

RADIO SERVICE BULLETIN

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CONTENTS

	Page		Page
Abbreviations and symbols.....	1	Miscellaneous—Continued.	
New stations.....	2	Time signals transmitted by Pekin (China) station.....	21
Alterations and corrections.....	6	Radio beacon established at Portland (Dyrholae) light station, Iceland.....	21
Miscellaneous:		Radio beacon established at Cape Tres Forcas light station, Morocco.....	21
Changes in radiobeacon stations of the United States.....	19	Radio beacon established at Stevns Klint Lighthouse, Baltic, Denmark.....	22
Amateur extra first-class radio operator license reestablished.....	20	Devizes (England) radio station discontinued	
Time of transmission of business information to Shipping Board vessels by Arlington changed.....	20	Portishead station established.....	22
Radio compass station established at Malin Head, England.....	20	Corrections to the list of international prefixes for call signals of amateur stations.....	22
General orders of the Federal Radio Commission.....	20	Collection and dissemination of hydrographic information by naval radio.....	22
Radiobeacon established at Casquets Light-house, Channel Islands (England).....	21	Bureau of Standards Journal of Research.....	25
		Radio aid to air navigation.....	25
		References to current radio literature.....	26

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.
 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.
 RB= Radio 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.
 Δ = Equipped with a radio compass (direction finder).

This edition is the first Supplement to the Annual List of Commercial and Government Radio Stations of the United States, edition June 30, 1928

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	Wave lengths	Service	Hours	Station controlled by—
California (portable) ¹	KGHT	122.35.....	FX	X	Raymond Concrete Pipe Co.
Do. ¹	KGHU	122.35.....	FX	X	Do.
Do. ¹	KGHV	97.5.....	FX	X	Universal Pictures Corporation.
Do. ¹	KGHW	97.5.....	FX	X	Do.
Deal, N. J. (near) ²	WMI	15.14, 20.58, 30.89.....	FX	N	American Telephone and Telegraph Co.
New York, N. Y. ⁴	WSF	600, 675, 2,098, 2,222.....	PG	N	Commercial Wireless (Inc.).
Ocean Township, N. J. ³	WLO	14.01, 18.44, 28.44.....	FX	N	American Telephone and Telegraph Co.
Do. ³	WNC	15.61, 20.73, 30.77.....	FX	N	Do.
San Francisco, Calif. ⁵	KGHY	71.....	FA	-----	Western Air Express.
(Mills Field)	KVA				
Sayville, N. Y. ⁷	WSL	17.805, 17.857, 26.785, 35.61, 53.57.	PG	N	Commercial Wireless (Inc.).

¹ System, v. t. telephone.

² System, composite v. t. telegraph and telephone.

³ System, Western Electric v. t. telephone.

⁴ Loc. 73° 06' 12" W., 40° 44' 36" N.; system, F. T. Co. v. t. telegraph, c. w. and i. c. w.; rates, 10 cents (52 centimes) per word.

⁵ Loc. 74° 01' 31" W., 40° 15' 32" N.; system, Western Electric v. t. telephone.

⁶ System, composite v. t. telegraph; hours, 8 a. m. 4 p. m.

⁷ System, F. T. Co. v. t. telegraph, c. w. and i. c. w.; rates, 10 cents (52 centimes) per word.

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
Aimee.....	WTBC				Lloyd G. Thompson.....	
Albatross ¹	WSBL					
Amida ²	WSBU	8	PG	X	E. R. Beirend.....	R. M. C. A.
California ³ (Standard)	WSBR	8	PG	X	Standard Oil Co. of Calif.....	Do.
Gale.....	WTBB				Bay State Fishing Co.....	
Lena.....	WSBE				W. C. Bell.....	
Mist.....	WSBJ				Bay State Fishing Co.....	
Nakeen ⁴	WSBM				Nakat Packing Corporation.....	
Ontario.....	WSBP				Albert F. Dobbertin.....	
Point Gorda ⁴	WSBK	8	PG	X	Swayne & Hoyt.....	Do.
Quest.....	WTBD				William Wrigley.....	
Saturn.....	WSBQ				Bay State Fishing Co.....	
Sun.....	WSBY				Sun Oil Co.....	
Tuck-a-Hoo ⁵	WSBJ		P	X	Nakat Packing Corporation.....	Owner of vessel.
Vagabondia ⁶	WSBO	8	PG	X	W. L. Mellon.....	R. M. C. A.
W. E. Fitzgerald ⁷	WSBV				Chicago Navigation Co.....	R. C. A.
Winifred II ⁸	WSBG		P	X	Sunny Point Packing Co.....	Owner of vessel.

¹ W. I., 600, 705, 800.

² System, R. C. A. v. t. telegraph, c. w. and i. c. w.; w. l., 600, 640, 660, 705, 730, 750, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,013, 2,039, 2,098.

³ System, Western Electric v. t. telegraph, c. w.

⁴ System, Marconi, 1,000; w. l., 600, 705, 800.

⁵ System, composite v. t. telephone; w. l., 53.87, 132.

⁶ System, R. C. A. v. t. telegraph; w. l., 600, 640, 660, 705, 730, 750, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,013, 2,069, 2,098, 2,128, 2,190, 2,400.

⁷ System, R. C. A. v. t. telegraph, c. w. and i. c. w.; w. l., 715, 800, 875 rates, Great Lakes service, 4 cents per word.

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
KGHT	California (portable).....c	WSBM	Nakeen.....b
KGHU	do.....c	WSBO	Vagabondia.....b
KGHV	do.....c	WSBP	Ontario.....b
KGHW	do.....c	WSBQ	Saturn.....b
KGHY	do.....c	WSBR	California Standard.....b
KVA	San Francisco, Calif. (Mills Field).....c	WSBU	Amida.....b
WLO		WSBV	W. E. Fitzgerald.....b
WMI	Deal, N. J.....c	WSBY	Sun.....b
WNC	Ocean Township, N. J.....c	WSBZ	Mist.....b
WSBE	Lena.....b	WSF	New York, N. Y.....c
WSBG	Winifred II.....b	WSL	Sayville, N. Y.....c
WSBJ	Tuck-a-Hoo.....b	WTBB	Gale.....b
WSBK	Point Gorda.....b	WTBC	Aimee.....b
WSBL	Albatross.....b	WTBD	Quest.....b

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	Wave length	Service	Hours	Station controlled by
C-268 ¹	KHAF	53.7, 71.8, 131.8.....			Boeing Air Transport (Inc.), Georgetown Station, Seattle, Wash.
C-4458 ²	KHAJ	71.8.....			Western Air Express.
C-5170 ³	KHAG	71.8.....			Do.
C-5358 ⁴	KHAI	71.8.....			Do.
Maid of Detroit ¹	KHAS	20.27, 34.09, 40.54, 68.18, 76.8, 600.	P	X	H. G. McCarroll, 4484 Cass Ave., Detroit, Mich.
Roma ⁴	KHAT	44.98, 600.	P	X	Cesare Sabelli.

¹ Power, 500 watts; system, composite v. t. telephone.

² System, v. t. telegraph.

³ Power, 20 watts; system, composite v. t. telegraph c. w. and i. c. w.

⁴ Power, 75 watts; system, R. C. A. v. t. telegraph c. w. and i. c. w.

Commercial aircraft stations, alphabetically, by call signals

Call signal	Name of station	Call signal	Name of station
KHAF	C-268.	KHAI	C-5358.
KHAG	C-5170.	KHAJ	C-4458.
KHAT	Roma.	KHAS	Maid of Detroit.

Government 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	Wave length	Service	Hours	Station controlled by—
Atlantic Coast (portable). ¹ *	WSP	133-150.....	O	X	Department of Commerce, Coast and Geodetic Survey.
Do. ¹ *	WSQ	133-150.....	O	X	Do.
Do. ¹ *	WSR	133-150.....	O	X	Do.
Denver, Colo. (Fitzsimons General Hospital). ² *	WUAX	-----	FX	-----	U. S. Army.
Detroit Lighthouse Depot, Mich. ¹	WWET	88.....	O	X	Department of Commerce, Bureau of Lighthouses.
Detroit River Lighthouse, Mich. ¹	WWES	88.....	O	X	Do.
Dillingham, Alaska. ³ *	WZE	-----	FX	-----	U. S. Army.
Dryden, Tex. ⁴ *	WYY	-----	FX	-----	Do.
Fort Eustis, Va. ⁴ *	WUD	-----	O	-----	Do.
Fort Shafter, Hawaii (Honolulu). ⁴ *	WUAR	-----	O	-----	Do.
Lordsburg, N. Mex. ⁴ *	WYZ	-----	FX	X	Do.
Pacific Coast (portable). ¹ *	KGAJ	-----	O	X	Department of Commerce, Coast and Geodetic Survey.
Do. ¹ *	KGAK	-----	O	X	Do.
Do. ¹ *	KGAL	-----	O	X	Do.
Do. ¹ *	KGAM	-----	O	X	Do.
Do. ¹ *	KGHM	-----	O	X	Do.
Do. ¹ *	KGHS	-----	O	X	Do.
Pensacola, Fla. (eighth district reserve unit).	NDD	-----	O	X	U. S. Navy.
Point Barrow, Alaska. ³ *	WUE	-----	FX	X	U. S. Army.
St. Louis, Mo. ⁴ *	WUBF	-----	O	-----	Do.
Squaw Harbor, Alaska (Unga Island). ⁴ *	WZF	34.36, 68.72, 600.	PG	-----	Do.
Tucson, Ariz. ⁴ *	WYDA	-----	FX	-----	Do.
Yuma, Ariz. ⁴ *	WYDB	-----	FX	-----	Do.

* While this edition of the Bulletin is the first supplement to the June 30, 1928, edition of the List of Commercial and Government Radio Stations of the United States, the stations marked with an asterisk (*) need not be added to this list, as they will appear therein.

¹ Composite v. t. telephone and telegraph.

² Hours, 7 a. m.—8 p. m.

³ Loc. (approximately) 156° 25' 00", 71° 18' 00" N.; system, U. S. Army v. t. telegraph.

⁴ System, U. S. Army v. t. telegraph; hours, 7 a. m.—8 p. m., rates, 12 cents per word.

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	Wave length	Service	Hours	Station controlled by—
Alton.....	NAMV	-----	-----	-----	U. S. Navy.
Augusta.....	NIDF	-----	-----	-----	Do.
Delta.*	WY CZ	-----	O	-----	U. S. Army.
Ed. J. Howard.....	WYDF	700.....	-----	-----	Do.
Fort Chartres.*	WYDE	-----	O	-----	Do.
Fort Gage.*	WYDD	-----	O	-----	Do.
Houston.....	NIQF	-----	-----	-----	U. S. Navy.
Penacook.....	NEMM	-----	-----	-----	Do.
Tecumseh.*	WYDC	-----	O	-----	U. S. Army.
Tuscumbia.*	WYCY	-----	O	-----	Do.
York.....	NIQQ	-----	-----	-----	U. S. Navy.

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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
KGAJ	Pacific coast (portable).....c	WUBF	St. Louis, Mo.....c
KGAJ	do.....c	WUD	Fort Eustis, Va.....c
KGAL	do.....c	WUE	Point Barrow, Alaska.....c
KGAM	do.....c	WWES	Detroit River Lighthouse, Mich.....c
KOHM	do.....c	WWET	Detroit Lighthouse Depot, Mich.....c
KGHS	do.....c	WYCY	Tuscumbia.....b
NAMV	Alton.....b	WYDZ	Delta.....b
NDD	Pensacola, Fla. (eighth district reserve unit).....c	WYDA	Tucson, Ariz.....c
NEMM	Penacook.....b	WYDB	Yuma, Ariz.....c
NIDF	Augusta.....b	WYDC	Tecumseh.....b
NIQF	Houston.....b	WYDD	Fort Gage.....b
NIQQ	York.....b	WYDE	Fort Chartres.....b
WSP	Atlantic coast (portable).....c	WYDF	Ed. J. Howard.....b
WSQ	do.....c	WYY	Dryden, Tex.....c
WSR	do.....c	WYZ	Lordsburg, N. Mex.....c
WUAR	Fort Shafter, Hawaii (Honolulu).....c	WZE	Dillingham, Alaska.....c
WUAX	Denver, Colo. (Fitzsimons General Hospital).....c	WZF	Squaw Harbor, Alaska.....c

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, 1928]

Station	Call signal	Wave length (meters)	Frequency (kilocycles)	Power (watts)	Station controlled by—
California:					
Long Beach.....	W6XBV	215.7	1,390		C. Merwin Dobyms.
Los Angeles.....	W6XC	65.22-66.67	4,600-4,500	15,000	Robert B. Parrish, 5155 South Grammercy Place.
Pennsylvania: East Pittsburgh.	W8XI	19.737-19.868, 62.5-63.83.	15,200-15,100, 4,800-4,700.	20,000	Westinghouse Electric and Manufacturing Co.
Rhode Island: Providence.	W1XAC	Var. between 5.84 and 186.92.	Var. between 51,360 and 1,605.	Var.	C. E. Manufacturing Co.
Tennessee: Whitehaven.....	W4XA	120-125	2,500-2,400	5,000	WREC (Inc.).
Portable					
Airplane C-268.....	W7XAA	50-200, 850, 950.	6,000-1,500, 350, 315.	50	Bell Telephone Laboratories.
Airplane NC-3314.....	W4XM	131.7	2,278	100-200	R. C. A.
Airplane NC-4616.....	W2XBX	50-200, 850, 950.	6,000-1,500, 350, 315.	500	Bell Telephone Laboratories.
New Jersey: Bound Brook.	W2XBW	19.737-19.868.	15,200-15,100.	5,000	R. C. A.
New York: New York.....	W2XBV	65.22-66.67	4,600-4,500	5,000	Do.
Sixth radio district	W6XD	8.76, 17.34, 34.68, 70.09, 140.2	34,240, 17,300, 8,650, 4,280, 2,140.	100	D. B. McGown, 1247 Forty-seventh Ave.

