

# RADIO SERVICE BULLETIN

ISSUED MONTHLY BY RADIO DIVISION

Washington, May 31, 1928—No. 134

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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. O = west longitude. N = north latitude. S = south latitude.  
 Call = Call signal (letters) assigned.  
 System = Radio system used and sparks per second.  
 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.  
 Service = Nature of service maintained:  
     FX = Point-to-point (fixed service).  
     PG = General public.  
     PR = Limited public.  
     RC = Radio compass.  
     FA = Aeronautical station.  
     AB = Aviation beacon.  
     B = Beacon.  
     P = Private.  
     O = Government business exclusively.  
 Hours = Hours of operation:  
     N = Continuous service.  
     X = No regular hours.  
 F. T. Co. = Federal Telegraph Co.  
 I. R. T. Co. = Intercity Radio Telegraph Co.  
 I. W. T. Co. = Independent Wireless Telegraph Co.  
 K. & C. = Kilbourne & Clark Manufacturing Co.  
 M. R. T. Co. = Mackay Radio and 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.
U. R. Corp.	= Universal Radio Corp.
W. S. A. Co.	= Wireless Specialty Apparatus 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.
△	= 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, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave lengths	Service	Hours	Station controlled by—
Big Port Walter, Alaska <sup>1</sup>	KPV	59.93	FX	X	Port Walter Herring & Packing Co.
Bristol Bay, Alaska <sup>2</sup>	KGGR	600, 650	FX	X	Red Salmon Canning Co.
Chicago, Ill. <sup>3</sup>	WLA	53.73	FA	X	Davis Industries.
Dapa, P. I. (Surigao Province) <sup>4</sup>	KZDF	600-1000	PG		Philippine Insular Government.
Kokomo, Ind. <sup>5</sup>	WKH	53.73	FA	X	Davis Industries.
Kukak Bay, Alaska <sup>6</sup>	KGGS	709	FX	X	Hemrich Packing Co.
Marion, Ill. <sup>6</sup>	WEU	71.7	FA		Egyptian Transportation System.
Palo Alto, Calif. <sup>7</sup>	KRK	27.16, 54.22	PG	N	Mackay Radio & Telegraph Co.
Port Alexander, Alaska <sup>8</sup>	KPR	600, 732, 1442, 1667	FX	X	Karl Hansen.
Port Herbert, Alaska <sup>9</sup>	KOV	149.85	FX	X	United States Alaska Packing Co.
Uzinki, Alaska <sup>10</sup>	KZU	95.3	P	X	Katmai Packing Co.

<sup>1</sup> Loc. (approximately) 134° 38' 00" W., 56° 22' 00" N., range, 300; system, composite, v. t. telegraph, c. w.

<sup>2</sup> Loc. (approximately) 156° 25' 00" W., 58° 43' 00" N., range, 160; system, Marconi, 1000.

<sup>3</sup> System, composite, v. t. telephone.

<sup>4</sup> Loc. (approximately) 126° 03' 20" E., 9° 46' 00" N., range, 70; system, v. t. telegraph; c. w.; hours, 8 a. m. to 12 noon and 2 to 5.30 p. m. daily, 9 to 11 a. m. Sundays and holidays; ship service first 10 minutes of each hour; rates, 6 cents per word.

<sup>5</sup> Loc. (approximately) 154° 10' 00" W., 58° 20' 00"; system, K. & C., 1000.

<sup>6</sup> System, composite, v. t. telephone; hours, hourly intervals from 10 a. m. to 6 p. m. and 9.30 p. m. to 5 a. m.

<sup>7</sup> Loc. 122° 9' 49" W., 37° 26' 23" N., system F. T. Co. v. t., c. w., i. c. w., rates, 10 cents per word.

<sup>8</sup> Loc. (approximately) 134° 37' 00" W., 56° 12' 00" N.; system composite v. t. telegraph.

<sup>9</sup> Loc. (approximately) 135° 00' 00" W., 57° 00' 00" N., range, 50; system, composite, v. t. telephone.

<sup>10</sup> Loc. (approximately) 152° 29' 30" W., 57° 54' 40" N., range, 300; system, composite v. t. telegraph, i. c. w.

*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, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Name of vessel	Call signal	Rates	Service	Hours	Owner of vessel
Camargo	WRBY				Julius Fleischmann.
Celtic	WGDA	3	PG		Robert Dollar Co.
Walaleale	WGDB				Inter Island Steam Navigation Co.

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

[b, ship station; c, land station]

Call signal	Name of station	Call signal	Name of station
KGGR	Bristol Bay, Alaska.....c	KZU	Uzinki, Alaska.....c
KGGS	Kukak Bay, Alaska.....c	WEU	Marion, Ill.....c
KOV	Port Herbert, Alaska.....c	WGDA	Celtic.....b
KPR	Port Alexander, Alaska.....c	WGDB	Waialeale.....b
KPV	Big Port Walter, Alaska.....c	WKH	Kokomo, Ind.....c
KRK	Palo Alto, Calif.....c	WLA	Chicago, Ill.....c
KZDP	Dapa, P. I. (Surigao Province).....c	WRBY	Camargo.....b

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

[Additions to the List of Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave length	Service	Hours	Station controlled by—
Friendship.....	WOX	600, 800.....	P	X	Mechanical Sciences Corporation, Boston, Mass.
Greater Rockford..	KHAH	23.62, 47.24, 94.4.....	P	X	Hassell Flight Committee, Rock- ford, Ill.

*Commercial aircraft stations, alphabetically, by call signals*

Call signal	Name of station	Call signal	Name of station
KHAH	Greater Rockford.	WOX	Friendship.

*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, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave length	Service	Hours	Station controlled by—
Crane.....	NUDJ	.....	O	X	Department of Commerce, Bureau of Fisheries.
F. H. Hilliard.....	WYCM	.....	O	X	U. S. Army.

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

[b, ship station; c, land station]

Call signal	Name of station	Call signal	Name of station
NUDJ	Crane.....b	WYCM	F. H. Hilliard.....b

*Special 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, 1927]

Station	Call signal	Wave length (meters)	Frequency (kilocycles)	Power (watts)	Station controlled by—
Brooklyn, N. Y. ....	2XBP	20, 40, 80, 850-950	15,000, 7,500, 3,750, 353-315.	50	Pilot Electric Manufacturing Co., 323 Berry Street.
Chicago, Ill. ....	9XAD	65.57	4,575	5	Joseph G. Branch, 3917 South Parkway.
Portable: Airplane No. 4876.	2XBQ	20, 40, 80, 850-950	15,000, 7,500, 3,750, 353-315.	50	Pilot Electric Manufacturing Co., 323 Berry Street.

*Special land stations, grouped by districts*

Call signal	District and station	Call signal	District and station
2XBP 2XBQ	Second district: Brooklyn, N. Y. Portable: Airplane No. 4876.	9XAD	Ninth district: Chicago, Ill.

