THE Year Book of Wireless Telegraphy AND TELEPHONY

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The Engineer.

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VOL. CXVII.—No. 3032] LONDON: FRIDAY EVENING, FEBRUARY 6, 1914. [PRICE SIXPENCE

TO MANUFACTURERS ONLY.

The Commissioners of H.M. Works, &c., are prepared to receive TENDERS for the SUPPLY of ELECTRICAL RADIATORS during a period of three years from the 1st April next.

Forms of Tender, with schedule of contract and full particulars, may be obtained on application to the Storekeeper, H.M. Office of Works, Storeyard, St. Leonard's Passage, London, S.E.

The Commissioners do not bind themselves to accept the lowest or any Tender.

Tenders must be delivered before 11 a.m. on Thursday, 19th February, 1914, addressed to the SECRETARY, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Electric Radiators."

H.M. Office of Works, &c., 7th January, 1914. 500

TO MANUFACTURERS ONLY.

The Commissioners of H.M. Works, &c., are prepared to receive TENDERS for the SUPPLY of LEAD AND COPPER HYDRANTS, LEAD AND COPPER PIPES, &c., FIRE AND HAND PAILS, &c.

during a period of three years from the 1st April, 1914.

Forms of Tender, conditions of contract, and full particulars may be obtained on application to the Storekeeper, H.M. Office of Works, Storeyard, St. Leonard's Passage, London, S.E.

The Commissioners do not bind themselves to accept the lowest or any Tender.

Tenders must be delivered before 11 a.m. on Thursday, 19th February, 1914, addressed to the SECRETARY, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Lead and Copper Hydrants," &c., and "Tender for Fire and Hand Pails," as the case may be.

H.M. Office of Works, &c., 31st January, 1914. 502

India Office, Whitehall, 6th February, 1914.

The Secretary of State for India in Council is prepared to receive TENDERS from such persons as may be willing to undertake

RAILS AND FASTENING.

The conditions of contract may be obtained on application to the Director (for one set of Home India Office, Whitehall, S.W.; and Tenders are to be delivered at that Office by 12 o'clock p.m. on Tuesday, the 17th February, 1914, after which time no Tender will be received.

H. J. W. PIM,
Director-General of Stores. 504

Assistant Engineer Required for the Government Works in the Gold Coast. Age between 25 and 30, preferably unmarried. Must have technical training and practical experience.

Salary £300 per annum, rising at £25 by annual increments of £25, superior officers' allowance. Allowance to cover cost of passage, and subsistence allowance.

Free first-class passage out and home each on satisfactory completion of engagement. Half salary on voyage out. Full salary from date of arrival in the Colony.

Applications, which must be made on the proper official form, to be obtained from the Crown Agents for the Colonies, 4, Millbank, Westminster, S.W., quoting the letter M 2, and should be addressed to the undersigned, and delivered at the office not later than Friday, February 27th.

Appointment for latter has been provisionally made, but applicants should state whether they will undertake it. Candidates must be natural born British subjects, of European parentage, and must be prepared to undergo a medical examination at the Crown Agents' Office. Applicants should state whether married or single, giving full particulars of age, education, and previous employment, and must produce testimonials of character and references of whom inquiries may be made. Applications should be addressed, in own handwriting, to the DIRECTOR OF PUBLIC WORKS, Gold Coast, West Africa.

Canvassing will disqualify. 505

In the High Court of Justice (No. 1) Action No. 1913
In the Matter of the ELEVATOR COMPANY Limited and
In the Matter of THE COMPANIES (CONSOLIDATION) ACT 1908

Notice is Hereby Given That by an ORDER of the Court in Chambers, dated the 27th day of January, 1914, CONFIRMING the REDUCTION of the CAPITAL of the above-named Company from £200,000 to £40,000, it was ordered that the Company should add to its name, until the 31st day of December, 1914, the words "and Reduced," and that such addition should be published in the London Gazette.

Dated this 27th day of January, 1914.

The said Order was made upon the Petition of the Company dated the 27th day of January, 1914, and confirmed by the Order of the Court dated the 27th day of January, 1914.

The Capital of the Elevator Company Limited and reduced is £200,000, divided into 200,000 Shares of £1 each, and reduced from £200,000 to £40,000 by cancelling 160,000 Shares of £1 each. As the terms of the reduction of the Capital is the sum of the said 40,000 shares have been issued, and the sum of £40 has been paid up in full thereon in respect of each share.

Dated this 27th day of January, 1914.

THOMAS WILLIAM CARPMAEL,
1, Copthall-buildings, London,
Solicitor for the Company. 501

HENRY CURRALL BANDERS DECEASED.