Special land stations, grouped by districts

Call signal	District and station	Call signal	District and station
W1XAC	First district: Providence, R. I. Second district:	W6XBV	Sixth district:
W2XBV	New York, N. Y. (portable).	W6XC	Long Beach, Calif.
W2XBW	Bound Brook, N. J. (portable).	W6XD	Los Angeles, Calif.
W2XBX	Airplane NC-4616.	W7XAA	Sixth radio district (portable).
W4XA	Fourth district:	W8XI	Seventh district: Airplane C-268.
W4XM	Whitehaven, Tenn.		Eighth district: East Pittsburgh, Pa.
	Airplane NC 3314.		

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]

HILO, HAWAII.—Service, FX.

NAKNEK, ALASKA (Hyades, moored vessel).—W. I., 600; station controlled by Red Salmon Canning Co.

(While this edition of the Bulletin is the first supplement to the June 30, 1928, edition of the list of Commercial and Government Radio Stations of the United States, the following-mentioned changes have already been made to that list. (See list of call changes in Bulletin No. 135, June 30, 1928.)

AKUTAN, ALASKA.—Service, P.

BOLINAS, CALIF. (KESS).—System, R. C. A. v. t. telegraph; w. I., 28.80 (separate and distinct station; all other particulars pertaining to KSS apply to KESS).

BOLINAS, CALIF. (KSS).—System, R. C. A. v. t. telegraph; w. I., 14.40.

BUFFALO, N. Y. (WBL).—Loc. (approximately), 78° 55' 00'' W., 42° 53' 00'' N.

DULUTH, MINN. (WRL).—Loc. (approximately), 92° 06' 0'' W., 46° 46' 00'' N.

KAHUKU, HAWAII (KIO).—System, R. C. A. v. t. telegraph; w. I., 25.685; (separate and distinct station; all other particulars pertaining to KEIO and KSIO apply).

KAHUKU, HAWAII (KSIO).—System, R. C. A. v. t. telegraph; w. I., 40.459 (separate and distinct station; all other particulars pertaining to KIO and KEIO apply to KSIO.)

MANISTIQUE, MICH.—Call changed to WMX, effective October 1, 1928.

NEW BRUNSWICK, N. J. (WIZ).—System, R. C. A. v. t. telegraph; w. I., 43.073.

ROCKY POINT, N. Y. (WAJ).—System, R. C. A. v. t. telegraph; w. I., 22.255 (separate and distinct station; all other particulars pertaining to WEAJ apply to WAJ).

ROCKY POINT, N. Y. (WBU).—W. I., 14.111.

ROCKY POINT, N. Y. (WDS).—System, R. C. A. v. t. telegraph; w. I., 15.873 (separate and distinct station; all other particulars pertaining to WEDS apply).

ROCKY POINT, N. Y. (WEAJ).—System, R. C. A. v. t. telegraph; w. I., 44.51.

ROCKY POINT, N. Y. (WEB).—W. I., 43.259.

ROCKY POINT, N. Y. (WEDS).—System, R. C. A. v. t. telegraph; w. I., 31.746.

ROCKY POINT, N. Y. (WEEM).—System, R. C. A. v. t. telegraph; w. I., 20.27.

ROCKY POINT, N. Y. (WEFX).—W. I., 31.312.

ROCKY POINT, N. Y. (WEHR).—W. I., 44.709.

ROCKY POINT, N. Y. (WELL).—System, R. C. A. v. t. telegraph; w. I., 33.52.

ROCKY POINT, N. Y. (WEM).—System, R. C. A. v. t. telegraph; w. I., 40.541 (separate and distinct station; all other particulars pertaining to WEEM apply).

ROCKY POINT, N. Y. (WEOP).—W. I., 43.165.

ROCKY POINT, N. Y. (WEPE).—W. I., 43.353.

ROCKY POINT, N. Y. (WEQA).—W. I., 28.275.

ROCKY POINT, N. Y. (WEQC).—W. I., 33.37.

ROCKY POINT, N. Y. (WEQX).—System, R. C. A. v. t. telegraph; w. I., 22.305.

ROCKY POINT, N. Y. (WFX).—W. I., 15.806 (separate and distinct station; all other particulars pertaining to WEFX apply to WFX).

ROCKY POINT, N. Y. (WHR).—W. I., 22.355 (separate and distinct station; all other particulars pertaining to WEHR apply to WHR).

ROCKY POINT, N. Y. (WIK).—System, R. C. A. v. t. telegraph; w. I., 21.536.

ROCKY POINT, N. Y. (WIY).—System, R. C. A. v. t. telegraph; w. I., 21.629.

ROCKY POINT, N. Y. (WLL).—System, R. C. A. v. t. telegraph; w. I., 16.76 (separate and distinct station; all other particulars pertaining to WELL apply to WLL).

ROCKY POINT, N. Y. (WOP).—W. I., 21.583 (separate and distinct station; all particulars pertaining to WEOP apply to WOP).

ROCKY POINT, N. Y. (WPE).—W. I., 21.676 (separate and distinct station; all particulars pertaining to WEPE apply to WPE).

ROCKY POINT, N. Y. (WQA).—System, R. C. A. v. t. telegraph; w. I., 14.13 (separate and distinct station; all other particulars pertaining to WEQA apply to WQA).

ROCKY POINT, N. Y. (WQB).—W. I., 16.722 (separate and distinct station; all other particulars pertaining to WEQB apply to WQB).

ROCKY POINT, N. Y. (WQC).—W. I., 16.797 (separate and distinct station; all other particulars pertaining to WEQC apply to WQC).

- ROCKY POINT, N. Y. (WQO).—System, R. C. A. v. t. telegraph; w. l., 44.61, 18.785.
- ROCKY POINT, N. Y. (WQX).—System, R. C. A. v. t. telegraph; w. l., 14.86.
- ROCKY POINT, N. Y. (WQY).—System, R. C. A. v. t. telegraph; w. l., 14.92.
- ROCKY POINT, N. Y. (WTT).—W. l., 15.839.
- SAN JUAN, P. R. (WGT).—System, R. C. A. v. t. telegraph; w. l., 21.771 (separate and distinct station; all other particulars pertaining to WEGT apply to WGT).
- Strike out all particulars of the following-named stations: Brownsville, Tex.; Portlock, Alaska; San Benito, Tex.
- Strike out 900 meters on all stations.

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]

- ALGONQUIN (KDKH).—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- AMERICAN BANKER.—Station controlled by R. M. C. A. (U. S. L.).
- ARCTURUS.—Station controlled by R. M. C. A. (U. S. L.).
- ARGON.—W. l., 600, 640, 705, 750, 800.
- ATLAS.—W. l., 600, 640, 705, 750, 800.
- CARABOBO.—W. l., 600, 640, 705, 750, 800.
- CITY OF BIRMINGHAM.—W. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
- CITY OF CHATTANOOGA.—W. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
- EGLANTINE.—Station controlled by R. M. C. A. (U. S. L.).
- LAKE FLATONIA.—Owner of vessel, Newtexas S. S. Corporation.
- LAS VEGAS.—Name changed to Illinois.
- MARY ELLEN O'NEIL.—System, F. T. Co. arc and F. T. Co. spark, 1,000; w. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,190; station controlled by M. R. T. Co.
- NORTH DAKOTA.—W. l., 600, 705.
- ST. ANTHONY.—Name changed to Biboco; station controlled by R. M. C. A. (U. S. L.).
- WEST ISON.—Owner of vessel, Tacoma-Oriental S. S. Co.
- WEST PROSPECT.—Name changed to Golden Sun.
- WEST TOGUS.—Name changed to Golden Forest.
- Strike out all particulars of the following-named vessels: Silver Shell, Star of Falkland.

While this edition of the Bulletin is the first supplement to the June 30, 1928, edition of the list of Commercial and Government Radio Stations of the United States, the following-mentioned changes have already been made to that list:

- ABANGAREZ.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098.
- A. C. BEDFORD.—W. l., 600, 640, 705, 750, 800.
- ACME.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- ADAM, E. CORNELIUS.—W. l., strike out 800.
- A. D. MACBETH.—W. l., 715, 875.
- ADMIRAL DEWEY.—W. l., 600, 705, 800, 2,100, 2,440.
- ADMIRAL EVANS.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- ADMIRAL FARRAGUT.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- ADMIRAL FISKE.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- ADMIRAL PEARY.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- ADMIRAL SCHLEY.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- ADMIRAL WATSON.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- ALADDIN.—W. l., 600, 640, 705, 750, 800.
- ALBERT E. WATTS.—W. l., 600, 640, 705, 750, 800.
- ALBERT HILL.—W. l., 600, 640, 705, 750, 800.
- ALPHA.—W. l., 600, 660, 705, 730, 800.
- AMASSA STONE.—W. l., 715, 800, 875, 1,875, 1,887, 1,987, 2,098, 2,400.
- AMERICA.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- AMERICAN LEGION.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- ANNISTON CITY.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- ANNISTON CITY.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- ARA.—W. l., 600, 640, 705, 800, 1,875, 1,887, 1,911.
- ARAS.—W. l., 536, 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- ARCADIA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- ARDMORE.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.

- ARIO.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- ARYAN.—W. l., 600, 660, 705, 730, 800.
- ASHTABULA.—System, R. C. A. v. t. telegraph.
- ASTRAL.—W. l., 600, 640, 705, 750, 800.
- ATENAS.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- ATLANTA CITY.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- ATLANTIC (KEE).—W. l., 600, 640, 705, 750, 800.
- ATLANTIC (WQBG).—Range, 150; system, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- AXTEL J. BYLES.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- BAFSHE.—W. l., 600, 705, 800.
- BALSAM.—W. l., 600, 705, 730, 800.
- BANGU.—System, add F. T. Co. arc; w. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
- BARACOA.—W. l., 600, 660, 705, 730, 800.
- BARREADO.—System, F. T. Co. arc and Marconi, 1,000; w. l., 600, 705, 1,875, 1,887, 1,911, 1,961, 1,987, 2,098, 2,128, 2,190, 2,400.
- BAYOU CHICO.—W. l., 600, 705, 800.
- BELBUCKLE.—System, Navy-Liberty, 1,000; w. l., 600, 705, 730, 800.
- BELHAVEN.—W. l., 600, 705, 800.
- BENJAMIN BREWSTER.—W. l., 600, 640, 705, 750, 800, 1,875, 1,887, 1,911, 1,987, 2,013, 2,098, 2,128, 2,190, 2,290, 2,400.
- BERING.—System, Marconi, 1,000; 600, 705, 800.
- BERURY.—System, add F. T. Co. arc; w. l., 600, 705, 800, 1,875, 1,911, 1,961, 1,987, 2,013, 2,069, 2,098, 2,128.
- BESSEMER.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- BIBCO.—W. l., 600, 660, 705, 730, 800.
- BILLOW.—W. l., 600, 640, 705, 750, 800.
- BIRD CITY.—W. l., 600, 660, 705, 730, 800.
- BIRKENHEAD.—W. l., 600, 640, 705, 750, 800.
- BLAIR.—W. l., 600, 660, 705, 730, 800.
- BLUE TRIANGLE.—System, Navy-W. S. A. Co., 1,000; w. l., 600, 705, 730, 800.
- BOGOTA.—W. l., 600, 660, 705, 730, 800.
- BOHEMIAN CLUB.—W. l., 600, 706, 800, 1,987, 2,098.
- BOLIVAR.—System, Navy Standard; w. l., 600, 660, 705, 730, 800.
- BOSTON.—System, R. C. A. spark and v. t. telegraph; w. l., 600, 705, 800, 1,875, 2,098.
- BRANT.—Range 200; System, W. S. A. Co.; w. l., 600, 705, 800.
- BRAVE COEUR.—System, Navy-Marconi, 1,000.
- BREAKER.—W. l., 600, 640, 705, 750, 800.
- BREEZE.—Range 200; System R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- BRIDGETOWN.—W. l., 600, 660, 705, 730, 800.
- BUTTERCUP.—W. l., 715, 1875.
- BYRON, D. BENSON.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- C. A. CANFIELD.—W. l., 600, 705, 800.
- CADDO.—W. l., 600, 640, 705, 750, 800.
- CALAMARES.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- CALAWAII.—System, Federal Arc and Spark; w. l., 600, 705, 800, 1,911, 1,987, 2,098, 2,190.
- CALIFORNIAN.—W. l., 600, 705, 800.
- CAMAGUEY.—W. l., 600, 660, 705, 730, 800.
- CAMBRIA.—System, Navy-Simon; 1,000.
- CANANOVA.—W. l., 600, 660, 705, 730, 800.
- CAPAC.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
- CARACAS.—System, R. C. A. v. t., telegraph; w. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
- CARENCO.—W. l., 600, 660, 705, 730, 800.
- CAROLINE.—W. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,400.
- CAROLYN.—W. l., 600, 660, 705, 730, 800.
- CARRILLO.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- CARTAGO.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- CASCADE (KDIS).—W. l., 600, 705, 800.
- CATALINA.—System, Navy-Spark, 1,000; w. l., 600, 705, 800; service, PG; hours, N.