**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, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

AKUTAN, ALASKA.—Owner of station, Warehouse Co.  
 ALITAK, ALASKA.—W. l., add 1667.  
 ANNETTE ISLAND, ALASKA.—W. l., add 1667.  
 BACHAROF, ALASKA.—W. l., add 1667.  
 BEAR CREEK, ALASKA (Nyac).—Range 50; w. l., 37.01.  
 BOCA DE QUADRA, ALASKA.—W. l., 700, add 1667.  
 BRISTOL BAY, ALASKA.—W. l., add 1667.  
 CAPE CHACON, ALASKA.—W. l., add 1667.  
 CHICAGO, ILL.—W. l., add 35.77, 47.8, 54.3.  
 CHIGNIK, ALASKA (KHC).—W. l., add 1667.  
 CHIGNIK, ALASKA (KJB).—W. l., add 1667.  
 CHOMLY, ALASKA.—W. l., add 1667.  
 CLARKS POINT, ALASKA.—W. l., add 1667.  
 CLEVELAND, OHIO (WCY).—W. l., add 35.77, 47.8, 54.3.  
 CLEVELAND, OHIO (WLI).—W. l., add 50.99 (U. S. L.).  
 DULUTH, MINN. (WRL).—W. l., add 35.77, 47.8, 54.3.  
 DUNDAS, ALASKA.—W. l., add 1667.  
 EGEKIK, ALASKA.—W. l., add 1667.  
 EKUK, ALASKA.—W. l., add 1667.  
 FUNTER, ALASKA.—W. l., add 1667.  
 HECETA ISLAND, ALASKA.—W. l., add 1667.  
 HIDDEN INLET, ALASKA.—W. l., add 1667.  
 HUNTERS BAY, ALASKA.—W. l., add 1667.  
 HYDER, ALASKA.—W. l., add 1667.  
 KAKE, ALASKA.—W. l., add 1667.  
 KARLUK, ALASKA.—W. l., add 1667.  
 KASAAN, ALASKA.—W. l., add 1667.  
 KENAI, ALASKA (KLD).—W. l., add 1667.  
 KENAI, ALASKA (KYZ).—W. l., add 1667.  
 KOGGIUNG, ALASKA (KUBX).—W. l., add 1667.  
 KOGGIUNG, ALASKA (KVV).—W. l., add 1667.  
 KVICHAK, ALASKA (KHB).—W. l., add 1667.  
 KVICHAK, ALASKA (KVQ).—W. l., add 1667.  
 LAKE BAY, ALASKA.—W. l., add 1667.

- LIBBYVILLE, ALASKA.—W. l., add 1667.  
 L. MCN. & L. VI No. 1 (moored vessel in Alaska).—W. l., add 900, 1667.  
 LOCKANOK, ALASKA.—W. l., add 1667.  
 LORING, ALASKA.—W. l., add 1667.  
 MAZAMA (moored vessel in Alaska).—Owner of vessel, Everett Packing Co.  
 MOUNT BAKER (moored vessel in Alaska).—Service P; owner of vessel, Red Salmon Canning Co.  
 NAKEN, ALASKA.—W. l., add 49.15, 107.1, 1667.  
 NAKNEK, ALASKA.—W. l., add 1667.  
 NUSHAGAK, ALASKA (KKAE).—W. l., add 1667.  
 NUSHAGAK, ALASKA (KNJ).—W. l., add 1667.  
 PALO ALTO, CALIF. (KRK).—Loc. 122° 9' 49" W., 37° 26' 23" N.  
 PILOT POINT, ALASKA.—W. l., add 1667.  
 POINT WARDE, ALASKA.—W. l., add 1,667.  
 PORT ALTHORP, ALASKA.—W. l., add 1,667.  
 PORT ARMSTRONG, ALASKA.—W. l., add 1,667.  
 PORT HOBROON, ALASKA.—W. l., 600, 675; service, PG; station controlled by the Warehouse Co.  
 PORTLAND, OREG. (KPK).—Loc. 122° 40' 39" W., 45° 30' 17" N.  
 PYBUS BAY, ALASKA.—W. l., add 1,667.  
 QUADRA, ALASKA (KHD).—W. l., add 1,667.  
 QUADRA, ALASKA.—(KOR).—W. l., add 1,667.  
 RED BLUFF BAY, ALASKA.—W. l., add 1,667.  
 ROSE INLET, ALASKA.—W. l., add 1,667.  
 RUBY, ALASKA.—W. l., add 1,667.  
 SAGINAW BAY, ALASKA.—W. l., add 1,667.  
 SEATTLE, WASH. (KPA).—Loc. (approximately) 120° 22' 00" W., 36° 21' 00" N.  
 SHAKAN, ALASKA.—W. l., add 1,667.  
 SNAG POINT, ALASKA.—W. l., add 1,667.  
 TAKU HARBOR, ALASKA.—W. l., add 1,667.  
 TENAKEE, ALASKA.—W. l., add 1,667.  
 TYEE, ALASKA.—W. l., 625, 700, 1,667.  
 UNION BAY, ALASKA.—W. l., add 1,667.  
 UYAK, ALASKA (KHA).—W. l., add 1,667.  
 UYAK, ALASKA (KHV).—W. l., add 1,667.  
 VIEW COVE, ALASKA.—W. l., add 1,667.  
 WARM SPRINGS BAY, ALASKA.—W. l., add 1,667; station controlled by United States-Alaska Packing Co.  
 WATERFALL, ALASKA.—W. l., add 49.15, 107.1, 1,667.  
 YAKUTAT, ALASKA.—W. l., add 1,667.  
 YES BAY, ALASKA.—W. l., add 1,667.  
 Strike out all particulars of the following-named stations: Port Walter, Alaska; Pysht, Wash.; Squaw Harbor, Alaska.

## 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, 1927, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

- AFEL.—Station controlled by R. M. C. A.  
 BEARPORT.—Owner of vessel, Oceanic & Oriental Navigation Co.  
 BETTERTON.—W. l., 600, 705, 800.  
 B. H. TAYLOR.—W. l., 715, 875, 1,800.  
 CALCITE.—Range, 150; w. l., 715, 875, 1,800.  
 CITY OF SEATTLE.—Station controlled by owner of vessel.  
 CLIFFWOOD.—Station controlled by R. M. C. A. (U. S. L.).  
 COMERIS.—Correct orthography Comerio.  
 CRISFIELD.—Name changed to Golden Horn; owner of vessel, Oceanic & Oriental Navigation Co.  
 CUPRUM.—Name changed to Shelton; owner of vessel, Tacoma-Oriental S. S. Co.  
 DEWEY.—Name changed to Golden Fleece.  
 EASTERN GLEN.—Correct orthography Eastern Glenn (U. S. L.).  
 F. A. WARNER.—Owner of vessel, Coos Bay Lumber Co.  
 FAYETTE BROWN.—Owner of vessel, Stewart Furnace Co.  
 FIRMORE.—Owner of vessel, Guaranty Trust Co.  
 FRANK G. DRUM.—Range, 200; w. l. 600, 705, 800.  
 GAFFNEY.—Name changed to Barreado.

