emissions.

All such stations now operating under authority granted by the Federal Radio Commission and having transmitters employing damped wave emissions shall discontinue such use and shall replace such transmitters with apparatus employing continuous waves or modulated continuous wave emissions prior to January 1, 1929. Any licensee who is unable to comply with this order within the period specified because of reasons beyond his control may, upon application and a proper showing to the commission, obtain a reasonable extension of said period. All radio supervisors are requested to make inspections and reports where necessary, to the end that the terms of this order may be strictly complied with.

*Broadcasting stations ordered to announce character of mechanical reproductions—General Order No. 49 modified (General Order No. 52, November 26, 1928).*—All broadcasting stations shall announce clearly and distinctly the character of all mechanical reproductions broadcast by them, the announcement to precede each such program item. In such announcements each phonograph record used, whatever its character, shall be described as a "phonograph record"; each piano-player selection used shall be described as played by "mechanical piano player"; every other mechanical reproduction shall be similarly described by the term generally used and understood by the public as meaning such mechanical reproduction: *Provided, however,* That where a recording or electrical transcript is made exclusively for broadcasting purposes and is neither offered nor intended to be offered for sale to the public, the words "phonograph record" may be replaced by any phrase which accurately describes such transcription and which is of such a nature as not to deceive or tend to deceive the public as to the character of the reproduction broadcast. Every station taking advantage of this proviso shall keep a record of the phrases actually used by such station and shall communicate such phrases to the commission on request by the commission.

*Broadcasting stations restricted as to power used after sunset—Operation during daytime not to cause greater heterodyning than exists during evening—General Order No. 10 repealed (General Order No. 53, November 26, 1928).*—Whenever a broadcasting station which, under its license from the commission, is permitted to operate both during daytime hours and during evening hours, is, under said license or any modification thereof, permitted to use a greater amount of power during the daytime hours than during the evening hours, the station will not be permitted to use its daytime power after the average time for sunset at the station during any particular month. In no event will such a broadcasting station be permitted to use its authorized daytime power at any time or in such manner as to cause greater heterodyne interference during the daytime than exists during evening operation from the use of the amount of power permitted for such evening operation.

This order supersedes General Order No. 10, which is hereby repealed.

#### RATES FOR UNITED STATES ARMY AND NAVY GENERAL PUBLIC SERVICE COAST STATIONS

Notice has been received from the War and Navy Departments that the rate for their general public service coast stations (ship-to-shore traffic) is 12 cents (60 centimes) per word. The International List of Radiotelegraph Stations published by the Berne bureau should be amended accordingly.

#### GOVERNMENT VESSELS EQUIPPED WITH RADIO COMPASS

The following correction should be made to the June 30, 1928, edition of the annual list of Commercial and Government Radio Stations of the United States: On page 153, at the top of the second column headed "Owner," change Pittsburgh S. S. Co. to read U. S. Navy.

## LISTS OF RADIO STATIONS AVAILABLE FOR DISTRIBUTION

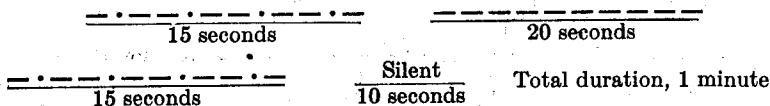
The annual lists of Commercial and Government Radio Stations of the United States and Amateur Radio Stations of the United States, editions of June 30, 1928, are now available for distribution by the Superintendent of Documents, Government Printing Office, Washington, D. C., at 15 cents and 25 cents a copy, respectively.

The Commercial and Government list contains lists of all ship, land, broadcasting experimental, and technical and training school stations up to June 30, 1928. In addition to the list of broadcasting stations as of that date, there is in the appendix a list of the broadcasting stations as of November 11, 1928. However, a number of changes has been made to this list since this publication went to press. These changes are shown in the monthly Radio Service Bulletin which is supplemental to the annual list. This pamphlet may also be obtained from the Superintendent of Documents at 5 cents a copy; subscription price, 25 cents per year.

RADIOBEACON ESTABLISHED AT POINTE DE LA COUBRE, GIRONDE RIVER ENTRANCE, FRANCE

A radiobeacon has been established at the lighthouse in latitude  $45^{\circ} 42' N.$ , longitude  $1^{\circ} 14' W.$  (approximately). The transmissions are made on 300 kilocycles (1,000 meters), c. w. and i. c. w.

The characteristic of the signal is as follows:

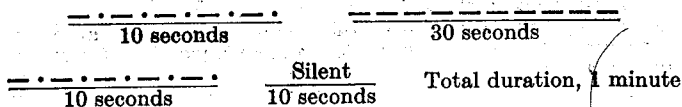


During fog the signals will be made on c. w., commencing at the beginning of each half hour; and on i. c. w., commencing at the fifth, fifteenth, twenty-fifth, thirty-fifth, forty-fifth, and fifty-fifth minutes of each hour. During clear weather the signals will be made on c. w., commencing at the beginning of each half hour.

RADIOBEACON ESTABLISHED AT BALEINES, FRANCE

A radiobeacon has been established at the lighthouse in latitude  $46^{\circ} 15' N.$ , longitude  $1^{\circ} 34' W.$  (approximately). The transmissions are made on 293 kilocycles (1,025 meters), i. c. w.

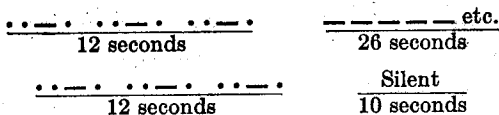
The characteristic of the signal is as follows:



The signals are transmitted during fog, commencing at the fifth, fifteenth, twenty-fifth, thirty-fifth, forty-fifth, and fifty-fifth minutes of each hour.