- CATHERINE D.—System, R. C. A. v. t. telegraph; w. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,190; hours, X.
- CATHERINE G. SUDDEN.—W. l., 600, 705, 800.
- CAYO MAMBI.—W. l., 600, 660, 705, 730, 800.
- CELILO.—W. l., 600, 705, 800; hours, X.
- CERRO AZUL.—W. l., 600, 640, 705, 750, 800.
- CHARLES E. HARWOOD.—W. l., 600, 640, 705, 750, 800.
- CHARLES G. BLACK.—W. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
- CHARLES H. CRAMP.—W. l., 600, 705, 800, 1,875, 1,960, 1,987, 2,098, 2,128, 2,190, 2,400.
- CHARLES M. SCHWAB.—W. l., 715, 800, 875, 1,875, 1,887, 1,987, 2,098, 2,400.
- CHATHAM.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- CHEROKEE.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
- CHICKASAW CITY.—W. l., 600, 660, 705, 730, 800.
- CHILBAR.—W. l., 600, 660, 705, 730, 800.
- CHILKAT.—System, Navy-Marconi, 1,000; w. l., 600, 705, 800.
- CHINCHA.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- CIRCINUS.—W. l., 600, 640, 705, 750, 800.
- CITY OF ALTON.—W. l., 600, 705, 800.
- CITY OF BIRMINGHAM.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- CITY OF CLEVELAND III.—W. l., 715, 875, 1,875.
- CITY OF COLUMBUS.—W. l., 600, 660, 705, 730, 800.
- CITY OF DALHART.—System, Navy-Marconi, 1,000; w. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,987, 2,013, 2,069, 2,098, 2,190.
- CITY OF DETROIT III.—W. l., 715, 875, 1,875.
- CITY OF ERIE.—System, Navy-Marconi, 1,000.
- CITY OF GRAND RAPIDS.—System, drop, 800, 875.
- CITY OF LOS ANGELES.—W. l., 600, 705, 7800, 1,987, 2,100, 2,440.
- CITY OF MONTGOMERY.—W. l., 600, 660, 705, 730, 800.
- CITY OF RAYVILLE.—System, Navy-Marconi, 1,000; and Federal Arc; w. l., 600, 705, 800, 1,875, 1,961, 2,013, 2,098, 2,128, 2,190.
- CITY OF SAUGATUCK.—W. l., add 875.
- CLARE.—W. l., 600, 640, 705, 750, 800.
- CLAUSEUS.—W. l., 600, 640, 705, 750, 800.
- CLIFFORD F. MOLL.—W. l., strike out 800.
- CLONTARF.—W. l., 600, 660, 705, 730, 800.
- COAMO.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
- CODY.—W. l., 600, 705, 800.
- COEUR D'ALENE.—W. l., 600, 660, 705, 730, 800.
- COLOMBIA.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- COLONEL JAMES PICKANDS.—W. l., 715, 800, 875, 1,875, 1,899, 1,987, 2,098, 2,128.
- COLOMBIAN.—W. l., 600, 705, 800.
- COMMERCIAL COURIER.—W. l., 600, 640, 705, 750, 800.
- COMMERCIAL PATHFINDER.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- COMMONWEALTH.—System, composite v. t. telegraph; w. l., 600, 640, 705, 750.
- COPPENAME.—W. l., 600, 705, 750, 800, 1,887, 1,987, 2,098.
- CORNELIA.—W. l., 600, 660, 705, 730, 800.
- CRAIGSMERE.—Owner of vessel, M. & J. Tracy.
- CREOLE (KKR).—System, Marconi, 1,000; w. l., 600, 705, 800.
- CREST.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
- CULBERSON.—W. l., 600, 705, 800, 1,887, 1,987, 2,100, 2,440.
- CUTTY SARK.—W. l., 600, 705, 750, 800, 1,875, 1,887, 2,098, 2,400.
- DAKOTAN.—W. l., 600, 705, 800.
- DE BARDELEBEN.—W. l., 600, 640, 705, 750, 800.
- DELECTO.—W. l., 600, 640, 705, 750, 800.
- DELFINA.—W. l., 600, 660, 705, 730, 800.
- DELISLE.—W. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,128, 2,190.
- DENALI.—W. l., 600, 705, 800, 1,987, 2,098, 2,128, 2,190.
- DILWORTH.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- DISTRICT OF COLUMBIA.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
- DIXIANO.—W. l., 600, 640, 660, 705, 730, 750, 800.
- DOLLY C.—W. l., 600, 705, 800.
- DOMINO.—W. l., 600, 660, 705, 730, 800.
- DONNA LANE.—System, Navy-Lowenstein, 1,000.

- DORA.—W. l., 600, 660, 705, 730, 800.
DORCHESTER.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
DOROTHY ALEXANDER.—W. l., 600, 705, 1,887, 2,100, 2,440.
DOROTHY BRADFORD.—W. l., 600, 705, 800.
DOROTHY LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
DRYDEN.—W. l., 600, 705, 1,987, 2,098, 2,400.
DURANGO.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
EAST INDIAN.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
EASTERN COAST.—System, Navy-K & C, 1,000; w. l., 600, 705, 800.
EASTERN DAWN.—W. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,987, 2,013, 2,098, 2,128.
EASTERN GLADE.—W. l., 600, 706, 800, 1,987, 2,098, 2,400.
EASTERN GLEN.—W. l., 600, 660, 705, 730, 800.
EASTERN PLANET.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
EASTERN STATES.—W. l., 715, 800, 875, 1,875.
ECUADOR.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
EDGAR F. CONEY.—System, Composite v. t. telegraph i. c. w.; w. l., 600, 705.
EDGAR F. LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
EDGEMONT.—System, Navy-Lowenstein, 1,000; w. l., 600, 705, 800.
EDITH.—System, Navy-Marconi, 1,000.
EDWARD L. DOHENY.—W. l., 600, 640, 705, 750, 800.
EDWARD L. SHEA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
ELBECK.—W. l., 600, 705, 800, 1,887, 1,987, 2,290, 2,440.
EGREMONT.—System, Navy-Marconi, 1,000.
EL CAPITAN (KILP).—W. l., 600, 705, 800.
EL CID.—System, Marconi, spark, 1,000; w. l., 600, 705, 800.
EL ESTERO.—W. l., 600, 705, 800.
ELIA.—W. l., 600, 705, 800.
EL ISLEO.—W. l., 600, 705, 800.
ELENOR.—W. l., 600, 660, 705, 730, 800.
EL OCCIDENTE.—W. l., 600, 705, 800; hours, X.
E. M. CLARK.—W. l., 600, 640, 705, 750, 800.
EMERGENCY AID.—W. l., 600, 705, 800, 1,875, 1,911, 1,961, 1,987, 2,013, 2,069, 2,098, 2,128, 2,190, 2,222, 2,256, 2,290, 2,400.
EMIDIO.—W. l., 600, 705, 800, 1,987, 2,098.
EMMA ALEXANDER.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
ETHAN ALLEN.—W. l., 600, 660, 705, 730, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,098, 2,128, 2,190.
EVANGELINE.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
EVELYN.—W. l., 600, 660, 705, 730, 800.
E. W. SINCLAIR.—W. l., 600, 640, 705, 800.
FAIRFAX.—W. l., 600, 705, 750, 800, 1,987, 2,098, 2,128, 2,190.
FAVORITE (KDNY).—W. l., 150, 600, 2,098, 2,400.
F. H. WICKETT.—W. l., 600, 640, 705, 800.
F. J. LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
FONTANA.—W. l., 715, 800, 875.
FORTUNA.—System, R. C. A. v. t. telegraph; w. l., 600, 705, 750, 800.
FRANK H. BUCK.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
FRANK H. GOODYEAR.—W. l., strike out 800.
FRANKLIN.—W. l., 600, 660, 705, 730, 800.
FREDERIC EWING.—W. l., 600, 640, 705, 750, 800.
FRED G. HARTWELL.—System, Navy-Simon, 1,000.
FREEPORT SULPHUR No. 5.—W. l., 600, 640, 705, 750, 800.
GALENA.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
GENE CRAWLEY.—W. l., 600, 640, 705, 750, 800.
GEORGE F. RAND.—W. l., strike out 800.
GEORGE H. INGALLS.—W. l., strike out 800.
GEO. H. JONES.—W. l., 600, 640, 705, 750, 800.
GEORGE L. OLSON.—W. l., 600, 705, 800.
GEORGE PIERCE.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
GEORGE WASHINGTON (KDCL).—System, Navy-Marconi, 1,000; and F. T. Co. arc; w. l., 600, 705, 800, 1,875, 1,911, 1,987, 2,013, 2,098, 2,128, 2,290.
GEORGE WASHINGTON (WFR).—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
GEORGE W. BARNES.—W. l., 600, 640, 705, 750, 800.
G. J. GRAMMER.—System, W. S. A. Co., 1,000; w. l., 715, 875.
G. N. WILSON.—W. l., strike out 800.
GOLDEN DRAGON.—W. l., 600, 705, 800, 2,098, 2,400.

- GOLDEN HIND.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 GOLIAH.—System, R. C. A. v. t. telegraph; w. l., 600, 705, 800.
 GOODTIME.—W. l., 715, 800, 875.
 GREYLOCK.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 GULFCREST.—W. l., 600, 640, 705, 750, 800.
 GULFKING.—W. l., 600, 660, 705, 730, 800.
 GULFLIGHT.—W. l., 600, 660, 705, 730, 800.
 GULF OF MEXICO.—W. l., 600, 705, 800, 1,887, 1,987, 2,098, 2,400.
 GULF OF VENEZUELA.—W. l., 600, 660, 705, 730, 800.
 GULFOIL.—W. l., 600, 660, 705, 730, 800.
 GULF PRIDE.—W. l., 600, 640, 660, 705, 750, 800.
 GULF PRINCE.—W. l., 600, 660, 705, 730, 800.
 GULF QUEEN.—W. l., 600, 660, 705, 730, 800.
 GULFSTAR.—W. l., 600, 660, 705, 730, 800.
 GULFSTATE.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 GULFSTREAM.—W. l., 600, 660, 705, 730, 800.
 GULFTRADE.—W. l., 600, 660, 705, 730, 800.
 HADNOT.—W. l., 600, 660, 705, 730, 800.
 HAIDA.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 660, 705, 750, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,013, 2,069, 2,098, 2,128, 2,190, 2,400.
 HALF MOON.—W. l., 600, 660, 705, 730, 800.
 HALO.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 HALSEY.—W. l., 600, 705, 800, 1,911, 1,961, 1,987, 2,128, 2,098, 2,190.
 HAMILTON.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 HAMPTON ROADS (KESR).—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 HANLEY.—W. l., 600, 705, 800, 1,887, 1,911, 1,987, 2,013, 2,098, 2,128, 2,190, 2,400.
 HAROLD WALKER.—W. l., 600, 660, 705, 750, 800.
 HARRY COULBY.—System, R. C. A. v. t. telegraph.
 HARRY FARNUM.—W. l., 600, 640, 660, 705, 730, 800.
 HARRY LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
 HARRY YATES.—W. l., strike out 800.
 HATTERAS.—System, Navy-K & C; w. l., 600, 660, 705, 730, 800.
 HAVANA.—W. l., 600, 660, 705, 730, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 HEFFRON.—W. l., 600, 660, 705, 730, 800.
 HEGIRA.—W. l., 600, 660, 705, 730, 800.
 HELEN.—W. l., 600, 660, 705, 730, 800.
 HELEN VINMONT.—System, add F. T. Co. arc; w. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,190.
 HENRY P. WERNER.—W. l., strike out 800.
 HENRY R. MALLORY.—W. l., 600, 660, 705, 730, 800.
 HENRY S. GROVE.—W. l., 600, 705, 1,987, 2,098, 2,400.
 HERBERT G. WYLLIE.—W. l., 600, 705, 750, 800.
 HEREDIA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 HERMAN FALK.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 HERON.—System, Navy-W. S. A., 1,000; w. l., 600, 705, 800.
 H. F. ALEXANDER.—W. l., 600, 705, 800, 1,987, 2,100, 2,400.
 H. H. ROGERS.—W. l., 600, 640, 660, 705, 730, 750, 800.
 HILTON.—W. l., 600, 660, 705, 730, 800.
 H. M. FLAGLER.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 HOG ISLAND.—W. l., 600, 660, 705, 730, 800.
 HOWARD.—W. l., 600, 660, 705, 730, 800.
 HUGH KENNEDY.—W. l., strike out 800.
 HUMACONNA.—System, add W. E. v. t. telegraph.
 HUMRICK.—W. l., 715, 1875.
 HURON (KVH).—W. l., 600, 660, 705, 730, 800.
 I. C. WHITE.—W. l., 600, 640, 705, 750, 800.
 ILLINOIS (KDSZ).—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 ILLINOIS (WCZ).—System, R. C. A. v. t. telegraph.
 ILLYRIA.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 660, 705, 750, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,013, 2,069, 2,098.
 INDIANA (WFC).—System, R. C. A. v. t. telegraph; w. l., 715, 800, 875.
 INTERNATIONAL.—System, Navy, 1,000; w. l., 600, 705, 800.
 INTREPID.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 IRENE (WQBE).—System, composite, 1,000.
 IRIS.—Station controlled by M. R. T. Co.
 IROQUOIS.—System, I. W. T. Co. arc & Lowenstein, 1,000; w. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 J. A. BOSTWICK.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.