- HANNAWA.—Name changed to Jefferson Myers; owner of vessel, Steamship Jefferson Myers (Inc.).
- JACOB T. KOPP.—Name changed to G. N. Wilson.
- JOHN C. KIRKPATRICK.—Range, 200; system, composite, 1000; w. l., 600, 705, 800; station controlled by M. R. T. Co.
- JOHN G. MUNSON.—W. l., 715, 875, 1800.
- LAKE FLATONIA.—Owner of vessel, Fox Bros.
- LAKE GIDDINGS.—Owner of vessel, Newton S. S. Corporation.
- LAKE INGLENOOK.—Owner of vessel, Newton S. S. Corporation.
- LIO.—W. l., 600, 705, 800, 1887, 1987, 2098, 2128.
- M. A. BRADLEY.—Owner of vessel, Stewart Furnace Co.
- MALOLO.—Owner of vessel, Matson Navigation Co.
- MERICOS H. WHITTIER.—W. l., 600, 705, 800.
- NABESNA.—Owner of vessel, Nabesna S. S. Co.
- NORTHWESTON.—Correct orthography Northwestern (U. S. L.).
- NORWOOD.—Station controlled by R. M. C. A.
- OAKRIDGE.—Name changed to Oregon; owner of vessel, States S. S. Co.
- OLEN.—Name changed to Berury; owner of vessel, U. S. S. B.; station controlled by R. M. C. A. (U. S. L.).
- OLEUM.—W. l., 600, 705, 800.
- ORMIDALE.—Owner of vessel, Gravel Motorship Corporation.
- PACIFIC FIR.—Owner of vessel, Dimon S. S. Corporation.
- PACIFIC PINE.—Owner of vessel, Dimon S. S. Corporation.
- PANAY.—Name changed to William Nelson.
- PAUL SHOUP.—W. l., 600, 705, 800.
- PHYLLIS.—W. l., 600, 705, 800.
- POINT ARENA.—Owner of vessel, Gulf Pacific Line.
- POINT MONTARA.—Owner of vessel, Gulf Pacific Line.
- SAMOA.—W. l., 600, 705, 800.
- SANTA INEZ.—System, Marconi, 1000; w. l., 600, 705, 800.
- STANLEY DOLLAR.—Station controlled by owner of vessel.
- STANWOOD.—W. l., 600, 705, 800.
- SUJERSEYCO.—Owner of vessel, Matson Navigation Co.
- SUSHERICO.—Owner of vessel, Matson Navigation Co.
- TILLAMOOK.—System, F. T. Co., 1000; w. l., 600, 705, 800.
- T. W. ROBINSON.—Range, 300; system, composite v. t. telegraph.
- WASHTENAW.—W. l., 600, 705, 800.
- WAWALONA.—Name changed to Wisconsin; owner of vessel, States S. S. Co.
- WEST CHOPAKA.—Name changed to Golden Dragon; owner of vessel, Oceanic & Oriental Navigation Co.
- WEST HELIX.—Name changed to Pacific Hemlock.
- WEST HIMEON.—Owner of vessel, Tacoma-Oriental S. S. Co.
- WEST HIXTON.—Name changed to California; owner of vessel, States S. S. Co.
- WEST HOLBROOK.—Name changed to Michigan; owner of vessel, States S. S. Co.
- WEST MINGO.—System, Navy-Lowenstein, 1000; w. l., 600, 705, 800.
- WESTMOUNT.—Name changed to Pacific Redwood.
- WEST NIVARIA.—Owner of vessel, Oceanic & Oriental Navigation Co.
- W. F. WHITE.—Range, 200; system, composite v. t. telegraph; w. l., 715, 875, 1800; rates, Great Lakes service, 4 cents per word.
- WILCOX.—Station controlled by R. M. C. A.
- W. R. CHAMBERLIN, Jr.—W. l., 600, 705, 800.
- Strike out all particulars of the following-named vessels: *Apollo, Constitution, Grace Dollar, Nile, Overbrook.*

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

KDFR, read Jefferson Myers; KDIJ, read Shelton; KDJG, read Pacific Redwood; KDVH, read Golden Dragon; KDVS, read G. N. Wilson; KEXM, read Wisconsin; KFUA, read William Nelson; KICR, read Barreado; KINR, read Berury; KODT, read Golden Fleece; KOKP, read Golden Horn; KUKV, read California; KUTD, read Oregon; KUXB, read Michigan; KWN, read Comerio; WSUA, read Pacific Hemlock; strike out all particulars following the call signals, KEQ, KFEM, KFP, KHI, KJA, KLAE, KOSD, WOU.

## 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, 1927]

- KFVD (Venice, Calif.).—Changed to Culver City, Calif.  
 KGCH (Wayne, Nebr.).—Owner, Farmers & Merchants Cooperative Radio Corporation of America.  
 KGCL (Seattle, Wash.).—Call changed to KPQ.  
 KGFH (La Crescenta, Calif.).—Changed to Glendale, Calif.  
 KGFI (San Angelo, Tex.).—Owner, San Angelo Broadcasting Co.  
 KGHD (Missoula, Mont.).—Owner, Elmore-Nash Broadcasting Corporation.  
 KGHI (Little Rock, Ark.).—W. l., 260.7; fy., 1,150.  
 KGKB (Goldthwaite, Tex.).—W. l., 280.2; fy., 1,070.  
 KICK (Atlantic, Iowa).—Changed to Red Oak, Iowa; owner, Red Oak Radio Corporation, lessee.  
 KRAC (Shreveport, La.).—Call changed to KRMD; owner, Robert M. Dean.  
 KUJ (Seattle, Wash.).—Changed to Longview, Wash.; owner, F. W. Lovejoy and R. W. Kerfoot.  
 KXRO (Aberdeen, Wash.).—Disregard notice of deletion in this publication for last month; w. l., 223.7; fy., 1,340.  
 WBES (Takoma Park, Md.).—Changed to Salisbury, Md.; owner, Tom F. Little.  
 WBRS (Cliffside, N. J.).—Call changed to WCOH; location changed to Greenville, N. Y.; owner, Westchester Broadcasting Corporation.  
 WCAP (Asbury Park, N. J.).—Power, 1,000 day, 500 night.  
 WCBE (New Orleans, La.).—Call changed to WDSU.  
 WDAY (Fargo, N. Dak.).—Owner, WDAY (Inc.).  
 WDEL (Wilmington, Del.).—Power, 250.  
 WGBF (Evansville, Ind.).—Owner, Evansville On The Air (Inc.).  
 WLBF (Kansas City, Mo.).—Changed to Kansas City, Kans.  
 WNRC (Greensboro, N. C.).—Power, 500.  
 WQBC (Utica, Miss.).—Owner, Utica Chamber of Commerce.  
 WRBI (Tifton, Ga.).—W. l., 222.1; fy., 1,350.  
 WRBJ (Hattiesburg, Miss.).—W. l., 249.9; fy., 1,200.  
 WRBL (Columbus, Ga.).—W. l., 256.3; fy., 1,170.  
 WRBQ (Greenville, Miss.).—W. l., 275.1; fy., 1,090.  
 WSAI (Mason, Ohio).—Crosley Radio Corporation, lessee.  
 Strike out all particulars of the following-named stations: KGHO (Fort Stockton, Tex.); KFVI (Houston, Tex.); WKBL (Monroe, Mich.); WEAM (North Plainfield, N. J.); WQBA (Tampa, Fla.).