RADIOBEACON ESTABLISHED AT CAPE BARFLEUR, FRANCE

A radiobeacon has been established at the lighthouse in latitude  $49^{\circ} 42' N.$ , longitude  $1^{\circ} 16' W.$  (approximately). The transmissions are made on 300 kilocycles (1,000 meters), i. c. w. During fog four groups of signals are transmitted every 10 minutes, each group consisting of the following signals:



The transmission of these signals commences at the tenth, twentieth, thirtieth, fortieth, fiftieth, and sixtieth minutes of each hour.

RADIOBEACON ESTABLISHED ON HINDER LIGHT VESSEL (HOLLAND), NORTH SEA

A radiobeacon has been established on this light vessel, located in latitude 51° 38' N., longitude 2° 34' E. (approximately). The transmissions are made on 316 kilocycles (950 meters), i. c. w.

The characteristic of the signal is as follows:

. . . . . 8.5 seconds	Silent 1.25 seconds
14 one-second dashes with intervals of 0.25 seconds 16.75 seconds	Silent 3.5 seconds
	Total, 30 seconds.

This group will be repeated seven times every three and one-half minutes.

During fog the seven groups of signals will be transmitted six times successively, followed by a silent interval of four minutes, during the last three-quarters of each hour, G. M. T., commencing at the fifteenth minute. During clear weather the seven groups of signals will be transmitted twice every three hours, commencing at 0h 15m, G. M. T.

The signal will be sent during the 4-minute silent interval of the signal made from the radiobeacon on Maas Light Vessel (to be changed in January, 1929) so as not to interfere with that signal which will be sent on the same frequency.

When the above beacon commences to function, the present submarine fog bell on North Hinder Light Vessel will be replaced by a submarine oscillator on which the Morse letters NR (— . . . .) will be sounded every 30 seconds, signal 9 seconds, silence 21 seconds.

The submarine signal begins immediately after the last dot of the second letter R of the radio signal. To obtain the distance from the light vessel, count the dashes of the radio signal, and the number of the dash (of the series of 14 one-second dashes) which coincides with the first sound of the submarine fog signal is the distance in miles. Thus, if the tenth dash coincides with the first sound of the submarine oscillator, the distance from the light vessel is 10 miles.

RADIOBEACON AND SUBMARINE FOG SIGNALS ON MAAS LIGHT VESSEL (HOLLAND), NORTH SEA, TO BE CHANGED

In January, 1929, the radiobeacon signal made from Maas Light Vessel, in (approximately) 52° 02' N., 3° 54' E., will be changed to the Morse letters MS MS (— . . . . — . . . .) to be sent on a frequency of 316 kilocycles (950 meters, modulated continuous wave) during 8.5 seconds, silence 1.25 seconds, then 14 dashes, each of 1 second's duration, separated by silent intervals of 0.25 second each, then a silence of ± 3.5 seconds, period 30 seconds. The complete signal will be made seven times in succession during 3.5 minutes.

In foggy weather the group of seven signals will be sent six times hourly, beginning at 18m 45s after each hour (Greenwich time). The interval between the groups will be 4 minutes.

In clear weather two groups of seven signals will be sent every third hour, beginning at 18m 45s after each hour (Greenwich time).

The signal will be sent during the 4-minute silent interval of the signal made from the radiobeacon on North Hinder Light Vessel, so as not to interfere with that signal which will be sent on the same frequency.

When the above change is made, the signal made on the submarine oscillator will be changed to the Morse letters MS (— . . . .), signal 9 seconds, silence 21 seconds, period 30 seconds. The submarine signal begins immediately after the last dot of the second letter S of the radio signal. To determine the distance from the light vessel, count the dashes of the radio signal, and the number of the dash (of the series of 14 one-second dashes) which coincides with the first sound of the submarine fog signal is the distance in miles. Thus, if the seventh dash coincides with the first sound of the submarine oscillator, the distance from the light vessel is 7 miles.

CIVIL SERVICE EXAMINATION FOR ASSISTANT RADIO INSPECTOR

Applications must be on file with the United States Civil Service Commission at Washington, D. C., not later than December 31, 1928.

Persons who enter this examination will not be admitted to any other examination for which the receipt of applications closes on the above date. The date for assembling of competitors will be stated on their admission cards and will be about 15 days after the close of receipt of applications.

The United States Civil Service Commission announces an open competitive examination for the position named above, to be held at any of the places listed hereon at which examination is requested in applications received by the commission at Washington, D. C., not later than the date stated above. Vacancies in the field service of the Department of Commerce throughout the United States, including Hawaii, Alaska, and Porto Rico, at \$2,400 a year, and in positions requiring similar qualifications, at approximately the same rate of pay, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

*Promotion.*—A probationary period of six months is required; advancement after that depends upon individual efficiency, increased usefulness, and the occurrence of vacancies in higher positions.

*Certification.*—In filling vacancies in this position certification will be made of the highest eligibles on the register who have not expressed unwillingness to accept appointment where the vacancy exists.

*Citizenship and sex.*—This examination is open to all citizens of the United States who meet the requirements; the department or office requesting certification of eligibles has the legal right to specify the sex desired. For this position the Department of Commerce wishes men.

*False statements.*—False statements in applications concerning any matter affecting the applicant's eligibility may result in cancellation of examination and debarment from future examinations and removal from service in case of appointment.

*Duties.*—The duties of the assistant radio inspector will be primarily to assist the radio inspector in the enforcement of the radio act. The assistant radio inspector will be required to inspect radio equipment on vessels and at land stations, which involves the carrying of 30 or 40 pounds of testing and measuring instruments; to make high frequency and field intensity measurements; to assist in the examination of radio operators, and to perform such office work as is required. The performance of these duties will involve considerable traveling, for which necessary traveling expenses will be allowed.