- JALAPA.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 JAMES MCGEE.—W. l., 600, 640, 705, 750, 800.
 JEFF DAVIS.—W. l., 600, 705, 800, 1,887, 1,987, 2,098, 2,100, 2,400.
 JEFFERSON.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 JEFFERSON MYERS.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
 J. M. DANZIGER.—W. l., 600, 640, 705, 750, 800.
 JOHN D. ARCHBOLD.—W. l., 600, 640, 705, 750, 800, 1,875, 1,887, 1,911, 1,987, 2,098, 2,128, 2,190, 2,400.
 JOHN J. BOLAND.—W. l., strike out 800.
 JOSEPH M. CUDAHY.—W. l., 600, 640, 705, 750, 800.
 JUNIATA (KQJ).—W. l., 600, 660, 705, 730, 800.
 JUNIATA (WCB).—System, add R. C. A. v. t. telegraph.
 KAALA.—Range, 200; system, K. & C. spark, 1,000; w. l., 600, 705, 800; controlled by owner.
 KEARNEY.—W. l., 600, 660, 705, 730, 800.
 KENTUCKIAN.—W. l., 600, 660, 705, 730, 800.
 K. I. LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
 KISHACOQUILLAS.—System, Navy-W. S. A. Co., 1,000; w. l., 600, 705, 800.
 KNOXVILLE CITY.—W. l., 600, 660, 705, 730, 800.
 K. R. KINGSBURY.—W. l., 600, 660, 705, 750, 800, 1,987, 2,100, 2,440.
 LAKE FAIRPORT.—W. l., 600, 660, 705, 730, 800.
 LAKE GORIN.—System, Navy-Marconi, v. t. telegraph.
 LAKE INGLENOOK.—System, Navy-Marconi, 1,000; w. l., 600, 705, 800.
 LA MERCED.—W. l., 600, 705, 800, 1,987, 2,098, 2,190.
 LANCASTER.—W. l., 600, 660, 705, 730, 800.
 LA PERLA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 LAVADA.—W. l., 600, 705, 800, 1,887, 1,987, 2,100, 2,440.
 LEBEC.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 LEVISA.—W. l., 600, 640, 705, 750, 800.
 LEWIS K. THURLOW.—W. l., 600, 705, 800.
 LEWIS LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
 LIBERTY LAND.—W. l., 600, 660, 705, 730, 800.
 LILLIAN LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
 LIVINGSTONE ROE.—W. l., 600, 640, 705, 750, 800.
 L. J. DRAKE.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 LOUIS R. DAVIDSON.—W. l., strike out 800.
 LUXPALILE.—W. l., 600, 660, 705, 730, 800.
 MADISON.—W. l., 600, 705, 800, 1,987, 2,098.
 MAINE.—W. l., 600, 660, 705, 730, 800.
 MAITLAND No. 1.—System, R. C. A. v. t. telegraph; w. l., 715, 800, 875.
 MALA.—W. l., 600, 705, 800.
 MALABAR.—W. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,128, 2,190.
 MALACRA.—W. l., 600, 660, 705, 730, 800.
 MANANA.—Name changed to Sphynx.
 MANCHURIA.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 MANGORE.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 MANHATTAN ISLAND.—W. l., 600, 660, 705, 730, 800.
 MANOA.—W. l., 600, 705, 800, 1,987, 2,100.
 MANULANI.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 660, 705, 730, 750, 800, 1,887, 1,911, 1,961, 1,987, 2,098, 2,222.
 MARGARET.—W. l., 600, 705, 730, 800.
 MARGARET DOLLAR.—W. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,400.
 MARORE.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 MASSMAR.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190, 2,400.
 MATINICOCK.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 MATSONIA.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
 MAUI.—W. l., 600, 705, 800, 870, 1,987, 2,100, 2,440.
 MAZATLAN.—Station controlled by M. R. T. Co.
 MCKEESPORT.—System, Navy-Marconi, 1,000; w. l., 600, 660, 705, 730, 800.
 MEANTICUT.—W. l., 600, 705, 800, 1,987, 2,100, 2,440.
 MELVILLE DOLLAR.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 MEMPHIS CITY.—W. l., 600, 660, 705, 730, 800.
 MERCER.—W. l., 600, 660, 705, 730, 800.
 METEPAN.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 METON.—W. l., 600, 705, 800, 1,987, 2,098.
 MEVANIA.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 MEXICO.—W. l., 600, 660, 705, 730, 800.

- M. F. ELDIOTT.—W. l., 600, 640, 705, 750, 800.
M. F. STERLING.—Station controlled by M. R. T. Co.
MICHABO.—W. l., 600, 705, 750, 800, 1,887, 1,987, 2,098, 2,400; service, PG; hours, X; rates, 8 cents per word.
MILLINOCKET.—System, Navy-Simon, 1,000.
MINEOLA.—W. l., 600, 660, 705, 730, 800.
MINNEKAHDA.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
MINNEQUA.—W. l., 600, 660, 705, 730, 800.
MINNESOTAN.—W. l., 600, 705, 800.
MOHAWK (KFYU).—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
MONGOLIA.—W. l., 600, 660, 705, 730, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190, 2,400.
MONTEREY.—W. l., 600, 660, 705, 730, 800.
MORRIS S. TREMAINE.—W. l., strike out 800.
MOSELLA.—W. l., 600, 705, 1,987, 2,100.
MOUNT CLAY.—W. l., 600, 705, 1,987, 2,098.
MOUNT EVANS.—System, Navy-Marconi, 1,000.
MOUNT HOPE.—System, Navy, 1,000.
MUNAIRE.—W. l., 600, 640, 705, 750, 800.
MUNAMAR.—W. l., 600, 660, 705, 730, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,098, 2,128, 2,190.
MUNARGO.—W. l., 600, 660, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128.
MUNINIDIES.—W. l., 600, 660, 705, 730, 800.
MUNPLACE.—W. l., 600, 660, 705, 730, 800.
MUNSONO.—System, I. W. T. Co., 1,000.
MYSTIC.—W. l., 600, 660, 705, 730, 800.
NANTUCKET.—W. l., 600, 660, 705, 800.
NARBO.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
NATIRAR.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
NELSON.—W. l., 600, 660, 705, 730, 800.
NEWTON.—W. l., 600, 640, 705, 750, 800.
NEW YORK (KOSL).—W. l., 600, 705, 800.
NEW YORK (WJK).—W. l., 600, 705, 800, 1,875, 1,981, 2,098, 2,128.
NIZINA.—W. l., add 800.
NORA.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
NORTH LAND.—W. l., strike out spark.
NOURMAHAL (KDII).—Name changed to Alder; w. l., 600, 640, 660, 705, 730, 750, 800, 1,885, 1,887, 1,911, 1,961, 1,987, 2,098, 2,128, 2,190, 2,400; owned by William Boyce Thompson; controlled by R. M. C. A.
OAKLEY L. ALEXANDER.—W. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
OAKMAR.—W. l., 600, 660, 705, 730, 800.
OAKSPRING.—W. l., 600, 660, 705, 730, 800.
OCEAN.—W. l., 600, 640, 705, 750, 800.
OCTORARA.—System, add R. C. A. v. t. telegraph.
ODUNA.—W. l., 600, 705, 800, 1,987, 2,098, 2,190.
OGONTZ.—W. l., 600, 705, 800.
OLEAN.—W. l., 600, 640, 705, 750, 800.
ONEIDA.—W. l., 600, 705, 715, 800, 875, 1,987, 2,098.
ONONDAGA.—W. l., 600, 705, 715, 750, 800, 875, 1,887, 1,987, 2,098, 2,400.
ONTARIO.—W. l., 600, 660, 705, 730, 800.
ORINOCO.—W. l., 600, 660, 705, 730, 800.
ORIOLE.—W. l., 600, 660, 705, 730, 800.
ORIZABA.—W. l., 600, 660, 705, 730, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
ORLEANS.—W. l., 600, 660, 705, 730, 800.
ORMES.—W. l., 600, 640, 705, 750, 800.
OSCAR D. BENNETT.—W. l., 600, 640, 660, 705, 730, 800.
OSSA.—W. l., 600, 660, 705, 730, 800.
O. T. WARING.—W. l., 600, 640, 660, 705, 730, 1,875, 1,887, 1,911, 1,961, 1,987, 2,098, 2,128, 2,190.
OUANANICHE.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
PACIFIC.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
PACIFIC HEMLOCK.—W. l., 600, 660, 705, 730, 800.
PACIFIC Redwood.—W. l., 600, 660, 705, 730, 800.
PACIFIC SPRUCE.—W. l., 600, 705, 800, 1,887, 1,987, 2,400.
PAN AMERICA.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190, 2,400.
PANUCO.—W. l., 600, 660, 705, 730, 800.
PAPOOSE.—W. l., 600, 640, 705, 750, 800.

- PARSIMINA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 PASTORES.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 PAT DONEHY.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 PAUL H. HARWOOD.—W. l., 600, 640, 705, 750, 800.
 PAUL LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
 PAULSBORO.—W. l., 600, 640, 705, 750, 800.
 PAWNEE (KFZE).—W. l., 600, 705, 750, 800, 1,875, 1,877, 1,987, 2,098.
 PECOS.—W. l., 600, 660, 705, 730, 800.
 PENMAR.—W. l., 600, 660, 705, 730, 800.
 PHILIP D. BLOCK.—W. l., 715, 800, 875.
 PIONEER (KIG).—W. l., 600, 640, 705, 750, 800.
 PIPESTONE COUNTY.—W. l., 600, 660, 705, 730, 800.
 POINT BONITA.—System, Navy-Marconi, 1,000.
 POINT BREEZE.—W. l., 600, 640, 660, 705, 730, 800.
 POLARINE.—W. l., 600, 640, 705, 750, 800.
 PONCE.—W. l., 600, 660, 705, 730, 800.
 PORTO RICO.—W. l., 600, 660, 705, 730, 800.
 PRESIDENT ADAMS.—W. l., 600, 705, 800, 1,887, 1,961, 1,987, 2,100, 2,440.
 PRESIDENT CLEVELAND.—W. l., 600, 705, 800, 1,887, 1,987, 2,098, 2,190.
 PRESIDENT HARDING.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,013, 2,098, 2,128, 2,190, 2,290.
 PRESIDENT JACKSON.—W. l., 600, 705, 800, 1,987, 2,100, 2,290.
 PRESIDENT JEFFERSON.—W. l., 600, 705, 800, 1,987, 2,098, 2,128, 2,190.
 PRESIDENT MCKINLEY.—W. l., 600, 705, 800, 1,987, 2,100, 2,290.
 PRESIDENT POLK.—System, Navy-Marconi, 1,000 and Federal Arc; w. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,987, 2,013, 2,069, 2,098, 2,128, 2,190, 2,400.
 PRESIDENT ROOSEVELT.—System, F. T. Co. arc & Navy-Marconi, 1,000; w. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,987, 2,013, 2,098, 2,128, 2,190, 2,290.
 PRESIDENT TAFT.—W. l., 600, 705, 800, 1,987, 2,100.
 PRESIDENT VAN BUREN.—W. l., 600, 660, 705, 730, 800.
 PRESIDENT WILSON.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,013, 2,098, 2,128, 2,190, 2,290, 2,400.
 QUEEN ANNE.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 660, 705, 730, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,013, 2,069, 2,098, 2,128, 2,190, 2,400.
 QUISTCONCK.—W. l., 600, 705, 800.
 RAYO.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 REAPER.—W. l., 600, 660, 705, 730, 800.
 REDBIRD.—W. l., 600, 660, 705, 730, 800.
 REPUBLIC (KSN).—W. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,987, 2,013, 2,098, 2,190, 2,290.
 REPUBLIC (KUBJ).—W. l., 600, 640, 705, 750, 800.
 RIPPLE (KFKN).—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 ROBADOR.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 ROBERT E. HOPKINS.—W. l., 600, 640, 705, 750, 800.
 ROBERT E. LEE.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 ROBERT HOBSON.—W. l., 715, 800, 875, 1,875, 1,899, 1,987, 2,098, 2,190.
 ROBERT LUCKENBACH.—W. l., 600, 660, 705, 730, 800.
 ROCHESTER.—W. l., 600, 640, 705, 750, 800.
 ROYAL ARROW.—W. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 RUTH.—W. l., 600, 660, 705, 730, 800.
 RUTH ALEXANDER.—W. l., 600, 705, 800, 1,796.
 SACANDAGA.—W. l., 600, 660, 705, 730, 800.
 SAC CITY.—W. l., 600, 660, 705, 730, 800.
 SACO.—W. l., 600, 660, 705, 730, 800.
 SAGAPORACK.—W. l., 600, 660, 705, 730, 800.
 ST. HELIERS.—W. l., drop 750.
 SAMUEL MATHER.—W. l., 715, 800, 875, 1,875, 1,899, 1,987, 2,098, 2,128.
 SAMUEL Q. BROWN.—W. l., 600, 640, 705, 750, 800.
 SAN FRANCISCO.—W. l., 600, 660, 705, 730, 800.
 SAN JACINTO.—W. l., 600, 660, 705, 730, 800. z
 SAN JUAN (KGJ).—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 SAN LORENZO.—System, I. W. T. Co. arc & W. S. A. Co., 1,000; w. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 SAN MATEO.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 SANTA ANA (WBX).—Name changed to Guatemala; w. l., 600, 640, 705, 750, 800.
 SANTA CECELIA (WIN).—W. l., add 640.
 SANTA CRUZ.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.