## 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, 1927, and to the International List of Radiotelegraph Stations, published by the Berne Bureau]

- CAPE HATTERAS, N. C.—Notice of deletion in this publication for last month applied only to the traffic station; the compass station is still in commission and is now located in  $75^{\circ} 31' 18.3''$  W.,  $35^{\circ} 15' 58.9''$  N.  
 Strike out all particulars of the following-named stations: Copper Center, Alaska; Little Squaw Mine, Alaska.

## 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, 1927, and to the International List of Radiotelegraph Stations, published by the Berne Bureau]

- McPHERSON.—Strike out all particulars.

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

- Strike out all particulars following the call signals, WUD, WUE; notice of deletion of NDW in this publication for last month applied only to the Cape Hatteras (N. C.) traffic station.





It extends for a period of 60 days the existing licenses of these stations, subject to all modifications and extensions, to terminate at 3 o'clock a. m., August 1, 1928.

The commission fixes Monday, July 9, 10 o'clock a. m., in its offices in Washington, D. C., as the time and place for a hearing of these applications.

The stations to which this order applies are as follows:

To station ——— and others.

NOTE.—Here follows a list of 162 broadcast stations divided among the five radio zones, as follows: Zone No. 1, 36 stations; zone No. 2, 30 stations; zone No. 3, none; zone No. 4, 91 stations; zone No. 5, 5 stations. Then follows a list of 11 portable broadcast stations referred to in General Order No. 34, cited hereunder, divided as follows: Zone No. 1, 3 stations; zone No. 2, 1 station; zone No. 3, none; zone No. 4, 6 stations; zone No. 5, 1 station.

*Extension of broadcast station licenses* (General Order No. 33, May 25, 1928).—All existing licenses to broadcast, subject to such modifications and extensions heretofore made, are hereby further extended for 60 days to terminate at 3 a. m., August 1, 1928, unless otherwise modified.

*Extension of portable broadcasting station licenses* (General Order No. 34, May 25, 1928).—It is hereby ordered that the existing licenses to all portable broadcasting stations, together with modifications thereof, be extended to July 1, 1928, and will expire at 3 a. m., July 1, 1928.

#### ALABAMA TRANSFERRED TO FOURTH RADIO DISTRICT

Effective July 1, 1928, the State of Alabama will be transferred from the fifth radio district to the fourth radio district, under jurisdiction of the Supervisor of Radio, 524 Post Office Building, Atlanta, Ga.

*Call signals of all master-control and alternate-control stations of the naval communication reserve changed*

Station	From—	To—	Station controlled by—
Wellesley, Mass.....	NRRA	NDA	U. S. Navy.
Oakland, Calif.....	NRRB	NDO	Do.
New York, N. Y.....	NRRC	NDB	Do.
Darby, Pa.....	NRRD	NDC	Do.
Hampton Roads, Va.....	NRRE	NDE	Do.
Atlanta, Ga.....	NRRF	NDJ	Do.
Winter Park, Fla.....	NRRG	NDL	Do.
New Orleans, La.....	NRRH	NDZ	Do.
Baltimore, Md.....	NRRK	NDK	Do.
Madison, Wis.....	NRRL	NDP	Do.
Jacksonville, Fla.....	NRRQ	NDU	Do.
Seattle, Wash.....	NRRS	NDQ	Do.
Los Angeles, Calif.....	NRRW	NDV	Do.
Winnetka, Ill.....	NRRZ	NDS	Do.

The particulars of these stations will appear in the June 30, 1928, edition of the list of Commercial and Government Radio Stations of the United States. The service will be shown as "O" and the hours as "X." The International List of Radiotelegraph Stations, published by the Berne Bureau should be changed accordingly.

#### CALL SIGNAL ASSIGNED TO SOUTH AMERICAN EXPLORING EXPEDITION

Call signal KLQ has been assigned for the temporary use of the Hammon Engineering Co., which is conducting an expedition through South America. No other particulars regarding the transmitting apparatus is available at this time.

#### GENERAL CALL SIGNAL ASSIGNED TO EXPORT S. S. CO.

Call signal WODO has been assigned to the Export S. S. Co. to be used as a general call in communicating general orders and other messages of a general nature to several or all of its vessels.

## LIST OF HIGH-FREQUENCY CHANNELS ALLOCATED TO COMMERCIAL STATIONS

The following allocation of high-frequency channels for commercial interests has been approved by the Federal Radio Commission. This includes the assignment of new channels and the reassignments of channels to all existing licensed stations:

*Tropical Radio Telegraph Co., 7 frequencies*

6, 770	10, 450	12, 940	17, 580
6, 785	10, 470	12, 970	

*American Publisher's Committee, 20 frequencies*

7, 340	7, 820	15, 580	15, 730
7, 355	7, 835	15, 610	15, 760
7, 370	7, 850	15, 640	15, 850
7, 625	7, 925	15, 670	15, 880
7, 640	7, 955	15, 700	15, 910

*Robert Dollar Steamship Co., 8 frequencies*

7, 430	9, 410	14, 860	18, 820
7, 445	10, 930	14, 890	22, 670

*American Telephone & Telegraph Co., 14 frequencies*

6, 755	10, 550	16, 270	21, 060
9, 170	13, 390	19, 220	21, 420
9, 750	14, 470	19, 820	
9, 870	14, 590	18, 340	

*Radio Corporation of America, 65 frequencies*

6, 710	9, 450	13, 900	18, 060
6, 725	9, 470	13, 930	18, 860
6, 740	9, 490	14, 800	18, 900
6, 845	10, 390	14, 830	18, 940
6, 860	10, 410	14, 920	18, 980
6, 890	10, 610	15, 040	19, 020
6, 920	10, 630	15, 430	20, 100
6, 935	11, 680	15, 460	20, 180
6, 950	13, 420	15, 490	20, 260
6, 965	13, 450	15, 970	20, 780
7, 400	13, 480	16, 000	20, 820
7, 415	13, 690	16, 030	21, 220
7, 520	13, 720	17, 860	21, 260
7, 715	13, 780	17, 900	21, 300
8, 950	13, 840	17, 940	
8, 990	11, 950	17, 980	
9, 010	13, 870	18, 020	