Pursuant to the Acts of Parliament now in force relating to the Administration of Estates of Deceased Persons.

Notice is Hereby Given that all creditors and other persons having any claims against or demands upon the Estate of HENRY CURRALL BANDERS, late of Alfred House, 19, South Audley-street, Grosvenor-square, in the County of Middlesex, Secretary of the Charing Cross Hotel, Limited, deceased, who died on the 6th day of January, 1914, and whose Will was duly proved by the Executors thereof on the 27th day of January, 1914, are hereby required to send in the particulars of their claims to the undersigned, the Solicitors to the Executors of the said deceased, on or before the 28th day of February, 1914, after which date the Executors will proceed to distribute the assets of the said deceased among the persons entitled thereto, having regard only to the claims of which they shall then have had notice, and they will not be liable for the assets or any part thereof so distributed to any person of whose claim they shall not have had notice at the time of such distribution.

Dated this 29th day of January, 1914.

THOMAS & HAMILTON,
Solicitors to the Executors.
1, Victoria-street, Westminster, S.W. 503

Royal Show.

SHREWSBURY.
June 30th to July 4th, 1914.
IMPLEMENTS

The REGULATIONS and FORMS of APPLICATION for SPACE and STABLING must be made by FRIDAY, MARCH 6th.

ENTRIES for LIVE STOCK on MAY 2nd; POULTRY, PIGEONS, and HORTICULTURE on MAY 30th; CIDER and PERRY on JUNE 20th.

THOMAS HOWE,
Secretary.

Royal Agricultural Society of England,
16, Bedford-square, London, W.C.
February, 1914. 476

Corporation of Glasgow.—MUSEUM AND ART GALLERIES.

ENGINEERING EXHIBITION.

Under the auspices of the Corporation a

LOAN COLLECTION OF MECHANICAL MODELS, TOOLS AND APPLIANCES

will be formed in KELVINGROVE MUSEUM in MAY next.

Offers of Loans, which must be delivered free of charge at the Museum, Gilmorehill, will be received for models of steam engines and engineering plant. There will also be a section for Electrical Plant. Offers of Loans for this section of the Exhibition should be addressed to the CONVENER, Electrical Exhibition Committee.

Further particulars and information may be obtained on application to the GENERAL SUPERINTENDENT, Museum, Gilmorehill, Glasgow. 493

The University of Liverpool.
FACULTY OF ENGINEERING.
ALEXANDER ELDER CHAIR OF NAVAL ARCHITECTURE.

The Council invite APPLICATIONS for the ALEXANDER ELDER CHAIR OF NAVAL ARCHITECTURE, lately held by Professor Biles.

Full particulars may be obtained on application to the undersigned.

EDWARD CARR,
Registrar. 422

Stanley Technical Trade School, SOUTH HOWOOD, LONDON.

The Board of Governors invite APPLICATIONS for the appointment of HEAD MASTER of the above-named School (Day and Evening Classes).

Particulars of the appointment and design of the form of application may be obtained on receipt of a stamped addressed envelope on application to undersigned, the Secretary, Stanley Hall, South Howood, S.E., and must be returned not later than Friday, February 27th.

Canvassing, direct or indirect, of Members of the Board or Governors will disqualify candidature.

W. W. KING,
Chairman of the Board of Governors.

3rd February, 1914.

Swansea Technical College.

THE WARDEN AND SECRETARY will RECEIVE APPLICATIONS on or before the 28th inst. for the CHAIR of CIVIL ENGINEERING, Constructional Work in connection with Engineering Science and Applied Mechanics. Commencing salary £300 per annum, increased by £25 per annum to £350 per annum, by annual increments.

Further particulars may be had from the undersigned, to whom applications must be sent not later than the 28th inst.

W. PAIN BARRETT,
Secretary.

University of Hongkong.

CHAIR OF CIVIL ENGINEERING.

APPLICATIONS are invited for the CHAIR of CIVIL ENGINEERING in the University.

Applications, with copies of testimonials, to be addressed to the SECRETARY, University Buildings, Hongkong, not later than 1st March, 1914.

Salary £1,000 per annum, with fees raised approximately to £1,200.

The Senior of the Lecturers will receive monthly in giving instruction in Engineering.

Details to be obtained from Secretary, British Engineers' Association, 36, Victoria-street, Westminster, S.W., from whom forms of application to be made by letter or on before February 21st.

Candidates should be prepared to leave England by May 15th.