- SANTA ELISA.—W. l., 600, 640, 705, 750, 800.
 SANTA LUISA.—W. l., 600, 640, 705, 750, 800.
 SANTA MARIA (WPBW).—System, R. C. A. v. t. telegraph; w. l., 600, 640, 660, 705, 730, 750, 800, 1,875, 1,887, 1,911, 1,961, 2,098, 2,128, 2,190, 2,400.
 SANTA MARTA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 SANTA ROSALIA.—W. l., 600, 660, 705, 730, 800.
 SANTA TECLA.—W. l., 600, 660, 705, 730, 800.
 SANTA TERESA.—W. l., 600, 640, 705, 750, 800.
 SANTORE.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 SARAMACCA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 SARCOXIE.—W. l., 600, 660, 705, 730, 800.
 SATARTIA.—W. l., 600, 660, 705, 730, 800.
 SATOCO.—System, Navy-Marconi, 1,000.
 SAUCON (WBK).—W. l., 600, 660, 705, 730, 800.
 SAUGUS.—W. l., 600, 660, 705, 730, 800.
 SAVARONA.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800, 1,875, 1,911, 1,987, 2,098, 2,128, 2,190; service, PG; hours X.
 SAWOKLA.—System, Navy-Marconi & F. T. Co.; w. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,987, 2,013, 2,098, 2,128, 2,190, 2,290, 2,400.
 S. B. HUNT.—W. l., 600, 640, 705, 750, 800.
 SCHENECTADY.—W. l., 600, 660, 705, 730, 800.
 SCHODACK.—W. l., 600, 660, 705, 730, 800.
 SEA.—W. l., 600, 640, 705, 750, 800.
 SEABORN.—W. l., 600, 705, 800, 1,887, 1,987, 2,098, 2,400.
 SEEANDBEE.—W. l., add 800.
 SEEKONK.—Station controlled by owner.
 SELMA CITY.—W. l., 600, 660, 705, 730, 800.
 SEMINOLE (WAK).—W. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,098, 2,128.
 SEMINOLE (KUGP).—System, Navy spark & Federal arc; w. l., 600, 705, 800, 1,911, 1,961, 1,987, 2,098, 2,128, 2,190.
 SEQUOIA.—W. l., 600, 640, 660, 705, 730, 750, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,098, 2,128, 2,190, 2,400.
 SHARON.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 SHAWNEE.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 SHELTON.—W. l., 600, 705, 800, 1,987, 2,098, 2,128, 2,190.
 SHREVEPORT.—W. l., 600, 660, 705, 730, 800.
 SIBONEY.—W. l., 600, 660, 705, 730, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 SIDNEY M. HAUPTMAN.—W. l., 600, 660, 705, 730, 800.
 SIERRA.—W. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,190.
 SILVER SHELL.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 SINSINAWA.—W. l., 600, 660, 705, 730, 800.
 SIXAOLA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 SOCONY.—W. l., 600, 640, 705, 750, 800.
 SOCONY 83.—W. l., 600, 660, 705, 730, 800.
 SOCONY 88.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 SOCONY 90.—W. l., 600, 660, 705, 730, 800.
 SOLITAIRE.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 SONOMA.—W. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,190.
 SOUTHERN CROSS.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190, 2,400.
 SPEEJACKS.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 STANDARD.—W. l., 600, 640, 705, 750, 800.
 STEEL ENGINEER.—W. l., 600, 660, 705, 730, 800.
 STEEL EXPORTER.—W. l., 600, 660, 705, 730, 800.
 STEEL INVENTOR.—W. l., 600, 660, 705, 730, 800.
 STEEL NAVIGATOR.—W. l., 600, 660, 705, 730, 800.
 STEEL RANGER.—W. l., 600, 660, 705, 730, 800.
 STEEL TRADER.—W. l., 600, 660, 705, 730, 800.
 STEEL TRAVELER.—W. l., 600, 660, 705, 730, 800.
 STEEL VOYAGER.—W. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 STEEL WORKER.—W. l., 600, 660, 705, 730, 800.
 STEPHEN M. CLEMENT.—W. l., strike out 800.
 STEPHEN R. JONES.—W. l., 600, 705, 800.
 STOCKTON.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 SUBOATCO.—W. l., 600, 660, 705, 730, 800.
 SUCARSECO.—W. l., 600, 660, 705, 730, 800.

- SUDURCO.—W. l., 600, 660, 705, 730, 800.
 SUEDCO.—W. l., 600, 660, 705, 730, 800.
 SUGILLENCO.—System, Navy-W. S. A. Co., 1,000.
 SUPHENCO.—W. l., 600, 660, 705, 730, 800.
 SURAILCO.—W. l., 600, 660, 705, 730, 800.
 SURF.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 SURINAME.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098.
 SUTERMCO.—W. l., 600, 660, 705, 730, 800.
 SUWARINCO.—W. l., 600, 660, 705, 730, 800.
 SWELL.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 SWIFTEAGLE.—W. l., 600, 705, 800, 1,887, 1,961, 1,987, 2,098, 2,128, 2,190.
 SWIFTLIGHT.—W. l., 600, 660, 705, 730, 800.
 SWIFTSURE.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 TAMPA (KVK).—W. l., 600, 660, 705, 800.
 TEAL.—System, W. S. A. spark, 1,000; w. l., 600, 705, 800.
 TEXMAR.—W. l., 600, 640, 705, 750, 800.
 THEODORE H. WICKWIRE, Jr.—W. l., strike out 800.
 THEODORE H. WICKWIRE.—Strike out 800.
 TIDE.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 TIONESTA.—System, Add R. C. A. v. t. telegraph.
 TOMALVA.—W. l., 600, 660, 705, 730, 800.
 TRACY BROTHERS.—W. l., 600, 640, 705, 750, 800.
 TRUJILLO.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 TURRIALBA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098.
 TUSTEM.—W. l., 600, 800, 1,987, 2,098, 2,400.
 UNICOI.—W. l., 600, 660, 705, 730, 800.
 VACOIL.—W. l., 600, 640, 705, 750, 800.
 VACUUM.—W. l., 600, 640, 705, 750, 800.
 VENEZUELA.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 VENTURO.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 VENUS.—W. l., 715, 800, 875, 1,875, 1,899, 1,987, 2,098, 2,128.
 VESTA.—System, R. C. A. v. t. telegraph; w. l., 600, 640, 705, 750, 800.
 VINCENT.—W. l., 600, 660, 705, 730, 800.
 WALTER A. LUCKENBACH.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 WALTER JENNINGS.—W. l., 600, 640, 705, 730, 750, 800.
 WALUCIA III.—W. l., 600, 705, 750, 800, 1,987, 2,098, 2,400.
 WARRIOR.—W. l., 600, 640, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 WAUKEGAN.—W. l., 600, 660, 705, 730, 800.
 WAVE.—W. l., 600, 640, 705, 750, 800.
 W. C. TEAGLE.—W. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190, 2,400.
 W. D. ANDERSON.—W. l., 600, 660, 705, 730, 800.
 WEST AFRICA.—W. l., 600, 705, 1,987, 2,098.
 WEST CADDOA.—System, add F. T. Co. arc; w. l., 600, 705, 800, 1,875, 1,911, 1,961, 1,987, 2,013, 2,069, 2,098, 2,128, 2,190, 2,222, 2,256.
 WEST CARMONA.—W. l., 600, 705, 800, 1,987, 2,100, 2,290.
 WEST CARNIFAX.—W. l., 600, 660, 705, 730, 800.
 WEST CUSSETA.—W. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,987, 2,013, 2,069, 2,098, 2,128, 2,190.
 WESTERN KNIGHT.—W. l., 600, 660, 705, 730, 800.
 WESTERN QUEEN.—System, K & C, 1,000; w. l., 600, 705, 800.
 WESTERN STATES.—W. l., 715, 800, 875, 1,987.
 WESTERN WORLD.—W. l., 600, 705, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 WEST GRAMA.—System, Navy-Marconi, 1,000 and Federal Arc; w. l., 600, 705, 800, 1,875, 1,987, 2,098, 2,190.
 WEST HIKA.—W. l., 600, 705, 800.
 WEST HONAKER.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 WEST ISLETA.—W. l., 600, 660, 705, 730, 800.
 WEST KEBAR.—System, add Navy-K & C, 1,000; w. l., 600, 705, 800, 1,875, 1,887, 1,911, 1,961, 1,987, 2,013, 2,069, 2,098, 2,128, 2,190, 2,400.
 WEST NOTUS.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 WEST O'ROWA.—W. l., 600, 705, 800, 1,987, 2,100, 2,290.
 WEST PROSPECT.—W. l., 600, 705, 800, 1,887, 1,987, 2,098, 2,400.
 WEST TOGUS.—W. l., 600, 705, 1,987, 2,098.
 WHITE CAP.—W. l., 600, 640, 705, 750, 800.
 W. H. LIBBY.—W. l., 600, 640, 705, 750, 800.
 W. H. TILFORD.—W. l., 600, 640, 705, 750, 800.
 WILHELMINA.—W. l., 600, 705, 800, 1,987, 2,098, 2,290.

- WILLBACO.—W. l., 600, 660, 705, 730, 800.
 WILLBORO.—Range, 150; system, Navy, 1,000; w. l., 600, 660, 705, 730, 800.
 WILLETT.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 WILLFARO.—W. l., 600, 660, 705, 730.
 WILLIAM F. HUMPHREY.—W. l., 600, 640, 705, 750, 800, 1,875, 1,911, 1,987, 2,098, 2,128, 2,190, 2,400.
 WILLIAM GREEN.—W. l., 600, 640, 705, 750, 800.
 WM. G. WARDEN.—W. l., 600, 640, 705, 750, 800.
 WILLIAM McLAUCHLAN.—W. l., 715, 800, 875, 1,875, 1,899, 1,987, 2,098, 2,190.
 WILLIAM NELSON.—W. l., add 800.
 WILLIAM PENN.—W. l., 600, 705, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 WILLIAM P. SNYDER, JR.—System, R. C. A. 1,000; w. l., 715, 800, 875; rates, Great Lakes Service, 4 cents per word.
 WM. ROCKEFELLER.—W. l., 600, 640, 705, 750, 800, 1,875, 1,887, 1,911, 1,987, 2,098, 2,128, 2,190, 2,400.
 WILLIAM T. ROBERTS.—W. l., strike out 800.
 WILLKENO.—System, Navy, 1,000; w. l., 600, 660, 705, 730, 800.
 WILLSOLO.—W. l., 600, 660, 705, 730, 800.
 WILLZIPO.—W. l., 600, 705, 730, 800.
 WINONA.—System, Navy-W. S. A. Co., 1,000; w. l., 600, 660, 705, 730, 800.
 WINONA COUNTY.—W. l., 600, 660, 705, 730, 800.
 WISCONSIN (KURS).—System, R. C. A. v. t. telegraph; w. l., add 800, 875.
 W. L. CONNELLY.—W. l., 600, 640, 705, 750, 800.
 WYTHEVILLE.—W. l., 600, 660, 705, 730, 800.
 YARMOUTH.—System, drop phone; w. l., 600, 640, 705, 750, 800, 1,875, 1,961, 1,987, 2,098, 2,128, 2,190.
 YORBA LINDA.—W. l., 600, 705, 800, 1,987, 2,098, 2,400.
 YORKMAR.—W. l., 600, 660, 705, 730, 800.
 YOUNGSTOWN (WPBH).—W. l., 715, 800, 875, 1,875, 1,899, 1,987, 2,098, 2,190.
 ZACAPA.—W. l., 600, 705, 750, 800, 1,875, 1,887, 1,987, 2,098, 2,400.
 Strike out all particulars following Independent Wireless Telegraph Co., general call, KFZZ.
 All 460 meters and 900 meters have been dropped; all those having 706 have been changed to 705.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

KDUK, *read*, Golden Sun; KEXJ, *read* Golden Forest; KUBM, *read* Biboco; KUQM, *read*, Illinois; strike out all particulars following the call signals, KFFM, WIA; the following call signals have already been stricken from the June 30, 1928, edition of the list of Commercial and Government Radio Stations of the United States: KFWR, KFWS, KFZZ, KJY; WOH *read* WMX.

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]

UNNAMED (KDZ).—Strike out all particulars. (This change already made to the June 30, 1928, list of Commercial and Government Radio Stations of the United States.)

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]

KEKJ (Beverly Hills, Calif.).—Owner of station, R. S. MacMillan.
 KFUL (Galveston, Tex.).—Owner of station, Will H. Ford.
 KGDR (San Antonio, Tex.).—Power, 30 from 6 a. m. to 6 p. m.
 KGHG (McGehee, Ark.).—W. l., 222.1, fy. 1,350.
 KGJF (Little Rock, Ark.).—W. l., 227.6, fy. 1,080.
 KKKL (Georgetown, Tex.).—W. l., 232.4, fy. 1,290, power, 100.
 KHMO (Harlingen, Tex.).—Call changed to KRGV.
 WBBZ (Chicago, Ill.—portable).—Changed to Ponca City, Okla.
 WDSU (New Orleans, La.).—Power, 250.
 WIBM (Chicago, Ill.—portable).—Changed to Jackson, Mich.
 WIL (St. Louis, Mo.).—Owner of station, Missouri Broadcasting Corporation.
 WIOD (Miami Beach, Fla.).—Owner of station, Isle of Dreams Broadcasting Co.

WJAM (Cedar Rapids, Iowa).—Changed to Waterloo, Iowa; owner of station, Waterloo Broadcasting Co.

WJJD (Mooseheart, Ill.).—Power, 5,000 daytime only.

Strike out all particulars of the following-named stations: KFBI (San Francisco, Calif.—portable), KFDZ (Minneapolis, Minn.), KFHL (Oskaloosa, Iowa), KFMR (Sioux City, Iowa), KFOX (Omaha, Nebr.), KFPR (Los Angeles, Calif.), KFUS (Oakland, Calif.), KFUT (Salt Lake City, Utah), KFVG (Independence, Kans.), KGEQ (Minneapolis, Minn.), KGFB (Iowa City, Iowa), KGFN (Aneta, N. Dak.), KGFO (Terre Haute, Ind.—portable), KGHC (Slayton, Minn.), KOOS (Marshfield, Oreg.), KPNP (Muscatine, Iowa), WABW (Wooster, Ohio), WAIT (Taunton, Mass.), WATT (Boston, Mass.—portable), WBBP (Petoskey, Mich.), WCBR (Providence, R. I.), WCON (Danbury, Conn.), WFAM (St. Cloud, Minn.), WFBZ (Galesburg, Ill.), WFKB (Chicago, Ill.), WGM (Jeanette, Pa.), WGMU (New York, N. Y.—portable), WGOP (Flushing, N. Y.), WJBZ (Chicago Heights, Ill.), WKDR (Kenosha, Wis.), WLBI (Wenona, Ill.), WLBQ (Atwood, Ill.), WLBT (Crown Point, Ind.), WLBY (Iron Mountain, Mich.), WLTS (Chicago, Ill.), WMBE (White Bear Lake, Minn.), WOBR (Shelby, Ohio—portable), WOKT (Rochester, N. Y.), WRAH (Providence, R. I.), WRAM (Galesburg, Ill.), WRES (Quincy, Mass.), WRMU (New York, N. Y.—portable), WSAX (Chicago, Ill.)