*Mackay Radio & Telegraph Co., 37 frequencies*

6, 815	8, 930	13, 960	19, 540
6, 875	8, 970	14, 680	19, 580
7, 670	9, 070	14, 710	19, 620
7, 655	9, 280	14, 740	19, 740
7, 730	10, 490	14, 770	20, 300
7, 745	10, 810	17, 420	20, 980
7, 760	10, 830	17, 660	21, 380
8, 075	13, 000	17, 700	
8, 720	13, 030	18, 260	
8, 850	13, 750	18, 780	

## LIST OF FREQUENCIES ABOVE 4,000 KILOCYCLES ALLOCATED TO GOVERNMENT STATIONS

Under Executive Order of March 30, 1928, the frequencies shown hereunder were allocated for the use of Government stations:

*Frequency-kilocycles*

4, 015	5, 920	8, 750	13, 290
4, 017	5, 925	8, 760	13, 305
4, 020	5, 930	8, 770	13, 308
4, 025	5, 935	8, 860	13, 320
4, 030	5, 940	8, 870	13, 335
4, 045	5, 945	8, 872	13, 575
4, 050	5, 950	8, 880	16, 060
4, 055	5, 955	8, 890	16, 068
4, 060	5, 960	9, 050	16, 080
4, 065	8, 030	12, 045	16, 100
4, 070	8, 034	12, 051	16, 120
4, 075	8, 040	12, 060	16, 180
4, 080	8, 050	12, 075	16, 320
4, 085	8, 060	12, 090	16, 340
4, 090	8, 090	12, 135	16, 420
4, 105	*8, 100	*12, 150	16, 540
4, 135	8, 110	12, 165	16, 620
4, 155	*8, 120	*12, 180	16, 820
4, 205	*8, 130	*12, 195	16, 940
4, 235	*8, 140	*12, 210	17, 020
4, 255	8, 150	12, 225	17, 060
4, 265	8, 160	12, 240	17, 180
4, 295	8, 170	12, 255	17, 200
4, 300	8, 180	12, 315	17, 460
4, 305	8, 210	12, 405	17, 480
4, 310	8, 270	12, 465	17, 500
4, 365	8, 310	12, 615	17, 540
4, 370	8, 410	12, 705	17, 720
4, 375	8, 470	12, 765	17, 740
4, 380	8, 510	12, 795	17, 744
4, 385	8, 530	12, 885	18, 100
4, 430	8, 590	12, 900	20, 085
4, 435	8, 600	13, 095	20, 125
4, 436	8, 610	13, 110	20, 150
4, 440	8, 620	13, 125	20, 225
4, 445	8, 730	13, 140	20, 400
4, 525	8, 740	13, 155	22, 625

## ICE PATROL MAINTAINED IN THE GULF OF ST. LAWRENCE, CANADA

An ice patrol will be maintained in the Gulf of St. Lawrence from Cape Ray to Bird Rocks, Bird Rocks to vicinity of Heath Point (Anticosti Island), and Heath Point to Cape Ray (approximately 47° 37' N., 59° 18' W.) from the opening of navigation in the spring of 1928 until the route is clear of ice. Call signal VCQ has been allotted for the patrol vessel. This call will be used by whatever vessel is engaged in the service.

A regular message embodying ice conditions from Cape Race to Quebec and recommendations as to the route to be followed will be made up by the ice patrol every four hours, at 0100, 0500, etc., G. M. T., and kept on file for immediate transmission by radio to ships upon request.

This information will also be broadcast four times daily by the ice patrol, as follows: (a) At 0100 and 1300 G. M. T. on 600 meters, spark; (b) at 0130 and 1330 G. M. T. on 1,621 meters, i. c. w.

The coast stations at North Sydney (VCO) and Grindstone Island (VCN) will receive this message and will repeat it to ships upon request. Cape Race (VCE) will also include the message in the regular ice reports broadcast by this station at 0215 and 1415 G. M. T. daily.

\* These frequencies available for assignment to commercial companies, subject to recall for Government use upon six months' notice.

Ships requiring the latest information concerning the Gulf of St. Lawrence route should communicate direct with the ice-patrol vessel (VCQ) on 600 meters, spark. The work of the patrol will be greatly facilitated if incoming ships will cooperate in supplying information regarding ice conditions in their vicinity.

TIME SIGNALS TRANSMITTED BY SAN FERNANDO (SPAIN) STATION

Time signals, in accordance with the international (Onogo) system, are transmitted daily, Sundays excepted, from this station, located in Cadiz Bay on the southwest coast of Spain in approximately, longitude 6° 12' W., latitude 36° 28' N., call signal EBY, wave length, 2,000 meters, c. w. The signals are automatically relayed from the standard clock at San Fernando Marine Observatory, the procedure being as follows:

G. M. T.				Signal	Signification
h.	m.	s.	h. m. s.		
12	56	00	to 12 56 55	----- etc.	Preparative.
	57	00	to 57 50	-. . . - etc.	XX, etc.
	57	55	to 58 00	-----	Time signal.
	58	08	to 58 50	-. . . -	NN, etc.
	58	55	to 59 00	-----	Time signal.
	59	06	to 59 50	-----	GG, etc.
12	59	55	to 13 00 00	-----	Time signal.

(After final time signal the general call CQ and call signal EBY are sent.)

The end of the final dash of each time signal represents the exact even minute. The final dots of the signals N and G coincide with the tenth, twentieth, thirtieth, fortieth, and fiftieth seconds of each minute, respectively.

RAME HEAD (ENGLAND) STATION CLOSED AND STATION OPENED AT DEVIL'S POINT, (PLYMOUTH)

According to Admiralty Notice to Mariners No. 582, London, April 14, 1928 the station at Rame Head has been closed and a new station opened at Devil's Point (Plymouth), in approximately longitude 4° 10' W., latitude 50° 22' N.; call signal, GYO, wave length 1,100 i. c. w., 2,800, 3,400, 4,100, c. w. meters. This station will retransmit the Air Ministry weather bulletins for shipping on 1,100 meters at 0918 and 2018.

SOUTHEAST SHOAL LIGHT STATION (CANADA) RADIOBEACON CHANGED

According to Canadian Notice to Mariners 19 (59) of 1928, the clear weather transmitting periods on and after June 1 of this beacon will be as follows: 7 to 7.30 a. m., 1 to 1.30 p. m., and 7 to 7.30 p. m., seventy-fifth meridian time.