*Subjects and weights.*—Competitors will be rated on the following subjects, which will have the relative weights indicated:

Subjects:	Weights
1. Theoretical and practical questions on radio and electrical engineering.....	50
2. Education, training, and experience.....	50
Total.....	100

*Ratings required.*—In the first subject nonpreference competitors must attain a rating of at least 70, competitors entitled to military preference a rating of at least 65, exclusive of military preference credit, and competitors entitled to disability preference a rating of at least 60, exclusive of military preference credit. In addition, all competitors must attain in the entire examination an eligible average of at least 70, inclusive of military preference credit, if any.

*Education and experience.*—Except as indicated below, applicants must show that they have been graduated with a degree in electrical or radio engineering from a college or university of recognized standing, or that they are senior students in such course. The names of senior students who attain eligibility may be certified for appointment, but they may not enter upon duty until they have furnished proof of actual graduation, which proof should consist of a certified or photostat copy of diploma or letter or brief certificate from the proper college officer.

*Substitution of experience for education.*—Provided the applicant has completed a standard high-school course or received 14 units of credit acceptable for college entrance, for each year lacking completion of the collegiate requirement he may substitute one year of subordinate practical radio engineering experience (ordinary amateur or radio operator experience is not considered as qualifying). In any case where experience is substituted for college education, the applicant must show that within the last five years he has had at least one year of full-time paid experience in a laboratory working on problems in connection with radio transmission or in a position furnishing very similar and equivalent training.

*License.*—In addition to meeting the above requirements, applicants must present a commercial operator's license or must pass an appropriate examination in the International Morse Code during their probationary period.

Statements as to education, training, and experience are accepted subject to verification.

*Age.*—Applicants must not have reached their 45th birthday on the date of the examination. This age limit does not apply to persons entitled to preference

because of military or naval service, but such applicants must not have reached the retirement age.

Persons given probational appointment must submit, when reporting for duty, birth certificate or other satisfactory evidence of date of birth.

*Retirement.*—Classified employees who have reached the retirement age and have served 15 years are entitled to retirement with an annuity. A deduction of 3½ per cent is made from the monthly salary to provide for this annuity, which will be returned to persons leaving the service before retirement with 4 per cent interest compounded annually.

*Photographs.*—Applicants must submit to the examiner on the day of the examination their photographs, taken within two years, with their names written thereon, and securely pasted in the space provided on the admission cards sent them after their applications are filed. Proofs or group photographs will not be accepted. Photographs will not be returned to applicants.

*Applications.*—Form 2600, which is required, may be secured from the following (the title of the examination desired should be stated): The United States Civil Service Commission, Washington, D. C., or the secretary of the United States Civil Service Board at any examination place listed hereon.

Form 2600 should be properly executed, excluding the medical certificate and the officer's certificate of residence, and must be on file with the United States Civil Service Commission at Washington, D. C., not later than the date indicated above.

The exact title of the examination desired, as given at the head of this announcement, should be stated in the application form.

*Preference.*—Applicants entitled to preference because of military or naval service should attach to their applications their original discharge or a photostat or certified copy thereof or their official record of service. If, because of disability, the applicant is entitled to a pension under authorization of the Bureau of Pensions, or to compensation or training under the Veterans' Bureau, he should also attach to his application his pension certificate, or a certified copy thereof, or a certificate from the Veterans' Bureau showing that he is entitled to compensation or training by that bureau. Such papers will be returned to the applicant.

The examination described in the accompanying announcement will be given at the places named below. A resident of any State or Territory may be examined in any city named in the list. A request for examination on a date other than that given on admission cards sent applicants after their applications are filed or at a place not included in the list can not be granted. Except where otherwise indicated, application blanks may be obtained from the local secretary of the United States Civil Service Board at the post office. Where the letters "C. H." occur, the secretary of the board is located at the customhouse. Boards of Pension Examining Surgeons are located at all places in the list, except those marked thus:\*

*Alabama*

Anniston.  
Birmingham.  
\*Decatur.  
\*Demopolis.  
\*Dothan.  
Florence.

Huntsville.  
Mobile, C. H.  
Montgomery.  
\*Opelika.  
\*Tuscaloosa.

Santa Barbara.  
\*Santa Cruz.  
Santa Rosa.

*California*

Stockton.  
Vallejo.

*Canal Zone*

\*Balboa Heights.

*Colorado*

\*Anchorage.<sup>1</sup>  
\*Fairbanks.<sup>2</sup>

*Alaska*

\*Juneau.<sup>3</sup>  
\*Ketchikan.<sup>3</sup>

Colorado Springs.  
Denver.  
Durango.  
Fort Collins.  
Fort Morgan.  
\*Glenwood Springs.  
Grand Junction.

La Junta.  
Leadville.  
Monte Vista.  
Montrose.  
Pueblo.  
\*Sterling.  
Trinidad.

*Arizona*

\*Ajo.  
\*Douglas.  
\*Flagstaff.  
\*Globe.

Phoenix.  
Prescott.  
Tucson.  
\*Yuma.

*Connecticut*

Bridgeport.  
\*Danbury.  
Hartford.  
Middletown.

New Haven.  
New London.  
Waterbury.  
Willimantic.

*Arkansas*

\*Camden.  
Fayetteville.  
Fort Smith.  
Helena.

Jonesboro.  
Little Rock.  
Texarkana.

*Delaware*

Dover.

Wilmington.

*California*

\*Bishop.  
Chico.  
Eureka.  
Fresno.  
Los Angeles.  
Red Bluff.

Riverside.  
Sacramento.  
San Diego.  
San Francisco.  
San Jose.  
San Luis Obispo.

Washington.

*District of Columbia*

*Florida*

Gainesville.  
Jacksonville.  
\*Key West.  
Miami.

Orlando.  
Pensacola.  
Tallahassee.  
Tampa.