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]

BAR HARBOR, ME. (Traffic station).—Disregard notice of deletion in Bulletin No. 135, June 30, 1928. This notice should have read "strike out the word Seawall."

MARQUETTE LIGHT STATION, MICH.—System, composite v. t. telegraph and telephone; w. l., add 88.

STANNARD ROCK LIGHT STATION, MICH.—System, composite v. t. telegraph and telephone; w. l., add 88.

While this edition of the Bulletin is the first supplement to the June 30, 1928, edition of the list of Commercial and Government Radio Stations of the United States, the following-mentioned changes have already been made to that list:

BETHEL, ALASKA.—Hours, 7 a. m. to 7 p. m.

CIRCLE, ALASKA.—W. l., 875, 1,744; hours, 7 a. m. to 7.30 p. m.

CORDOVA, ALASKA.—W. l., 17,503, 22,805, 34.21, 1,099, 6,840.

CRAIG, ALASKA.—W. l., 450.5, 485.4, 625; hours, 7.30 a. m. to 7 p. m.

FAIRBANKS, ALASKA.—W. l., 16.93, 22.57, 33.86, 67.72, 3,700; hours, 7 a. m. to midnight.

FAIRFIELD, OHIO.—Changed to Dayton, Ohio.

FORT EGBERT, ALASKA.—W. l., 440.5; hours, 7.30 a. m. to 7 p. m.

FORT GIBBON, ALASKA.—W. l., 500, 571.4; hours, 7.30 a. m. to 7 p. m.

FORT ST. MICHAEL, ALASKA.—W. l., 460.1.

FORTUNA, ALASKA.—W. l., 530.

FORT YUKON, ALASKA.—W. l., 630.3.

GRUNDLER, ALASKA.—W. l., 465.1; hours, 7 a. m. to 7 p. m.; rates, 12 cents per word.

HAINES, ALASKA.—Hours, 7 a. m. to 7 p. m.

HOLY CROSS, ALASKA.—W. l., 470.2; hours, 8 a. m. to 7 p. m.

HOT SPRINGS, ALASKA.—W. l., 545; hours, 7 a. m. to 7 p. m.

IDITAROD, ALASKA.—W. l., 3,490, 5,560; hours, 8 a. m. to 7 p. m.

JUNEAU, ALASKA.—W. l., 600, 2,256; hours, 7 a. m. to 10 p. m.; service FX.

KETCHIKAN, ALASKA.—W. l., 14,888, 18.61, 24.88, 37.22, 74.44, 545, 1,734, 4,550; service, PG; hours, N.

KOTZEBUE, ALASKA.—W. l., 435.4; hours, 8 a. m. to 7 p. m.

LIVENGOD, ALASKA.—W. l., 480; hours, 8 a. m. to 7 p. m.

NOME, ALASKA.—W. l., 22.83, 34.25, 68.49, 660.8, 1,071, 3,610, 4,000; service, PG; hours, 7 a. m. to 12 midnight; rates, 12 cents per word.

NULATQ, ALASKA.—W. l., add 636.9; service, FX; hours, 7 a. m. to 8 p. m.

PETERSBURG, ALASKA.—Service, FX; hours, 7 a. m. to 7 p. m.

PITTSBURGH, PA. (portable).—Station controlled by Department of Commerce, Bureau of Mines.

RUBY, ALASKA.—W. l., 400; hours, 8 a. m. to 7 p. m.

SEWARD, ALASKA.—W. l., 17.162, 17.182, 22.88, 22.91, 34.32, 34.36, 68.65, 68.957, 1,091, 1,500, 2,500, 3,000; service, PG; hours, N.; rates 12 cents per word.

SITKA, ALASKA.—W. 1., 600, 1,200; hours, 7 a. m. to 7 p. m.

SKAGAWAY, ALASKA.—W. 1., 22.83, 34.25, 68.49; service, FX; hours, 7 a. m. to 8 p. m.

TACOTNA, ALASKA.—W. 1., 537.6, 559.7; hours, 8 a. m. to 7 p. m.

VALDEZ, ALASKA.—W. 1., 450.5; hours, 7 a. m. to 9 p. m.

WISEMAN, ALASKA.—W. 1., 550.5; hours, 8 a. m. to 8 p. m.

WRANGELL, ALASKA.—Service, FX; hours, 7 a. m. to 7 p. m.

Strike out all particulars of the following-named station: Fort Grant, Canal Zone.

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]

RAINBOW.—Strike out all particulars.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

NBD, disregard notice of deletion in Bulletin No. 135 regarding traffic station.

WYD, read Dayton, Ohio; strike out all particulars following the call signals, NAMV, WUBE.

SPECIAL LAND 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]

BEACON, N. Y. (2XBU).—W. 1., 62.5–61.22; kc., 4,800–4,900.

EAST PITTSBURGH, PA. (8XAV).—W. 1., 63.83–62.5, 19.868–19.737; kc., 4,700–4,800, 15,100–15,200; power, 20,000 w.

LEXINGTON, MASS. (1XAY).—W. 1., 61.22–62.5; kc., 4,900–4,800.

NEW YORK, N. Y. (Portable) (2XBS).—W. 1., 65.22–63.83; kc., 4,600–4,700.

OCEAN BEACH, N. J. (2XJ).—Changed to Deal, N. J.

WASHINGTON, D. C. (3XK).—W. 1., 61.22–60; kc., 4,900–5,000.

Strike out all particulars of the following-named stations (while this edition of the Bulletin is the first supplement to the June 30, 1928, edition of the list of Commercial and Government Radio Stations of the United States, the following-named stations have already been stricken from that list): Agricultural College, Miss. (5YD); Alva, Okla. (5YC); Arizona (portable) (6XAM); Atlanta, Ga. (4XJ); Bandini, Calif. (6XBU); Belfast, Me. (1XAO); Cleveland, Ohio (8XBR); Corvallis, Oreg. (7YJ); Detroit, Mich. (portable) (8XM); Detroit, Mich. (8XN); Green Harbor, Mass. (near) (1XD); Greenland (portable) (1XL); Las Vegas, Nev. (6XBS); Los Angeles, Calif. (portable) (6XAE); Los Angeles, Calif. (portable) (6XAF); Los Angeles, Calif. (6XAH); Los Angeles, Calif. (portable) (6XAL); Los Angeles, Calif. (portable) (6XAU); Los Angeles, Calif. (portable) (6XBD); Los Angeles, Calif. (portable) (6XBR); Los Angeles, Calif. (6XC); Los Angeles, Calif. (portable) (6XQ); Maywood, Ill. (9XR); Missoula, Mont. (7XA); Mount Clemens, Mich. (near) (8XAE); Naknek, Alaska (7XP); Newark, N. J. (2XAQ); New Haven, Conn. (1XB); New Orleans, La. (5YF); New Orleans, La. (5YU); New York, N. Y. (2XY); Oakland, Calif. (6XBG); Oakland, Calif. (6XR); Parkesburg, Pa. (3XW); Portland, Oreg. (7YK); Pullman, Wash. (7YE); Richmond, Va. (3XE); Salt Lake City, Utah (6XBT); San Diego, Calif. (portable) (6XAZ); San Francisco, Calif. (6XT); San Francisco, Calif. (6XX); Schenectady, N. Y. (2XQ); Seattle, Wash. (portable) (7XC); Seattle, Wash. (7YD); Spokane, Wash. (7YL); Tulsa, Okla. (5XF); Washington, D. C. (3XG); Washington, D. C. (3XH); Whitefish, Mont. (7XAL); Montana (portable) (7XR); General Call for all I. W. T. Co. vessels (KFZZ); Independent Wireless Telegraph Co.—general call for all vessels (KFZZ).

MISCELLANEOUS

CHANGES IN RADIOBEACON STATIONS OF THE UNITED STATES

Pollock Rip Lightship, Mass.—Radiobeacon established. Transmits every 180 seconds groups of 1 dash, 2 dots, 1 dash, thus:

— . . . — . . . — etc.
60 seconds

Silent.
120 seconds

Transmits only on request on 300 kc. (1,000 m.). Position: long. 69° 51' W., lat. 41° 36' N. Call WWAG.

South Pass West Jetty Range Front Light Station, La.—Operating periods changed to 12.30 to 1, 3.30 to 4, 6.30 to 7, and 9.30 to 10 a. m. and p. m., ninetyeth meridian time in clear weather.

Calumet Harbor Light Station, Ill.—Operating periods changed to the first 15 minutes of each hour during the navigable season in addition to the following periods: 1 to 1.30 and 7 to 7.30 a. m. and p. m.

AMATEUR EXTRA FIRST-CLASS RADIO OPERATOR LICENSE REESTABLISHED

The requirements for this class of license which is again being issued are as follows: To be eligible for the examination the applicant must have had at least two years' experience as a licensed radio operator and must not have been penalized for violation of the radio laws. The code speed requirement is 20 words per minute receiving and transmitting. Applicants must pass a special examination in which 75 per cent will constitute a passing mark.

TIME OF TRANSMISSION OF BUSINESS INFORMATION TO SHIPPING BOARD VESSELS BY ARLINGTON CHANGED

The evening broadcast to Shipping Board vessels, via Arlington (NAA), now follows immediately after the hydrographic and ice broadcast at 2100 (9 p. m.) in lieu of 2300 (11 p. m.) seventy-fifth meridian time.

RADIO COMPASS STATION ESTABLISHED AT MALIN HEAD, ENGLAND

This station now transmits bearings to ships at sea. Position, 7° 20' 30'' W., 55° 21' 45'' N. Reliable sectors, 025° to 073° and 236° to 374°. For procedure and charges see note 56, pages 182 and 183, in the International List of Radiotelegraph Stations, 12th edition (Berne).

GENERAL ORDERS OF THE FEDERAL RADIO COMMISSION

Extension of broadcasting station licenses not subject to General Order No. 32, May 25, 1928 (General Order No. 35, July 25, 1928).—It is ordered that, with the exceptions hereinafter set forth, all existing licenses to broadcast, subject to such modifications and extensions as may be appended thereto, be, and the same are hereby, further extended for a period of 31 days to terminate at 3 o'clock a. m., eastern standard time, September 1, 1928.

This order shall not apply, and no extension of any existing license to broadcast shall be deemed to be granted, with respect to (1) any broadcasting station listed in or later made subject to General Order No. 32 of this commission, issued May 25, 1928, the continued use or operation of such station to be subject to such order or orders as the commission may hereafter enter; (2) any broadcasting station that has heretofore surrendered its license; (3) any broadcasting station with respect to which there has not been heretofore duly filed with this commission on application for renewal of its existing license.

Extension of broadcasting station licenses subject to General Order No. 32, May 25, 1928, with certain exceptions (General Order No. 36, July 26, 1928).—This order is issued with reference to all broadcasting stations listed in, or later made subject to, General Order No. 32 of this commission, issued May 25, 1928, excepting the following: (1) Those stations with respect to which pending applications for renewal of license have been denied by the commission, such stations having in each case been so notified by order July 25, 1928; (2) those stations that have heretofore surrendered their licenses; (3) those stations with respect to which there have not been heretofore duly filed with this commission applications for renewal of their existing licenses: *It is ordered,* That all existing licenses to broadcast of all broadcasting stations listed in or later made subject to General Order No. 32 (other than those above excepted) be, and the same are hereby, further extended for a period of 31 days to terminate at 3 o'clock a. m., eastern standard time, September 1, 1928, subject, however, (1) to such modifications as may heretofore have been appended thereto, and (2) to the condition that this order shall not be deemed or construed as a finding or decision by the commission, or as any evidence whatsoever, that the continued use or operation of any of said broadcasting stations serves, or will serve, public interest, convenience or necessity, or that public interest, convenience or necessity would be served by the granting of any pending application for a renewal of license to broadcast with

respect to such station, and any licensee subject to this order shall continue to use or operate a broadcasting station during the period covered by this order shall be deemed to have assented to said condition.

RADIOBEACON ESTABLISHED AT CASQUETS LIGHTHOUSE, CHANNEL ISLANDS (ENGLAND)

A radiobeacon has been established at this lighthouse in longitude 2° 23' W., latitude 49° 43' N., which operates on 300 kc. (1,000 m.) during thick weather, whenever the atmosphere in the vicinity of the lighthouse is obscured so as to impede navigation. The signal will be transmitted for one minute every four minutes, thus:

- (a) The signal GCM (— . — . . —) will be emitted continuously, at the rate of 15 words per minute, for 48 seconds, approximately;
- (b) A continuous dash (—) of 10 seconds' duration, approximately;
- (c) The signal GCM made once, of 2 seconds' duration, approximately. (The whole transmission of (a), (b), and (c) will take one minute.)
- (d) A silent interval of 3 minutes.

During clear weather, in order to afford facilities to mariners for obtaining bearings, three emissions of the whole character of the signal as described above will be made consecutively, at half hourly intervals approximately, commencing at 18 minutes past the hour.

Remarks: Although this signal is to be permanent, it may be found necessary to make some adjustment after establishment, and the station should be considered as under test for a period of three months, during which time the signals may be subject to temporary interruptions.