LE HAVRE LIGHT VESSEL (FRANCE) RADIOBEACON CHANGED

The radiobeacon on this light vessel located in longitude 0° 09' 05'' W., latitude 49° 31' 55'' N., is now operated continuously during fog every minute, as follows:

.....	.....	.....	-----	-----
10 seconds			30 seconds	
.....	.....	.....	Silent	
10 seconds			10 seconds	

CAPE TRES FORCAS LIGHT STATION (MOROCCO) RADIOBEACON ESTABLISHED

A radiobeacon, operating on 1,000 meters, c. w., has been established at this light station, located in longitude 2° 59' W., latitude 35° 27' N. (approximately). The signal consists of the transmission of the Morse letters T F ( \_ . . . ), followed by a long dash ( \_ \_ \_ ) of four seconds duration. This group will be repeated six times for one minute, after which there will be a silent interval of four minutes.

RADIOBEACON OF ELBE NO. 1 LIGHT VESSEL (GERMANY) CHANGED

The characteristic of the beacon on this vessel has been changed as follows:

— — —	Silent	— — —	Silent
2.8 seconds	1 second	2.8 seconds	1.253 seconds
10 dashes (— etc.), each of 1 second duration, with intervals of 0.253 second between each dash <hr style="width: 100%;"/> 12.277 seconds			
Silent	— — —	Silent	
0.253 second	7.265 seconds	2.352 seconds	

STORM WARNINGS TRANSMITTED BY PARIS (FRANCE) STATION (EIFFEL TOWER)

Eiffel Tower radio station now broadcasts storm warnings when the force of the wind is predicted to exceed 50 feet (15<sup>m</sup>0) per second (force 7 of the Beaufort Scale).

For this purpose the coasts of France have been divided into the following coastal areas: Manche, from the Belgian frontier to and including Carteret; Bretagne, from and including Cherbourg to the estuary of the Loire; Ocean, from and including Lorient to the Gironde; Gascogne, from and including Ile de Re to the Spanish frontier; Roussillon, from the Spanish frontier to and including Cette; Rhone, from and including Cette to Camarat; Provence, from and including Camarat to the Italian frontier; Corse, all the coast of Corsica.

Storm warnings are issued for the areas which are apparently threatened. They are valid for 24 hours from the time indicated in the message.

The warning is transmitted in plain language and comprises (1) the day of the week and the time from which the validity of the warning is reckoned; (2) name of area threatened; (3) the word "tempete," followed by the initial direction from which the storm is expected, designated either as "Nord-est" (NE.), "Sud-est" (SE.), "Sud-ouest" (SW.), or "Nord-ouest" (NW.). Thus, "Nord-est" means that a gale is expected from between north and east, etc. If several areas are threatened, the text of the message is altered accordingly.

Example of message: "Jeudi 15 heures. Manche. Tempete Nort-ouest," meaning, "From (day of the week) until 1500 to-morrow, a gale (wind force exceeding 15 meters per second), and from a direction between north and west, will threaten all parts of the coast between the Belgian frontier and Carteret."

STORM WARNINGS TRANSMITTED BY CHERBOURG (FRANCE) STATION (ROUGES TERRE)

Storm warnings are now issued by the Office National Meteorologique for any of the four coastal areas—Manche, Bretagne, Ocean, Gascogne. (See above notice regarding warnings by Eiffel Tower for explanation.)

The warning is broadcast as soon as received and repeated during the next single operator watch-keeping period which follows, if the first transmission is made outside that period.

The message is preceded by the danger signal TTT (sent slowly), followed by DE FUC. This transmission will commence toward the end of one of the international 3-minute silent periods (which commence at 15 and 45 minutes past each hour). The nature of the warning will be sent immediately after the end of the silent period. The whole message is repeated in its entirety after the lapse of several minutes. (See above notice regarding warnings by Eiffel Tower for example of message.)

Table for conversion of degrees Fahrenheit into degrees centigrade and degrees absolute

°F.	°C.	A.	°F.	°C.	A.	°F.	°C.	A.	°F.	°C.	A.
20	-6.7	266.3	45	7.2	280.2	70	21.1	294.1	95	35.0	308.0
21	-6.1	266.9	46	7.8	280.8	71	21.7	294.7	96	35.6	308.6
22	-5.6	267.4	47	8.3	281.3	72	22.2	295.2	97	36.1	309.1
23	-5.0	268.0	48	8.9	281.9	73	22.8	295.8	98	36.7	309.7
24	-4.4	268.6	49	9.4	282.4	74	23.3	296.3	99	37.2	310.2
25	-3.9	269.1	50	10.0	283.0	75	23.9	296.9	100	37.8	310.8
26	-3.3	269.7	51	10.6	283.6	76	24.4	297.4	101	38.3	311.3
27	-2.8	270.2	52	11.1	284.1	77	25.0	298.0	102	38.9	311.9
28	-2.2	270.8	53	11.7	284.7	78	25.6	298.6	103	39.4	312.4
29	-1.7	271.3	54	12.2	285.2	79	26.1	299.1	104	40.0	313.0
30	-1.1	271.9	55	12.8	285.8	80	26.7	299.7	105	40.6	313.6
31	-0.6	272.4	56	13.3	286.3	81	27.2	300.2	106	41.1	314.1
32	0.0	273.0	57	13.9	286.9	82	27.8	300.8	107	41.7	314.7
33	+0.6	273.6	58	14.4	287.4	83	28.3	301.3	108	42.2	315.2
34	1.1	274.1	59	15.0	288.0	84	28.9	301.9	109	42.8	315.8
35	1.7	274.7	60	15.6	288.6	85	29.4	302.4	110	43.3	316.3
36	2.2	275.2	61	16.1	289.1	86	30.0	303.0	111	43.9	316.9
37	2.8	275.8	62	16.7	289.7	87	30.6	303.6	112	44.4	317.4
38	3.3	276.3	63	17.2	290.2	88	31.1	304.1	113	45.0	318.0
39	3.9	276.9	64	17.8	290.8	89	31.7	304.7	114	45.6	318.6
40	4.4	277.4	65	18.3	291.3	90	32.2	305.2	115	46.1	319.1
41	5.0	278.0	66	18.9	291.9	91	32.8	305.8	116	46.7	319.7
42	5.6	278.6	67	19.4	292.4	92	33.3	306.3	117	47.2	320.2
43	6.1	279.1	68	20.0	293.0	93	33.9	306.9	118	47.8	320.8
44	6.7	279.7	69	20.6	293.6	94	34.4	307.4	119	48.3	321.3

## UNITED STATES 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 June 26, 1928.

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.

Persons who enter this examination will not be admitted to any other examination for which the receipt of applications closes on the date indicated above.