A. HINCKLEY-SMITH,
Secretary, British Engineers' Association. 479

Notice.—It Has Come to the notice of the Secret Service Co., Ltd., that persons for the production of Circulars for the sale of motor cars recently have offered for sale to the trade

NOTICE IS HEREBY GIVEN that the BRITISH OTTOMAN CO. LTD. are SOLE OWNERS of the LINDE BRITISH REFRIGERATION PATENTS for Motor Cars, and that all Licenses and Rights granted by them are void. Those rights have been unconditionally granted to the Secret Service Co., Ltd., for exhibition purposes, and the Company giving its offers to the Consumers from such persons is in the unauthorised possession of private and confidential information.

Corporation of Darlington.
ASSISTANT ROAD SURVEYOR.

Corporation of Madras.—Special WORKS DEPARTMENT DRAINAGE SECTION.

CONTRACT No. 2 and W. No. 21.

The Corporation of Madras is prepared to receive TENDERS from experienced Contractors for the execution of the following CONTRACT and WORKS:—

MADRAS MAIN DRAINAGE SCHEME.

Forms of Tender prepared by J. W. Madeley, Esq., M.A., M.Inst.C.E., M.I.E. (India), Chief Engineer Engineer to the Corporation of Madras, may be obtained from the Secretary of the Corporation on payment of Fifty Rupees or Five Guineas per set, which will not be returned.

Tenders, accompanied by a deposit in currency notes or a Draft on a Scheduled Bank for Rs. 500 should be sent direct to the Secretary, Corporation of Madras, so as to reach him not later than noon on the 20th day of March, 1914.

The Corporation does not bind itself to accept the lowest or any tender.

(Sgd.) JAMES HARGREAVE and SONS,
Agents to the Corporation.

6, Victoria-street, Westminster, London, S.W.
6th February, 1914. 450

City of Westminster.—The Westminster City Council is prepared to receive TENDERS from persons willing to undertake the EXECUTION of the undermentioned WORKS and the SUPPLY of the undermentioned MATERIALS, ARTICLES, &c., for the Twelve Months ending the 31st March, 1915:—

1. Paving works.
2. Kerbing, new and relaying.
3. Sett, tar (new and repaired) and rear of three yards).
4. Granite.
5. Broomhead and Yorkshire.
6. Carriageway Repairs (Granite) Repair (Asphalt).
7. Carriageway Repairs (Wood Pavement).
8. Carriageway Repairs (Granite Setts) Renewals.
9. Carriageway Repairs (Asphalt) Renewals.
10. Tarmac and Lime.
11. Tarmac and Coal Tar Macadamising.
12. Coal Tar (Tarry Macadam only, dressing 10th inch).
13. Tarmac.
14. Tarmac and Lime.
15. Tarmac and Sanded.
16. Tarmac and Sanded and Rolled.
17. Tarmac and Lime (Construction).
18. Tarmac and Lime (Repairs).
19. Tarmac and Lime (Repairs).
20. Stone Kerb and Channel Work.
21. Stone Kerb (Repair and Renewal) Leather Cloth.
22. Kerb Channel Work.
23. Footway Work and Wood Pavement Work.
24. Pitch and Gravel.
25. Stone, Bricks, Brick Dust, Tar, Granite, and Sundries.
26. Sand, Gravel, Ballast, Broken Stone, Cinder, Ash, &c.
27. Stone Paving (Granite) and Kerbing.
28. Paving and Landscape Work.
29. Paving, Flints, Tar and Tarmac, and Kerb Work.
30. Asphalt Paving, &c., for Pavements.
31. Asphalt Paving (Granite) and Kerbing.
32. Stone Paving (Granite) and Kerbing.
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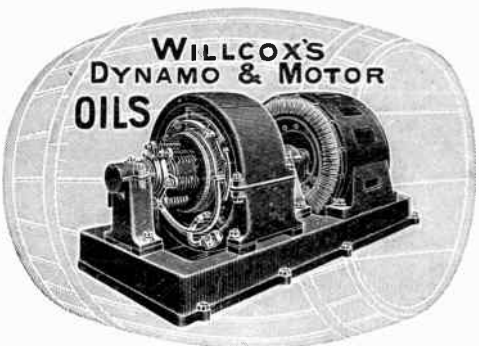