TIME SIGNALS TRANSMITTED BY PEKIN (CHINA) STATION

This station located in longitude 116° 28' 15" E., latitude 39° 54' 25" N., call signal, XPK, transmits time signals on 1,400 meters, spark, twice daily from the Central Observatory, Pekin, in accordance with the procedure hereunder. "Pekin time signals," repeated three times, is sent at 0^h.55^m.00^s. and 10^h.55^m.00^s, however, this signal is sometimes omitted.

G.M.T.				Signal			
h.	m.	s.	h.	m.	s.		
0	57	00	to	0	57	55	. — . — . — etc.
10				10			
		58	00				. Time signal.
		58	00	„	58	55	. — . — . — . — etc.
		59	00	„			. Time signal.
		59	00	„	59	55	. . . — . . . — . . . — etc.
1							
11			00	00			. Time signal.

RADIOBEACON ESTABLISHED AT PORTLAND (DYRHOLAÆY) LIGHT STATION, ICELAND

A radiobeacon will be established shortly at Portland (Dryholaey) Light Station. The signal will be sent on a frequency of 300 kc. (1,000-meter) and will be as follows: The Morse letter D (— . .) three times in succession during 12 seconds, silent 2.5 seconds, 25 dashes, each of 1 second duration and separated by intervals of 0.25 second each (transmission time 31 seconds), silent 2.5 seconds, the Morse letter D three times in succession during 12 seconds, period 1 minute. This period of 1 minute is repeated 9 times during the first 10 minutes of each hour, the intervals between each 1-minute period being 7.5 seconds. In case of thick or foggy weather this signal will be given three times every hour at 10-minute intervals.

RADIOBEACON ESTABLISHED AT CAPE TRES FORCAS LIGHT STATION, MOROCCO

A radiobeacon has been established at this light station, located in approximately longitude 2° 59' W., latitude 35° 27' N. The signal consists of the transmission of the letters TF (— . . — .) of the Morse code, followed by a long dash of four seconds duration. This signal is transmitted six times in one minute, after which there is a silent period of four minutes. The frequency is 300 kc. (1,000 m.).

RADIOBEACON ESTABLISHED AT STEVNS KLINT LIGHTHOUSE, BALTIC, DENMARK

A radiobeacon has been established at this lighthouse, located in approximately longitude 12° 27' E., latitude 55° 17' N. The signal consists of the transmission of the Morse letters ST ST ST (. . . — . . . — . . . —) and 12 dashes (— — — — etc) for one minute every three minutes. The frequency is 285.7 kc. (1,050 m.).

DEVIZES (ENGLAND) RADIO STATION DISCONTINUED; PORTISHEAD STATION ESTABLISHED

Devizes station has been discontinued, and the services formerly carried on by that station are now being operated by the Portishead station, call signal GKU, wave length, 2,013, 2,100, and 2,479 meters, c. w., location about ½ mile south-eastward of Blacknore Point Light, in longitude 2° 47' 30" W., latitude 51° 28' 41" N.

CORRECTIONS TO THE LIST OF INTERNATIONAL PREFIXES FOR CALL SIGNALS OF AMATEUR STATIONS

Attention is invited to the fact that the list of prefixes published in the Radio Service Bulletin for June 30, 1928, is only *tentative*, and that the division has not been officially advised that these prefixes will be used by the various countries. The list was published with a view of giving advance information as to what prefixes would probably be assigned. It appears that typographical errors were made in that the prefixes for Chile and Honduras should have been shown as CA and HR in lieu of CI and HP, respectively. The division has been advised by the Director of Radio, Canada, that the only prefix assigned for amateurs of that country is VE, the prefix CF not being used at the present time.

COLLECTION AND DISSEMINATION OF HYDROGRAPHIC INFORMATION BY NAVAL RADIO

The Hydrographic Office and the Naval Communication Service are prepared to collect and disseminate hydrographic information by naval radio. The cooperation of owners, operators, radio companies controlling installations on board vessels, and masters is necessary to make this undertaking a success. In return greater protection will be afforded mariners than heretofore. In addition to disseminating hydrographic information by radio, the Hydrographic Office will continue to publish, as at present, in the Daily Memorandum, Hydrographic Bulletin, or Notice to Mariners, confirmation of hydrographic information disseminated by radio.

The naval radio stations will make no charge for reception of messages containing hydrographic information, provided such messages are checked "Govt. Hydro.," and will arrange to furnish this information to the nearest Branch Hydrographic Office free. The ship-sending charge, if any, will have to be borne by the sending vessel. Any other expenses in connection with the receipt and dissemination of this information will be borne by the Hydrographic Office.

The procedure, as far as masters of vessels are concerned, may be divided in two parts: (a) Sending hydrographic information to naval radio station. (b) Receiving information twice daily when in radio range of the distributing station of its zone.

Sending information

Vessels cooperating in this service should transmit messages in plain English direct to United States naval radio stations, as follows:

Atlantic Ocean: North of lat. 42° 00' N. to Boston Naval Radio Station (NAD). Between lat. 39° 30' N. and 42° 00' N. to New York Naval Radio Station (NAH). Between lat. 38° 30' N. and 39° 30' N. to Philadelphia Naval Radio Station (NAE). Between lat. 33° 00' N. and lat. 38° 30' N. (including entrance to Chesapeake Bay) to Norfolk Naval Radio Station (NAM). South of lat. 33° 00' N. and northeast of line joining Cape Sable, Fla., and Cay Piedras, Cuba, to Charleston Naval Radio Station (NOA).

Gulf of Mexico: In the southeastern part of the Gulf of Mexico, the Florida Straits, Old Bahama Channel, Yucatan Channel, and the northern part of the Caribbean Sea to Key West Naval Radio Station (NAR). Between the line joining Cape Sable, Fla., and Cape Piedras, Cuba, and the line joining Ship Shoal Light, La., and Cape Catoche, Yucatan (including Yucatan Channel), to New

Orleans Naval Radio Station (NAT). In the Gulf of Mexico west of the line joining Ship Shoal Light, La., and Cape Catoche, Yucatan, to Brownsville Naval Radio Station (NAY).

Caribbean Sea and West Indian waters: Vessels in the Caribbean Sea and West Indian waters, north of latitude 15° N., may report to any of the under-mentioned radio stations: St. Thomas, Virgin Islands (transmits the information to San Juan), NBB, $18^{\circ} 20'$ N., $64^{\circ} 56'$ W.; Guantanamo Bay, Cuba (transmits the information to Key West), NAW, $19^{\circ} 55'$ N., $75^{\circ} 09'$ W.; Navassa Island, Windward Passage (transmits the information to Key West), WWEA, $18^{\circ} 25'$ N., $74^{\circ} 00'$ W. In the Caribbean Sea south of lat. $15^{\circ} 00'$ N. to Naval Radio Station, Colon (NAX).

Pacific Ocean: Between the Equator and lat. $20^{\circ} 00'$ N. to Colon Naval Radio Station (NAX), Balboa (Darien) Naval Radio Station (NBA). Between lat. $30^{\circ} 00'$ N. and $42^{\circ} 00'$ N. to San Francisco Naval Radio Station (NPG), Eureka Naval Radio Station (NPW). Between lat. $42^{\circ} 00'$ N. and $46^{\circ} 00'$ N. to Astoria Naval Radio Station (NPE). North of lat. $46^{\circ} 00'$ N. (including Puget, Vancouver, and Queen Charlotte Sounds, and Alaskan waters) to Seattle Naval Radio Station (NPC).

Great Lakes: Radiograms addressed "Govt. Hydro." will be accepted free of charge by the following stations at any time: NAJ, U. S. Navy, Great Lakes, Ill.; WBL, Radio Corporation of America, Buffalo; WCY, Radio Corporation of America, Cleveland; WDI, Intercity Radiotelegraph Co., Detroit; WGO, Radio Corporation of America, Chicago; WRL, Radio Corporation of America, Duluth; WTK, Intercity Radiotelegraph Co., Cleveland. From 7 a. m. to 11 p. m. (Seventy-fifth meridian time), WAM, Intercity Radiotelegraph Co., Buffalo. From 8 a. m. to 6 p. m. (seventy-fifth meridian time), WCFL, Intercity Radiotelegraph Co., Chicago. From 8 a. m. to 8 p. m. (seventy-fifth meridian time), WME, Intercity Radiotelegraph Co., Duluth.

At any time when not otherwise engaged in furnishing radio compass bearings to ships radiograms will be accepted free of charge by the following stations: NUG, U. S. Navy Radio-compass Station, Eagle Harbor, Mich.; NZT, U. S. Navy Radio-compass Station, Whitefish Point, Mich.; NZU, U. S. Navy Radio-compass Station, Detour Point, Mich. (Vessels should call on 375 kilocycles (800 m.) then shift to 419 kilocycles (715 m.) or 343 kilocycles (875 m.) to transmit when told to go ahead.)

The naval radio stations stand continuous watch and are prepared to receive hydrographic messages at any time. Vessels should transmit information as soon as they are in normal radio range of the station. Vessels are requested to inform the Hydrographic Office if they have any trouble in "raising" a station or transmitting the hydrographic messages.

In preparing information for transmission it is desired that messages be concise as consistent with exactness and clearness. The order of the message will be in the order of the importance of the items. To promote uniformity the following order of subjects is recommended: (1) Aids to navigation off station, misplaced, or not functioning; (2) derelicts, submerged obstructions, wreckage, and rafts; (3) mines; (4) ice; (5) other items considered sufficiently important to broadcast. It is not intended to forward information by radio unless danger to a vessel is involved, either from collision or a resulting inadequacy of aids to navigation. Vessels are requested to forward by first mail to the Branch Hydrographic Office concerned a confirmation copy of all radio messages sent.

Receiving information

The latest available hydrographic information of each zone will be distributed from its assigned radio station as given below; all times are seventy-fifth meridian.

Atlantic Ocean: Atlantic zones and trans-Atlantic steamer tracks will broadcast from Washington (Arlington) Naval Radio Station at 12 noon and 9 p. m.; 113 kilocycles (2,653 m.), a. c. w. Zone south of the forty-fifth parallel and northeast of a line joining Point Judith and Nantucket Shoal Light Vessel and north of the parallel passing through Nantucket Shoal Light Vessel will broadcast from Boston Naval Radio Station at 11 a. m. and 5 p. m.; 102 kilocycles (2,939 m.), c. w. Zone included between the parallels $42^{\circ} 00'$ N. and $39^{\circ} 30'$ N. will broadcast from the New York Naval Radio Station (it is to be noted that this zone intentionally overlaps the Boston zone) at 10.30 a. m. and 4.30 p. m.; 102 kilocycles (2,939 m.), c. w. Zone included between lat. $39^{\circ} 30'$ N. and lat. $38^{\circ} 30'$ N., including the Delaware River and Bay, will broadcast from the

Philadelphia Naval Radio Station at 10.45 a. m. and 5 p. m.; 104 kilocycles (2,883 m.), a. c. w. Zone included between lat. $38^{\circ} 30'$ N. and lat. $33^{\circ} 00'$ N., the entrance to Chesapeake Bay, Hampton Roads, Newport News, and Norfolk will broadcast from Norfolk Naval Radio Station at 4 a. m. and 4 and 10.45 p. m.; 122 kilocycles (2,677 m.), i. c. w. Zone south of $33^{\circ} 00'$ N. and northeast of a line joining Cape Sable, Fla., and Cay Piedras, Cuba, will broadcast from the Charleston Naval Radio Station at 10.30 a. m. and 6 p. m.; 122 kilocycles (2,458 m.), i. c. w. Hydrographic information broadcast from San Juan Naval Radio Station. Frequency, 48 kilocycles (6,246 m.), c. w.

Gulf of Mexico: Southeastern part of the Gulf of Mexico, the Florida Straits, Old Bahama Channel, Yucatan Channel, and northern part of the Caribbean Sea will broadcast from the Key West Naval Radio Station immediately after the weather bulletins at 1 and 11 p. m.; 113 kilocycles (2,653 m.), i. c. w. Gulf of Mexico between the line Cape Sable, Fla., and Cay Piedras, Cuba, and the line Ship Shoal Light, La., and Cape Catoche, Yucatan, including the Yucatan Channel, will broadcast from the New Orleans Naval Radio Station at 11 a. m. and 5 p. m.; 104 kilocycles (2,883 m.), c. w. Gulf of Mexico west of the line joining Ship Shoal Light, La., and Cape Catoche, Yucatan, will broadcast from the Brownsville Naval Radio Station immediately after the weather bulletins at 12 a. m. and 7 and 12 p. m.; 104 kilocycles (2,883 m.), a. c. w.

Caribbean sea: Caribbean Sea will broadcast from the Colon Naval Radio Station at 5 a. m.; 132 kilocycles (2,271 m.), i. c. w.

Pacific Ocean: Zone between the Equator and lat. $20^{\circ} 00'$ N. will broadcast from the Colon Naval Radio Station at 5 a. m.; 132 kilocycles (2,271 m.), i. c. w. Hydrographic information broadcast from Balboa (Darien) Naval Radio Station at 5 a. m. and 1 p. m.; 46 kilocycles (6,518 m.), c. w. Zone included between lat. $33^{\circ} 00'$ N. and lat. $42^{\circ} 00'$ N. will broadcast from the San Francisco Naval Radio Station at 1 a. m., 66 kilocycles (4,543 m.) a. c. w.; 10.30 a. m., 42.8 kilocycles (7,005 m.) c. w., 108 kilocycles (2,776 m.) a. c. w., and 8,350 kilocycles (35.9 m.) a. c. w.; 3 p. m., 66 kilocycles (4,543 m.) c. w.; 10.30 p. m., 42.8 kilocycles (7,005 m.) c. w.; 108 kilocycles (2,776 m.) a. c. w.; and 8,350 kilocycles (35.9 m.) a. c. w. Hydrographic information broadcast from Eureka Naval Radio Station at 12 noon, 5 and 8.30 p. m.; 108 kilocycles (2,776 m.) i. c. w. Zone included between lat. $42^{\circ} 00'$ N. and lat. $46^{\circ} 00'$ N. will broadcast from the Astoria Naval Radio Station at 4.30 and 11.30 p. m.; 102 kilocycles (2,939 m.) i. c. w. Zone north of lat. $46^{\circ} 00'$ N., including Vancouver and Queen Charlotte Sounds and Alaskan waters, will broadcast from the Puget Sound (Seattle) Naval Radio Station at 12 noon, 4 p. m. and 10 p. m.; 102 kilocycles (2,939 m.) i. c. w.