<sup>1</sup> Address local secretary, care Alaska Railroad.

<sup>2</sup> Address local secretary, care U. S. Land Office.

<sup>3</sup> Address local secretary, care Immigration Service.

*Georgia*

Albany.  
 \*Athens.  
 Atlanta.  
 Augusta.  
 \*Columbus.  
 Gainesville.

Macon.  
 Rome.  
 Savannah.  
 Thomasville.  
 \*Valdosta.  
 \*Waycross.

*Hawaii*

\*Honolulu.

*Idaho*

Boise.  
 Coeur d'Alene.  
 Grangeville.  
 Idaho Falls.  
 Lewiston.  
 Moscow.

Pocatello.  
 \*Sandpoint.  
 \*St. Anthony.  
 Twin Falls.  
 \*Weiser.

*Illinois*

Aurora.  
 Cairo.  
 \*Centralia.  
 Chicago.  
 Decatur.  
 East St. Louis.  
 Effingham.  
 Freeport.  
 Galena.

Galesburg.  
 Kankakee.  
 Peoria.  
 Quincy.  
 Rockford.  
 Rock Island.  
 Springfield.  
 Streator.  
 Urbana.

*Indiana*

Angola.  
 Bloomington.  
 Evansville.  
 Fort Wayne.  
 \*Hammond.  
 Indianapolis.  
 \*Jeffersonville.  
 La Fayette.

Marion.  
 Muncie.  
 Richmond.  
 South Bend.  
 Terre Haute.  
 Valparaiso.  
 Vincennes.

*Iowa*

\*Ames.  
 Atlantic.  
 Burlington.  
 Cedar Rapids.  
 Council Bluffs.  
 Creston.  
 Davenport.  
 \*Decorah.  
 Denison.  
 Des Moines.

Dubuque.  
 Fort Dodge.  
 Iowa City.  
 Marshalltown.  
 Mason City.  
 Ottumwa.  
 \*Shenandoah.  
 Sioux City.  
 Spencer.  
 Waterloo.

*Kansas*

Concordia.  
 Dodge City.  
 Emporia.  
 Fort Scott.  
 Kansas City.  
 Lawrence.  
 Leavenworth.

Manhattan.  
 Norton.  
 \*Parsons.  
 \*Pittsburg.  
 Salina.  
 Topeka.  
 Wichita.

*Kentucky*

Ashland.  
 Bowling Green.  
 \*Covington.  
 Henderson.  
 Hopkinsville.  
 Lebanon.  
 Lexington.

London.  
 Louisville.  
 Middlesboro.  
 Owensboro.  
 Paducah.  
 Paintsville.  
 Somerset.

*Louisiana*

\*Alexandria.  
 Baton Rouge.  
 \*Lake Charles.  
 \*Monroe.

\*New Iberia.  
 New Orleans. C. H.  
 Shreveport.

*Maine*

Augusta.  
 Bangor.  
 Bath.  
 Calais.  
 Caribou.

\*Fort Kent.  
 Houlton.  
 \*Lewiston.  
 Portland.  
 Rockland.

*Maryland*

Baltimore. C. H.  
 Cumberland.  
 \*Easton.

Hagerstown.  
 Salisbury.

*Massachusetts*

\*Amherst.  
 Boston. C. H.  
 Brockton.  
 Fall River.  
 Fitchburg.  
 Greenfield.  
 Hyannis.

Lawrence.  
 Lowell.  
 New Bedford.  
 Pittsfield.  
 Salem.  
 Springfield.  
 Worcester.

*Michigan*

Alpena.  
 Ann Arbor.  
 \*Battle Creek.  
 \*Big Rapids.  
 \*Cadillac.  
 Cheboygan.  
 Detroit.  
 Escanaba.  
 Flint.  
 Grand Rapids.  
 Houghton.  
 Ironwood.

Jackson.  
 Kalamazoo.  
 Lansing.  
 Manistee.  
 \*Marquette.  
 Muskegon.  
 Port Huron.  
 Saginaw.  
 \*Saint Joseph.  
 Sault Ste. Marie.  
 Traverse City.

*Minnesota*

\*Austin.  
 \*Bemidji.  
 \*Brainerd.  
 Crookston.  
 Duluth.  
 \*Ely.  
 Fairmont.  
 Fergus Falls.  
 \*Glenwood.  
 \*Grand Rapids.  
 \*International Falls.

Mankato.  
 Minneapolis.  
 Montevideo.  
 Pipestone.  
 Rochester.  
 St. Cloud.  
 St. Paul.  
 Thief River Falls.  
 \*Virginia.  
 Willmar.  
 Winona.

*Mississippi*

Corinth.  
 \*Greenville.  
 \*Grenada.  
 \*Hattiesburg.  
 \*Holly Springs.  
 Jackson.

Meridian.  
 Natchez.  
 \*Oxford.  
 \*Starkville.  
 Vicksburg.  
 West Point.

*Missouri*

Cape Girardeau.  
 Chillicothe.  
 \*Columbia.  
 Hannibal.  
 Jefferson City.  
 Joplin.  
 Kansas City.  
 Kirksville.  
 Maryville.

Moberly.  
 Nevada.  
 Poplar Bluff.  
 Rolla.  
 St. Joseph.  
 St. Louis. Old C. H.  
 Springfield.  
 Warrensburg.

*Montana*

Billings.  
 Bozeman.  
 Butte.  
 \*Glasgow.  
 Great Falls.  
 Havre.

\*Helena.  
 Kalispell.  
 Lewistown.  
 Miles City.  
 Missoula.

*Nebraska*

Alliance.  
 Beatrice.  
 Broken Bow.  
 Chadron.  
 Columbus.  
 Fremont.  
 Grand Island.  
 Hastings.  
 Holdrege.  
 Lincoln.