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 will 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:

<i>Subject</i>	<i>Weight</i>
1. Theoretical and practical questions on the construction, use, and adjustment of radio apparatus and auxiliaries.....	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 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. Albany. Birmingham. *Decatur. *Demopolis. *Dothan. Florence. Huntsville. Mobile (C. H.). Montgomery. *Opelika. *Tuscaloosa.	Connecticut: Bridgeport. *Danbury. Hartford. Middletown. New Haven. New London. Waterbury. Willimantic. Delaware: Dover. Wilmington. District of Columbia: Washington. Florida: Gainesville. Jacksonville. *Key West. Miami. Orlando. Pensacola. Tallahassee. Tampa. 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.	Indiana—Continued. 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.	Louisiana—Continued. 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.). Brookton. 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.
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\* Address local secretary, care Alaska Railroad.

\* Address local secretary, care United States Land Office.

\* Address local secretary, care Immigration Service.



## Minnesota—Continued.

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.  
 \*Goldfield.  
 Reno.  
 New Hampshire:  
 Berlin.  
 \*Claremont.

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#### THE STATUS OF FREQUENCY STANDARDIZATION

In a paper which appeared in the May, 1928, Proceedings Institute of Radio Engineers, page 579, under this title, Dr. J. H. Dellinger, chief of the radio section of the Bureau of Standards, shows that frequency standardization, of hitherto laboratory character only, has become of first-rank importance in reducing radio interference. The recent International Radio Conference recognized frequency as the corner stone in the radio structure by devoting its major attention to a frequency allocation to provide for the orderly development of all radio services.

Because of increasing use of all available radio channels, particularly those for broadcasting and the very high frequencies, the requirements of frequency measurements are a hundred times more rigorous than they were five years ago. The perfection of standards and measurements to the necessary accuracy requires the most intensive work by the Government and by various large organizations to produce standards and instruments that can be used to keep radio stations each operating on its own channel. This development has been facilitated by a special cooperative plan organized by the Bureau of Standards a year ago and involving the Commerce, Navy, and War Departments, the General Electric Co., the Westinghouse Co., American Telegraph & Telephone Co., Radio Corporation, and the General Radio Co.

Piezoscillators are now available to hold radio-station frequencies extremely constant. For instruments of this type equipped with temperature control, national and international comparisons have shown that they are reliable to a few parts in 100,000.

This brings in sight the possibility of the use of special piezoscillators in broadcasting stations, which will hold the frequency so close that several such stations can operate simultaneously without heterodyne interference on the same frequency. This is the only practical scheme so far developed for solving the problem of too many broadcasting stations.

The use of frequency standards of this high accuracy is also vital to all users of the very high frequencies. Many more high-frequency channels will become available when all stations use the best available frequency standards and keep the stations on their frequencies with great accuracy.

#### RADIOTELEPHONE COMMUNICATION FROM AN AIRPLANE AT ALL AMERICA AIRCRAFT SHOW

In cooperation with the committee which managed the All America Aircraft Show, held in Detroit, Mich., April 14 to 21, the Bureau of Standards installed and operated radiotelephone equipment on a Ford trimotor airplane. This airplane was used as a flying studio for the broadcasting of speeches and music during the show. Programs originating on the airplane were received on the ground, relayed by wire to a Detroit broadcasting station, and rebroadcast by that station. During each flight an explanation was given as to just how the broadcasting was being carried on and the outstanding technical features involved. Flights were made at night when there was a large radio audience, and reports received from all parts of the country as well as from the people in and around Detroit showed that the programs reached a large number of people and in a very effective way brought to their attention the possibilities of radio communication in air navigation. The flights made were an outstanding feature of the show.

#### AIRPLANE RADIOBEACON VARIATIONS OVERCOME

In the work which the Bureau of Standards is carrying on to develop radio aids to air navigation it was necessary to determine the reliability of the crossed coil radiobeacons which are used to guide aircraft. Experience has shown that the beacons are very reliable in the daytime up to the limit of their distance range. There has been, however, very little information on night reliability.

<sup>2</sup>Address local secretary, care United States Land Office.

A series of night flights between Cleveland and New York were made observing principally the beacon at Bellefonte, Pa., in the middle of the Allegheny Mountains. These flights showed that the beacon was very reliable at night up to a distance of 25 miles and gave accurate bearing most of the time up to 50 miles. Beyond 100 miles bearings observed in this series of flights were usually of questionable value.

Observations made on the ground and in the air indicate that the cause of this shifting of the radio course is a distortion that is introduced in the radio waves as they travel through the upper atmosphere. The nature of this distortion has been carefully studied and analyzed. It is especially pronounced in mountainous regions. By using special antenna arrangements for receiving it has been found that these shifts can be practically eliminated.

The flights mentioned were made with the old type of airplane antenna consisting of a long trailing wire. Such antennas by reason of hanging down at a slanting angle do not have the necessary characteristics to eliminate the effect of false radio course indications at night. A new type of antenna consisting of a vertical 10-foot metal pole has been developed by the Bureau of Standards. The use of so short an antenna has been made possible by the development of a new and specialized type of aircraft receiving set. This antenna is expected to be a great boon to aviation, as recent flight tests have indicated that it practically eliminates all errors in the indications of the radiobeacon, showing the course where it actually is at all times.

It is furthermore probable that there will be special conditions on some of the airways requiring the radiobeacons in some regions to be spaced closer together than at first contemplated, with corresponding reduction in the power used by each. At short distances there is no distortion of the course indication. Thus, it is expected that the combination of the new antenna with this modified plan for closer beacon spacing will eliminate these night effects and make the radiobeacon an accurate device for air navigation under all conditions.

The study of these variations is reported in a paper, "Apparent night variations with crossed-coil radiobeacons," by Haraden Pratt, which appeared in the Proceedings Institute of Radio Engineers for May, 1928, page 652.

#### REFERENCES TO CURRENT RADIO LITERATURE

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

##### R100.—Radio principles

- R110 Lambert, A. Sur la vitesse de propagation des ondes radiotelegraphiques. (On the velocity of propagation of radio waves.) *Comptes Rendus*, 186, pp. 686-688; March 12, 1928. *Experimental Wireless* (London), 5, p. 285; May, 1928.  
Values for speed of propagation of radio waves deduced from other data always leads to figures less than 300,000 km./sec.
- R113.6 Munro, G. H. The reflecting layer of the upper atmosphere. *Experimental Wireless* (London), 5, pp. 242-244; May, 1928.  
Experiments carried on in New Zealand during December, 1925, for estimation of height of reflecting layer for waves of 500 kc.
- R125.1 Aicardi, J. Sur un nouveau dispositif d'alignement par émissions Hertiennes. (On a new method of course setting by wireless.) *Comptes Rendus*, 186, pp. 305-307; January 30, 1928. *Experimental Wireless* (London), 5, p. 288; May, 1928.  
Uses two antennas short distance apart radiating same radio-frequency waves from one antenna pure continuous wave and from other modulated. Course indication is produced by interference pattern.
- R145.5 Allen, R. G. The establishment of formulae for the self-inductance of single-turn circuits of various shapes. *Experimental Wireless* (London), 5, pp. 259-263; May, 1928.  
Development of formulae.