Great Lakes: Lake Superior and St. Marys River to Sault Ste. Marie from Branch Hydrographic Office, Duluth, will broadcast from the Duluth Intercity Radio Telegraph Co. Station (WME) at 11 a. m. and 5 p. m.; 419 kilocycles (715 m.) spark. Duluth Radio Corporation of America Station (WRL) will broadcast at 11 a. m. and 11 p. m.; 342 kilocycles (875 m.) i. c. w. Duluth Head of Lakes Radio Station (WEBC) will broadcast at 11.55 a. m., 5.55 and 7.15 p. m. (not transmitted on Sundays and holidays); 1,240 kilocycles (241.8 m.) R. T. (Broadcast at time of receipt of message in addition to above time schedules.) Branch Hydrographic Office, Sault Ste. Marie, will broadcast from the Whitefish Point Naval Radio-Compass Station during the first 10 minutes of each hour; 375 kilocycles (800 m.) spark. Branch Hydrographic Office, Sault Ste. Marie, will broadcast from the Detour Point Naval Radio-Compass Station during the first 10 minutes of each hour. This station relays all broadcasts from Great Lakes Naval Radio Station (NAJ); 375 kilocycles (800 m.) spark. Great Lakes from Branch Hydrographic Office, Chicago, will broadcast from the Great Lakes Naval Radio Station (NAJ) at 10.45 a. m., 5 and 11 p. m.; 122 kilocycles (2,458 m.) i. c. w. Chicago Intercity Radiotelegraph Company Station (WCFL) will broadcast at 11 a. m. and 5 p. m.; 419 kilocycles (715 m.) i. c. w. Chicago Radio Corporation of America Station (WGO) will broadcast at 12 noon, 5 and 10 p. m.; 337 kilocycles (890 m.) c. w. (Broadcast at time of receipt of message in addition to above time schedules.) Chicago Zenith Radio Corporation Station (WJAZ) will broadcast at 9.30 p. m. (Wednesdays, Fridays, and Saturdays only); 1,140 kilocycles (263 m.) R. T. Detroit Free Press Radio Station (WCX) will broadcast at 4 p. m. (not transmitted on Sundays and holidays); 680 kilocycles (440.9 m.) R. T. Detroit Radio Station (WGHP) will broadcast at 6.45 p. m. (not transmitted on Saturdays, Sundays, and holidays); 680 kilocycles (440.9 m.) R. T. Detroit Radio Station (WJR) will broadcast at 12.45 p. m. (not transmitted on Sundays and holidays), 4.30 p. m. (not transmitted on Sundays and holidays; also broadcasts vessel passages), and

9.30 p. m. (daily); 680 kilocycles (440.9 m.) R. T. Detroit News Radio Station (WWJ) will broadcast at 11 a. m., 5.45 and 11.55 p. m. (not transmitted on Sundays and holidays); 850 kilocycles (352.7 m.) R. T. Detroit Intercity Radiotelegraph Co. Station (WDI) will broadcast at 11 a. m., 4 and 10 p. m.; 419 kilocycles (715 m.) i. c. w. Cleveland WTAM and WEAR Incorporated Station (WEAR) will broadcast at 12 noon and 3.55 p. m. (not transmitted on Sundays and holidays); 750 kilocycles (399.8 m.) R. T. Lake Erie, Detroit River, Lake St. Clair, St. Clair River, Lake Huron, Georgian Bay, and Lake Michigan will broadcast from the Cleveland Intercity Radiotelegraph Co. Station (WTK) at 11 a. m., 4 and 10 p. m.; 419 kilocycles (715 m.) i. c. w. Cleveland Radio Corporation of America Station (WCY) will broadcast at 10.30 p. m.; 342 kilocycles (875 m.) i. c. w. Lake Ontario, Lake Erie, and Detroit River will broadcast from the Buffalo Intercity Radiotelegraph Co. station (WAM) at 11 a. m., 4 and 10 p. m.; 419 kilocycles (715 m.) i. c. w. (Maintains constant watch on 419 kilocycles (719 m.) and broadcasts at time of receipt of message in addition to above time schedules.) Buffalo Federal Radio Corporation Station (WGR) will broadcast at 12 noon (daily) and 6 p. m. (not transmitted on Sundays; during the time the city of Buffalo observes eastern daylight saving time broadcasts are one hour earlier than shown; this station also broadcasts at sign-off); 990 kilocycles (302.8 m.) R. T. Buffalo WMAK Studios Incorporated Station (WMAK) will broadcast at 12.15 and 7.15 p. m. (not transmitted on Sundays; during the time the city of Buffalo observes eastern daylight saving time broadcasts are one hour earlier than shown); 550 kilocycles (545.1 m.) R. T. Buffalo Radio Corporation of America Station (WBL) will broadcast at 12.45, 4.45, and 10.45 p. m.; 337 kilocycles (890 m.) c. w. (The above stations on the Great Lakes are subject to changes; such changes are published in memorandums issued by the Branch Hydrographic Offices on the Great Lakes.) The arrangements for collecting, digesting, and disseminating hydrographic information are complete; it remains for masters of vessels to make this undertaking a success, for information must be received before it can be distributed.

BUREAU OF STANDARDS JOURNAL OF RESEARCH

Beginning with July, 1928, the Bureau of Standards series Scientific Papers and Technologic Papers will be discontinued and will be replaced by a monthly publication to be called "Bureau of Standards Journal of Research." The new journal is intended for the publication of all bureau papers embodying the results of original research (experimental and theoretical) or critical review.

It is expected that the periodical form of publication will reach a wider circle of readers than the separate Scientific and Technologic Papers heretofore issued.

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RADIO AIDS TO AIR NAVIGATION

Research work extending over two years has resulted in the development and practical demonstration of radio aids to flying on the civil airways. These aids comprise a radiobeacon system marking out definite courses and radio telephone service from ground to airplane. The whole system can be utilized by airplanes carrying no radio apparatus except a simple receiving set. This development which was carried on by the Bureau of Standards for the Aeronautics Branch of the Department of Commerce was briefly described in the Radio Service Bulletin, March 31, 1928, on page 19. A technical description of the work, "Development of radio aids to air navigation," by J. H. Dellinger and Haraden Pratt, was published in the Proceedings of the Institute of Radio Engineers, July, 1928, page 890.

In the same issue of the proceedings, page 985, there is given a "Bibliography on aircraft radio," by C. B. Jolliffe and Elizabeth M. Zandonini. This bibliography includes 257 references to foreign and domestic periodicals.

Copies of these two papers are not available from the Government. A copy of the Proceedings Institute of Radio Engineers may be obtained from the Institute of Radio Engineers, 33 West Thirty-ninth Street, New York, N. Y., for \$1.

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 radioc 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.

R000.—Radio communication

- R007 Lemoine, S. Allocation of European broadcast wave lengths. *Experimental Wireless* (London), **5**, pp. 386-96; July, 1928.
Discusses basis of reallocation of frequencies to conform with Washington Conference.

R100.—Radio principles

- R113 Barfield, R. H. Woods and wireless. *Nature* (London), **121**, p. 908; June 9, 1928.
Absorption of wireless waves by trees.
- R113 Hankey, H. A. Empire broadcasting—Results of the recent range tests conducted by the Wireless League. *Wireless World and Radio Rev.*, **22**, pp. 695-96; June 27, 1928.
Observations made on 5SW broadcasts during a voyage to the Antipodes via South Africa; results showed good reception of this station on 24 meters.
- R113.4 Tuve, M. A., and Dahl, O. A transmitter modulating device for the study of the Kennelly-Heaviside layer by the echo method. *Proc. Inst. Radio Engrs.*, **16**, pp. 794-98; June, 1928.
A method of modulating a transmitting set by sudden pulses of plate current which occur in an unbalanced multivibrator circuit is described.
- R113.5 Pickard, G. W. Some correlations of radio reception with atmospheric temperature and pressure. *Proc. Inst. Radio Engrs.*, **16**, pp. 765-72; June, 1928.
Night reception and temperature at receiving station found to be directly related, maximum reception being associated with maximum temperatures; temperature effect is local to the receiver; correlation between night reception and pressure found.
- R113.7 Espenschied, L. Technical considerations involved in the allocation of short waves; frequencies between 1.5 and 30 megacycles. *Proc. Inst. Radio Engrs.*, **16**, pp. 773-777; June, 1928.
Chart given which shows approximate relation of optimum frequency to distance in short wave radio transmission and the number of available channels based on present practice.
- R120 Wilmotte, R. M. The distribution of current in an transmitting antenna. *Jour. Inst. of Elec. Engrs. (London)*, **66**, pp. 617-627; June, 1928.
Investigation conducted to ascertain whether assumption usually made regarding distribution of current in antenna is an approximation to conditions obtained in practice; current distribution of straight vertical antenna found by placing ammeters at various points along antenna; ammeters placed in inside of cage type of antenna to determine effect of ammeters; comparison of experimental and theoretical curves showed good agreement over range of 15 to 800 meters.
- R125.6 Chireix, M. Un systeme Francais d'emission a ondes courtes projetees. (A French system of the transmission of projected short waves.) *L'Onde Electrique*, **7**, pp. 169-195; May, 1928.
Short wave beam system installed by French Government for communication with the Colonies is described.
- R125.6 Yagi, H. Beam transmission of ultra short waves. *Proc. Inst. Radio Engrs.*, **16**, pp. 715-41; June, 1928.
Describes experiments at frequencies above 1,500 kc. Curves given which show effect of ground and various types of antennas; describes the use of the magnetron for the production of 12 cm. waves; circuit arrangements used with these tubes given.
- R127 The equivalent inductance and capacity of an aerial with inserted tuning coil or condenser. *Experimental Wireless* (London), **5**, pp. 357-360; July, 1928.
Editorial pointing out error in treatment of subject by Palmer in "Wireless Principles and Practice"; mathematical discussion of the conditions.
- R134 Nelson, J. R. Detection with the four-electrode tube. *Proc. Inst. Radio Engrs.*, **16**, pp. 822-839; June, 1928.
Mathematical analysis of plate rectification and results applied to screen-grid tubes.
- R134.45 David, [P. La superreactions. (On Superregeneration). *L'Onde Electrique*, **1**, pp. 217-260; June, 1928.
Principles of superregeneration explained; circuits given; short bibliography included.
- R141 Bird, L. T. Reactance and admittance curves applied to tuned circuits with and without resistance. *Experimental Wireless* (London), **6**, pp. 371-377; July, 1928.
Continuation of paper in June issue. Use of vector diagrams in study of circuits.

R200.—*Radio measurements and standardization*

- R210 Worrall, R. H., and Owens, R. B. The Navy's primary frequency standard. Proc. Inst. Radio Engrs., **16**, pp. 778-793; June, 1928.
Describes the method used to determine the fundamental frequency in terms of Naval Observatory time to an accuracy of one part in 100,000.
- R214 Van Dyke, K. S. The piezoelectric resonator and its equivalent network. Proc. Inst. Radio Engrs., **16**, pp. 742-764; June, 1928.
Theory of piezoelectric and mechanical behavior of quartz resonators; rods which are excited lengthwise through transverse piezoelectric effects and those excited through longitudinal piezoelectric effects are described and equivalent circuits of these are given.
- R261 Turner, H. M. A compensated electron-tube voltmeter. Proc. Inst. Radio Engrs., **16**, pp. 799-801; June, 1928.
Method described which eliminates source of error in use of electron-tube voltmeter due to changes in filament; the grid bias changes with filament current so the plate current is practically independent of filament current.

R300.—*Radio apparatus and equipment*

- R330 Oatley, C. W. The use of a. c. for heating valve filaments. Experimental Wireless (London), **5**, pp. 380-384; July, 1928.
Discusses problem of direct and indirect heating of electron-tube cathode by a. c., concludes that tubes with indirectly heated cathodes have definite place in detector stage but have no obvious advantages in amplifier stages.
- R342 Kirke, H. L. Microphone amplifiers and transformers. Experimental Wireless (London), **5**, pp. 361-370; July, 1928.
Design of microphone amplifiers and transformers for use in a broadcast transmitting system.

R400.—*Radio communication systems*

- R431 Tubbs, E. A. System of combating effects of static. Experimental Wireless (London), **5**, pp. 378-379; July, 1928.
Device used by Federal Telegraph Co. of California to increase reliability of service; McCaa system used.

R500.—*Applications of radio*

- R522 Kaufman, J. Radio's part in the "Southern Cross" flight. Radio (San Francisco), **10**, pp. 18-20; July, 1928.
Description of short-wave transmitting equipment used by the "Southern Cross" on its flight from San Francisco to Australia.
- R526.1 Gunn, R. Aircraft radio and navigation. Jour. Franklin Inst., **205**, pp. 849-863; June, 1928.
Engineering features of aircraft radio and associated difficulties are discussed; heterodyne beacon system described.
- R526.1 New radiobeacon guides planes. Science and Invention, **16**, p. 333; August, 1928.
Work of Bureau of Standards on visual type of indicator, and beacon transmitting set at College Park, Md.

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