McCook.  
 Nebraska City.  
 Norfolk.  
 North Platte.  
 Omaha.  
 \*O'Neill.  
 Scottsbluff.  
 Sidney.  
 Superior.  
 Valentine.

*Nevada*

Carson City.  
 Elko.  
 \*Ely.

Fallon.<sup>4</sup>  
 \*Goldfield.  
 Reno.

*New Hampshire*

Berlin.  
 \*Claremont.  
 Concord.  
 \*Durham.  
 \*Hanover.

Keene.  
 Manchester.  
 Plymouth.  
 Portsmouth.

<sup>4</sup> Address local secretary, care Reclamation Service.

*New Jersey*

Atlantic City.  
Camden.  
Newark.

\*New Brunswick.  
Trenton.

*New Mexico*

Albuquerque.  
East Las Vegas.  
\*Las Cruces.  
\*Raton.

Roswell.  
\*Santa Fe.  
Tucumcari.

*New York*

Binghamton.  
Buffalo.  
\*Chautauqua.  
Elmira.  
Ithaca.  
Jamestown.  
New York. C. H.

Ogdensburg. C. H.  
Plattsburg.  
Poughkeepsie.  
Rochester.  
Syracuse.  
Troy.  
Utica.

*North Carolina*

\*Asheville.  
\*Chapel Hill.  
Charlotte.  
\*Durham.  
\*Gastonia.  
Goldsboro.  
Greensboro.  
\*Hickory.

New Bern.  
Raleigh.  
\*Rocky Mount.  
\*Salisbury.  
Washington.  
Wilmington.  
\*Winston-Salem.

*North Dakota*

\*Beach.  
Bismarck.  
\*Devils Lake.  
Dickinson.  
Fargo.  
\*Grand Forks.  
\*Harvey.  
Jamestown.

\*Kenmare.  
\*Mandan.  
\*Minot.  
\*New Rockford.  
\*Oakes.  
\*Valley City.  
Wahpeton.  
Williston.

*Ohio*

Ashtabula.  
Athens.  
Canton.  
Chillicothe.  
Cincinnati.  
Cleveland.  
Columbus.  
Dayton.  
Ironton.

Lima.  
Mansfield.  
Marietta.  
\*Portsmouth.  
Sandusky.  
Steubenville.  
Toledo.  
Youngstown.  
Zanesville.

*Oklahoma*

\*Altus.  
Ardmore.  
Bartlesville.  
Chickasha.  
Enid.  
Guthrie.  
Lawton.

McAlester.  
Muskogee.  
Oklahoma.  
Stillwater.  
Tulsa.  
Vinita.  
Woodward.

*Oregon*

Astoria.  
\*Baker.  
Bend.<sup>‡</sup>  
Corvallis.  
Eugene.  
\*Grants Pass.  
\*Klamath Falls.

La Grande.  
\*Marshfield.  
Pendleton.  
Portland.  
Salem.  
The Dalles.

*Pennsylvania*

\*Altoona.  
\*Bethlehem.  
Chambersburg.  
Du Bois.  
Erie.  
\*Galeton.  
Harrisburg.  
Kittanning.  
Lancaster.  
Oil City.

Philadelphia.  
Pittsburgh.<sup>§</sup>  
Reading.  
Scranton.  
\*State College.  
Sunbury.  
Uniontown.  
Warren.  
Wilkes-Barre.  
Williamsport.

*Porto Rico*

San Juan.<sup>‡</sup>

*Rhode Island*

Narragansett.  
Newport.

Providence.

*South Carolina*

Charleston.  
\*Chester.  
\*Clemson College.  
Columbia.  
Florence.

Greenville.  
\*Greenwood.  
\*Orangeburg.  
\*Spartanburg.  
\*Sumter.

*South Dakota*

Aberdeen.  
Brookings.  
\*Chamberlain.  
Deadwood.  
Hot Springs.  
Huron.  
\*Lemmon.  
Madison.  
Milbank.

Mitchell.  
\*Mobridge.  
Pierre.  
Rapid City.  
Redfield.  
Sioux Falls.  
Watertown.  
Winner.  
Yankton.

*Tennessee*

Bristol.  
Chattanooga.  
Jackson.

Knoxville.  
Memphis.  
Nashville.

*Texas*

Abilene.  
Amarillo.  
Austin.  
\*Brownsville. C. H.  
\*Bryan.  
\*Corpus Christi.  
Dallas.  
\*Del Rio.  
El Paso.  
Galveston. C. H.  
Houston.

Laredo.  
\*Lubbock.  
\*Marfa.  
\*Nacogdoches.  
Palestine.  
\*San Angelo.  
San Antonio.  
\*Texarkana.  
Waco.  
Wichita Falls.

*Utah*

\*Logan.  
Ogden.

\*Provo.  
Salt Lake City.

*Vermont*

Brattleboro.  
Burlington.  
Middlebury.  
Montpelier.

Newport. C. H.  
Rutland.  
St. Albans. C. H.  
St. Johnsbury.

*White River Junction.*

*Virginia*

\*Abingdon.  
\*Alexandria.  
\*Blacksburg.  
\*Charlottesville.  
\*Clifton Forge.  
\*Lynchburg.

Norfolk.  
Richmond.  
Roanoke.  
Staunton.  
\*Winchester.

*Washington*

Aberdeen.  
Bellingham.  
\*Centralia.  
\*Everett.  
Olympia.  
\*Pasco.  
Port Townsend.  
\*Pullman.

\*Raymond.  
Seattle.  
Spokane.  
Tacoma.  
Vancouver.  
Walla Walla.  
Wenatchee.  
Yakima.

*West Virginia*

Bluefield.  
Charleston.  
Clarksburg.  
Elkins.  
Grafton.  
Hinton.