## R200.—Radio measurements and standardization

- R201.6 Zickner, G. A bridge for the measurement of inductance and capacity. *Experimental Wireless* (London), **5**, pp. 280-282; May, 1928.  
Application of the Maxwell Bridge to measurements made by radio experimenters.
- R210 Pierce, G. W. Magnetostriction oscillators. *Proc. American Academy of Arts and Sciences*, **63**, pp. 1-47; April, 1928.  
Description of method of using magnetostriction in connection with electron tube circuits to produce and control frequency of electrical and mechanical oscillations. Range of frequencies from few hundred cycles per second to 300,000 cycles per second.
- R210 Black, K. C. A dynamic study of magnetostriction. *Proc. American Academy of Arts and Sciences* **63**, pp. 9-66; April, 1928.  
Measurement of dynamic electrical characteristics of magnitude of vibration of various magnetostrictive rods and tubes.
- R213. Namba, Y., and Namba, S. Study on the operation of the multivibrator. *Researches of the Electrotechnical Laboratory No. 218*, November, 1927. Tokyo, Japan.  
Experimental and mathematical discussion of multivibrator.
- R220 Roberts, W. Van B. A capacity measurement method. *Jour. Frank. Inst.*, **205**, pp. 699-701; May, 1928.  
Method of calibrating condensers at radio-frequencies.
- R230 Coil calculations—Design data for short-wave coils. *Wireless World and Radio Review*, **22**, pp. 466-468; May 2, 1928.  
Charts giving calculations for coils in the 40 to 110 and 110 to 240 meter bands.
- R240 Jackson, W. Dielectric losses in single layer coils at radio-frequencies. *Experimental Wireless* (London), **5**, pp. 255-258; May, 1928.  
Experiments to measure the increase of effective resistance of coils at radio-frequencies.
- R270 Sreenivasan, K. A short survey of some methods of radio-signal measurement (concluded from April issue). *Experimental Wireless* (London), **5**, pp. 273-278; May, 1928.  
Description of methods of measurement of field intensity used in various laboratories.
- R275 Robinson, E. H. The power in a modulated oscillation. *Experimental Wireless* (London), **5**, pp. 252-254; May, 1928.  
Interpretation of voltmeter and ammeter readings in terms of power dissipated in case of circuits carrying modulated radio-frequency currents.

## R300.—Radio apparatus and equipment

- R320.8 Smith-Rose, R. L. Wireless masts and screening. *Wireless World and Radio Review*, **22**, pp. 460-462; May 2, 1928.  
Shielding action of metal masts used at Rugby station.
- R342 Kafka, H. Zur Niederfrequenzverstärkung mit Drosselspulenkopplung. (On the low frequency amplification with impedance coupling.) *Zeitschrift für Hochfrequenztechnik*, **31**, pp. 87-90; March, 1928.  
How to design impedance coupled amplifiers.
- R342.6 Thomas, H. A. Retroaction in amplifiers. *Experimental Wireless* (London), **5**, pp. 245-251; May, 1928.  
Gives general properties of regeneration and analysis of conditions to be fulfilled for advantageous use in amplifiers.
- R342.6 Glasgow, R. S. Tuned radio-frequency amplifiers. *Jour. Amer. Inst. Elec. Engrs.*, **47**, pp. 327-331; May, 1928.  
Simplified method of calculating performance of tuned circuit amplifying set with curves showing performance obtained with various types of tubes.
- R343.7 A German H. T. mains unit with glow discharge rectifier. *Experimental Wireless* (London), **5**, p. 251; May, 1928.  
A receiving tube for use on alternating current.
- R344 Über die gleichzeitige Erregung zweier Schwingungen in einer Dreielektrodenröhre. (On the simultaneous excitation of two oscillations in a 3-electrode tube.) *Zeitschrift für Hochfrequenztechnik*, **31**, pp. 72-84; March, 1928.  
Discussion of possibilities of generating two oscillations within the same tube. Methods and use.
- R384.1 Griffiths, W. H. F. The demonstration of a new precision wave-meter condenser. *Experimental Wireless* (London), **5**, pp. 278-279; May, 1928.  
Sullivan-Griffiths variable air condenser for use as part of a substandard wave-meter.
- R385.5 Jakowleff, A. J. Analyse einer Elektrischen Schaltung für das Kondensatormikrophon. (Analysis of an electrical connection for the condenser microphone.) *Zeitschrift für Hochfrequenztechnik*, **31**, pp. 85-87; March, 1928.  
Theory of the condenser microphone.
- R388 Rangachari, T. S. The harmonic comparison of radio-frequencies by the cathode-ray oscillograph. *Experimental Wireless* (London), **5**, pp. 264-267; May, 1928.  
Use of cathode-ray tube for comparison of harmonics of radio-frequencies.

R400.—*Radio communication systems*

- R402 Kruse, R. S. Getting started at 30 megacycles. QST, 12, pp. 9-10; May, 1928.  
Description and design of receiving and transmitting apparatus for 10-meter work.
- R412 Blackwell, O. B. Transatlantic telephony—The technical problem. Bell System Technical Jour., 7, pp. 163-186; April, 1928.  
Nontechnical description of engineering problems involved in developing transatlantic radio circuits by means of which the American Telegraph & Telephone Co.'s system is used for communication with England.
- R412 Waterson, K. W. Transatlantic telephony—Service and operating features. Bell System Technical Jour., 7, pp. 187-194; April, 1928.  
Description of differences in operating practice on the two sides of the Atlantic. Data given on the extent to which trans-Atlantic connection was used during first year.

R500.—*Applications of radio*

- R520 Donisthorpe, H. de A. Air service and amateur cooperation. Wireless World and Radio Review, 22, pp. 491-492; May 9, 1928.  
Report of coast to coast flight of all American airplane equipped with radio apparatus and assistance rendered by amateurs.

R800.—*Nonradio subjects*

- 512 Ratcliffe, J. A. Symbolical algebra. Experimental Wireless (London), 5, pp. 239-242; May, 1928.  
Discussion of errors which occur in applying process of symbolical algebra to treatment of problems containing sine and cosine functions.
- 621.3 Buckley, O. E. High speed ocean cable telegraphy. Bell System Technical Jour., 7, pp. 225-267; April, 1928.  
Brief history of development of permalloy loaded cables and discussion of problems concerned with their design, construction, and operation.
- 621.374.2 Herman, J. Bridge for measuring small-time intervals. Bell System Technical Jour., 7, pp. 343-349; April, 1928.  
Measurement of time intervals from about one ten-thousandth of a second up to several seconds is described.

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