Huntington.  
Martinsburg.  
Morgantown.  
Parkersburg.  
Wheeling.

*Wisconsin*

Appleton.  
Ashland.  
Eau Claire.  
Fond du Lac.  
Green Bay.  
Janesville.  
La Crosse.

Madison.  
Marinette.  
Milwaukee.  
\*Rhinelander.  
Stevens Point.  
Superior.  
Wausau.

*Wyoming*

\*Casper.  
Cheyenne.  
\*Cody.  
\*Evanston.  
Lander.<sup>‡</sup>

Laramie.  
Rawlins.  
\*Rock Springs.  
Sheridan.

<sup>‡</sup> Address local secretary, care U. S. Land Office.

<sup>§</sup> Address local secretary, care Forest Service.

<sup>¶</sup> Address local secretary, care Immigration Service, 508 Grant Street.

<sup>‡</sup> U. S. Civil Service Commission represented in Porto Rico by chairman, Porto Rican Civil Service Commission, San Juan.

## DESIGN OF TUNED REED COURSE INDICATORS FOR AIRCRAFT RADIOBEACON

The tuned reed indicator, a simple and reliable instrument for use in connection with the radiobeacon system developed by the Bureau of Standards for guiding aircraft, is described in Research Paper No. 28 in the Bureau of Standards Journal of Research for November, 1928.

This visual indicator, which operates from the output of a radio receiving set tuned to the radiobeacon, indicates whether or not the airplane is flying on a specified course, and if not, to which side and how much it has deviated. This indication is given by the relative amplitude of vibration of two steel reeds. Equal amplitudes of the two reeds indicates that the airplane is on the course. These reeds give a continuous indication to the pilot of his position with respect to his course. The indicator unit containing the vibrating reeds is arranged to plug into a shock-proof mounting on the instrument board of the airplane. Several types of indicators are described and data given on each. Reprints of this paper may be obtained for 5 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

## RECEIVING SETS FOR AIRCRAFT BEACON AND TELEPHONY

A striking advance in the safety and reliability of air navigation is the system of radiobeacons and navigational aid messages broadcast from ground radio telephone stations which has been developed by the Bureau of Standards. This depends for its success on the provision of a suitable radio receiving set for use aboard airplanes. Such a set has been designed by the Bureau of Standards, containing special features for aeronautic use. It is tunable by means of a single control over the frequency band from 285 to 350 kilocycles (850 to 1,050 meters) which was allotted to aircraft communications and radiobeacons by the International Radio Convention of Washington, 1927. The set is very compact and light in weight. It is so sensitive that a small vertical pole antenna can be employed to pick up the radio signals, thereby reducing the night errors in radiobeacon bearings, as well as removing the danger of a trailing wire antenna.

This set is described in Bureau of Standards Research Paper No. 19, *Receiving Sets for Aircraft Beacon and Telephony*, by H. Pratt and H. Diamond, which appeared in the October, 1928, issue of the Bureau of Standards Journal of Research. Copies of this research paper may be obtained for 15 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

## REFERENCES TO CURRENT RADIO LITERATURE

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

R100.—*Radio principles*

- R007.1 Hooper, S. C. Considerations affecting the licensing of high-frequency stations. *Proc. Inst. of Radio Engrs.*, 16, pp. 1240-51; September, 1928.  
Discussion based on study while with Federal Radio Commission.
- R113 Edwards, S. W., and Brown, J. E. The use of radio field intensities as a means of rating the outputs of radio transmitters. *Proc. Inst. of Radio Engrs.*, 16, pp. 1173-93; September, 1928.  
A method described by which outputs of radio transmitting sets can be regulated by Federal authority in terms of measured radio field intensities instead of watts in the transmitting set or antenna circuit; work done on broadcast range only; field intensity contour maps given for several stations.
- R113 Jansky, C. M., jr. Some studies of radio broadcast coverage in the Middle West. *Proc. Inst. of Radio Engrs.*, 16, pp. 1356-67; October, 1928.  
Statistical study based on reports to station WBBM.
- R113.2 Austin, L. W. Long-wave radio receiving measurements at the Bureau of Standards in 1927. *Proc. Inst. of Radio Engrs.*, 16, pp. 1252-57; September, 1928.  
Curves and tables give daylight signal intensities of a number of stations and strength of atmospheric disturbances.



- R113.4 Breit, G.; Tuve, M. A.; Dahl, O. Effective heights of the Kennelly-Heaviside layer in December, 1927, and January, 1928. *Proc. Inst. of Radio Engrs.*, **16**, pp. 1236-39; September, 1928.  
Report on results of effective heights of Kennelly-Heaviside layer obtained December 19, 1927, to January 16, 1928, by the reflection method.
- R113.6 Hoag, J. B. and Andrew, V. J. A study of short-time multiple signals. *Proc. Inst. of Radio Engrs.*, **16**, pp. 1363-74; October, 1928.  
An investigation of signals which may have traveled one or more times around the earth. Shows reflections of signals from region other than Heaviside layer.
- R125.6 Turlyghin, S. J., and Ponomareff, M. J. Zusammengesetzte Rahmenantennen. (Combination of coil antennæ.) *Zeitschrift für Physik*, **9**, pp. 356-64; 1928.  
Theoretical investigation of coil antennæ and coil combinations and coil antennæ with reflectors.
- R125.6 Walmsley, T. Polar diagrams due to plane aerial reflector systems. *Experimental Wireless (London)*, **5**, pp. 575-77; October, 1928.  
Derivation of formulas by means of which the polar diagram in any vertical plane can be plotted. It is shown that the field behind the reflector is of considerable strength.
- R130 Crossley, A., and Page, R. M. A new method for determining the efficiency of vacuum-tube circuits. *Proc. Inst. of Radio Engrs.*, **16**, pp. 1375-83; October, 1928.  
Method described for determining efficiency of vacuum-tube circuits for high and low frequencies by application of surface pyrometer indicating temperature of glass walls of tube.
- R131 Reed, M. The application of alignment charts to valve characteristics. *Experimental Wireless (London)*, **5**, pp. 571-74; October, 1928.  
The theory of alignment charts is given and applied to the tube equation for the anode and grid voltages and the plate current.
- R132 von Ardenne, M. The final or power stage of amplifiers. *Experimental Wireless (London)*, **5**, pp. 556-64; October, 1928.  
A discussion of the performance of the amplifier stage energizing a loud-speaker. The circuit is treated by means of the dynamic characteristic.
- R132 Medlam, W. B. Effect of anode-grid capacity in detector and low-frequency amplifiers. *Experimental Wireless (London)*, **5**, pp. 545-55; October, 1928.  
An analytical treatment of the effect of the internal tube capacity for detector and low-frequency amplifier circuits.
- R132 Watanabe, Y. Über den rückgekoppelten Verstärker. (On feedback amplifiers.) *Zeitschrift für Hochfrequenztechnik*, **32**, pp. 77-83; September, 1928.  
Equations for the amplification of amplifiers with electrostatic and magnetic feedback.
- R133 Grechowa, M. Zur Frage der Erzeugung kurzer elektromagnetischer Wellen. (On the production of short electromagnetic waves.) *Physikalische Zeitschrift*, **29**, pp. 726-29; October 15, 1928.  
Based on an equation by Abraham; the case of the Barkhausen and the Gill and Morrell oscillations are studied with respect to their frequency.
- R133 Pfitzer, W. Die Selbsterregungsbedingungen bei Rückkopplungs-Röhrensendern für sehr kurze Wellen. (The condition for self-excitation for short waves of tube generators with feedback.) *Elektrische-Nachrichten Technik*, **5**, pp. 348-69; September, 1928.  
The oscillations for very short waves are investigated by taking into account the ground capacity and the interelectrode effects. It is shown that the circuit acts like a voltage divider. The feed-back conditions can then be expressed by simple equations which give expressions for the natural oscillations.
- R134 Terman, F. E. Some principles of grid-leak grid-condenser detection. *Proc. Inst. of Radio Engrs.*, **16**, pp. 1384-97; October, 1928.  
Bases discussion on equivalent circuits, measures detection factors.
- R145.3 Wheeler, H. A. Simple inductance formulas for radio coils. *Proc. Inst. Radio Engrs.*, **16**, pp. 1398-1400; October, 1928.  
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## R200.—Radio measurements and standardization

- R201.2 Eisner, F. Über punktförmige Aufnahme von Wechselstromkurven, insbesondere bei hoher Frequenz. (On the point-by-point method for tracing a. c. curves, particularly at high frequency.) *Archiv für Elektrotechnik*, **20**, pp. 473-502; September 17, 1928.  
A three-electrode tube method is described for tracing wave shapes by the point-to-point method. The method seems good up to about 10 kilocycles, although results have been obtained up to 150 kilocycles.
- R210 Westman, H. P. Frequency stability by magnetostriction oscillators. *QST*, **12**, pp. 21-26; November, 1928.  
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- R220 Graham, V. M. A gang capacitor testing device. *Proc. Inst. of Radio Engrs.*, **16**, pp. 1401-03; October, 1928.  
Description of testing of gang condensers.
- R250 Coursey, P. R. On the application of condensers to the measurement of large radio-frequency currents. *Experimental Wireless (London)*, **5**, pp. 565-71; October, 1928.  
The methods for measuring large radio-frequency currents are discussed and the method with two condensers in parallel is described in detail.

- R251.2 Colebrook, F. M., and Wilmotte, R. M. The design of noncontact thermojunction ammeters. *Experimental Wireless* (London), **5**, pp. 538-44; October, 1928.  
Contact and noncontact types of thermojunction a. c. ammeters are compared. General principles are given of the designing of the noncontact type. Description of two designs of noncontact types embodying these principles, with details as to performance. An account of a particular application as a known source of radio-frequency voltage is given.
- R300.—*Radio apparatus and equipment*
- R326 Szekely, A. Über die einem Empfänger durch Erdung zugeführte Energie—II. (On a receiving set, energy for which comes from the ground—II.) *Zeits. für Hochfrequenztechnik*, **32**, pp. 83-86; September, 1928.  
The author finds that a coil antenna which has in addition a vertical lead-in to ground gives a larger current reading. The increase is due to the induction of the field on the vertical lead and is not due to the ground.
- R342 Rukop, H. Die elektrischen Eigenschaften der Rundfunksender-Vorverstärker im Hinblick auf ihre akustischen Qualitäten. (On the electrical properties of broadcast transmitter amplifiers with regard to their acoustic qualities.) *Zeits. für Hochfrequenztechnik*, **32**, pp. 86-93; September, 1928.  
Final paper of articles which appeared in this periodical, volume 32, page 18, 1928, and page 65, 1928. Deals with the frequency-amplitude characteristics of the amplifier.
- R342.15 Diamond, H., and Stowell, E. Z. Note on radio-frequency transformer theory. *Proc. Inst. Radio Engrs.*, **16**, pp. 1194-1202; September, 1928.  
General equations worked out which include the effect of the distributed capacity coupling existing between transformer windings.
- R382 Rucklin, R. Ein experimenteller Beitrag zum Spulenproblem. (An experimental contribution on the coil problem.) *Archiv für Elektrotechnik*, **20**, pp. 507-532; September 17, 1928.  
Experimental and theoretical investigation of single-layer and pancake coils with respect to the critical frequency and current and voltage distribution. The theory includes also the contributions due to Ruedenberg, Wagner, Boehm, von Steidingen, Rogowski, and Dreyfuss.
- R385.3 Schulgin, W. M. Der Wehnelt-Unterbrecher als Generator elektromagnetischer Schwingungen. (The Wehnelt interrupter as generator of electromagnetic oscillations.) *Physikalische Zeitschrift*, **29**, pp. 724-26; October 15, 1928.  
Across a Wehnelt interrupter (platinum lead) a resonator is connected and a voltage from a direct-current source impressed across the interrupter (platinum forms the negative pole). High-frequency oscillations are produced in the resonator circuit as in the arc generator.
- R385.5 Hartmann, C. A. Neuere Untersuchungen an Kohlmikrophonen. (New investigations on carbon microphones.) *Elektrische-Nachrichten Technik*, **5**, pp. 344-47; September, 1928.  
Methods for testing microphones.
- R388 Sommerfeld, E. Über ein Kathodenoszillographen höher Spannungsempfindlichkeit. (On a cathode-ray oscillograph of high-voltage sensitivity.) *Archiv für Elektrotechnik*, **20**, pp. 607-618; September 17, 1928.  
A cathode-ray oscillograph with accelerated grid and inside photographic arrangement with a sensitivity of 0.1 cm. per volt is described.
- R388 Rogowski, W.; Sommerfeld, E.; and Wolman, W. Empfindlicher Glühkathodenoszillograph für Innenaufnahmen in einem Vorkuum. (Sensitive cathode-ray oscillograph for photos inside the tube under a vacuum.) *Archiv für Elektrotechnik*, **20**, pp. 619-24; September 17, 1928.  
The effect of the acceleration grid is brought out by several oscillograms. It is shown that slow electrons only slightly affect the photographic plate which is inside the tube, and an increase of the speed of the electrons by fast transients does not help much. The slow-moving electrons are therefore accelerated by a grid before falling in the plate. If an accelerating grid is not used, it is better to photograph the fluorescence with a camera outside the tube.
- R500.—*Applications of radio*
- R521 Pratt, H., and Diamond, H. Receiving sets for aircraft beacon and telephony. *Bureau of Standards Journal of Research*, October, 1928. Research Paper No. 19. Reprint copies obtainable for 15 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.  
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- R526.1 Dunmore, F. W. Design of tuned reed course indicators for aircraft radiobeacon. *Bureau of Standards Journal of Research*, November, 1928. Research Paper 28. Reprint copies obtainable for 5 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.  
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- R526.1 Shangraw, C. C. Radiobeacons for trans-Pacific flights. *Proc. Inst. of Radio Engrs.*, **16**, pp. 1203-35; September, 1928.  
Description of equisignal radiobeacon system developed by the Air Corps and Signal Corps aircraft radio laboratories. Application of these radiobeacons in the recent trans-Pacific flights.
- R536 Jakosky, J. J. Electrical prospecting. *Proc. Inst. of Radio Engrs.*, **16**, pp. 1305-55; October, 1928.  
Electrical geophysical methods for locating minerals.
- R582 Picture telegraphy. *Post Office Engrs. Jour.* (London), **21**, pp. 191-99; October, 1928.  
Résumé of various systems of picture telegraphy.

## R600.—Radio stations: Equipment, operation, and management

- R610 Pession, G., and Montefinale, G. Radiotelegraphic center at Rome (San Paolo). Proc. Inst. of Radio. Engrs., 16, pp. 1404-21; October, 1928.  
Description of station San Paolo, including new short-wave transmitting set.

## R800.—Nonradio subjects

- 534 Trendelenburg, F. Zusammenfassenden Bericht: Über neuere akustische und insbesondere elektroakustische Arbeiten. (Summary report: On new acoustic and especially electrical acoustic papers.) Zeits. für Hochfrequenztechnik, 32, pp. 94-99; September, 1928.  
In this continuation of a series of papers the acoustic field in space is discussed. The treatment considers reverberation such as originally given by W. C. Sabine and lately by F. R. Watson.
- 534 Die Tonerzeugung durch Spitzen an hohen Wechselfpotential und ihre Verwendung als membranloser Lautsprecher. (The sound production by means of needle gaps and high alternating potential and its application to a loud-speaker without a diaphragm.) Naturwissenschaft, 16, pp. 795-96; October 19, 1928.  
A method is described where, by means of a needle gap and a high voltage across it, sounds are produced. This principle is then applied to a new type of a loud-speaker.
- 534.3 Harrington, E. A. The vibration of tuning forks. Jour. Opt. Soc. and Rev. of Scientific Instruments, 17, pp. 224-39; September, 1928.  
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- 534.83 Service, J. A. Radio acoustic position finding in hydrography. Jour. Amer. Inst. of Elec. Engrs., 47, pp. 670-74; September, 1928.  
In this method the sound of a bomb alongside the ship whose position is to be determined affects a microphone at the shore and by means of it sends out a radio signal which is recorded on the same chronograph as the report of the bomb on the ship. The time interval between sound report and radio signal gives a means for calculating the distance to the shore. In addition, a device for quickly plotting the field sheet is described.
- 537.65 Skellet, A. M. Visual method for studying modes of vibration of quartz plates. Jour. Opt. Soc. of America and Rev. of Scientific Instruments, 17, pp. 308-17; October, 1928.  
Experimental study of the different modes of resonator frequencies of quartz plates. The glow discharge method of Glebe and Scheibe is used.
- 538 Masiyama, Y. On the magnetostriction of a single crystal of nickel. Science Reports of Tohoku University, Japan, 17, pp. 945-61; August, 1928.  
Longitudinal and transverse effects due to magnetostriction were studied in a crystal of nickel whose shape was that of an oblate ellipsoid. When the ellipsoid was in different positions of a magnetic field, the longitudinal effect produces a contraction. The transverse effect is the reverse.

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