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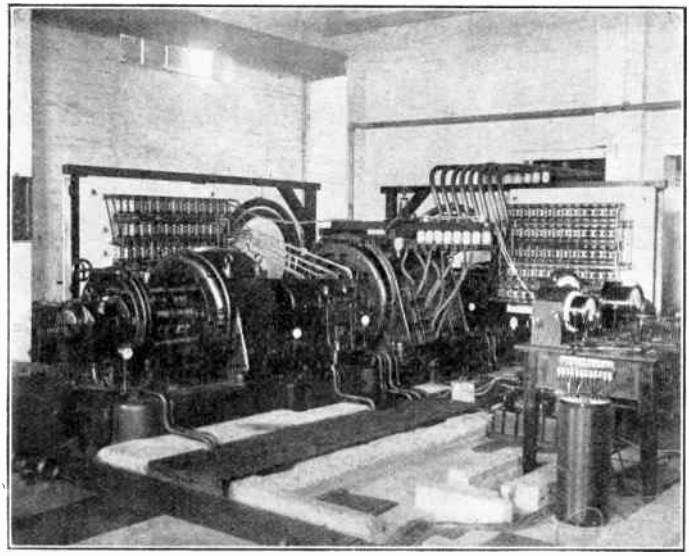

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The Year-Book *of* Wireless Telegraphy & Telephony · 1915

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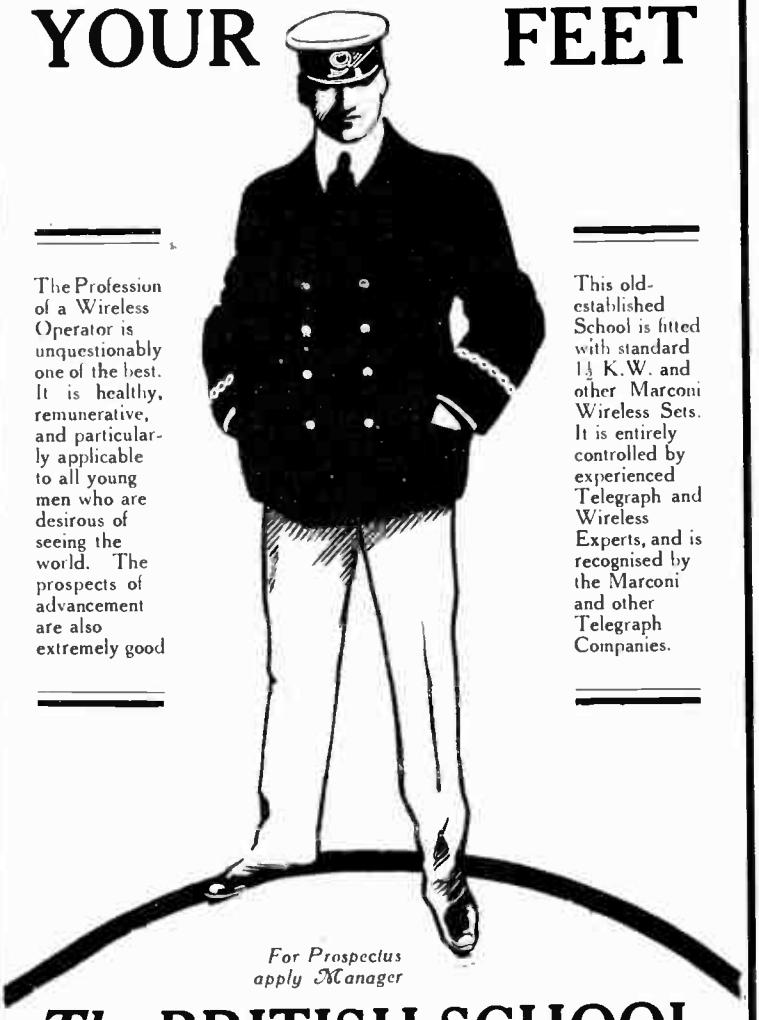

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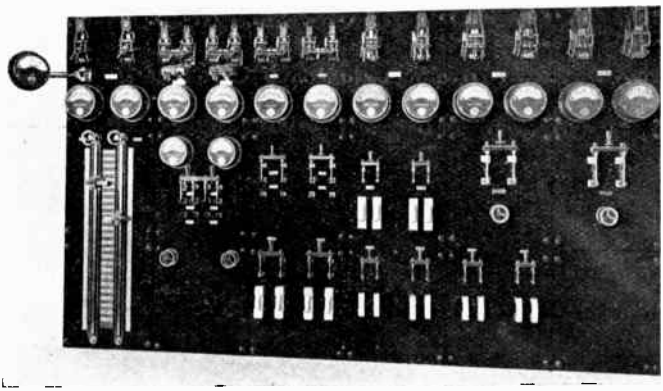

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NOTE.—The land and ship stations are not included in this index. They are grouped together under the countries in which the land stations are, or to which the ships belong, and these countries are arranged in the section in alphabetical order. Names not in the index should be sought under "Biographical Notices," where they are arranged in alphabetical order.

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PREFACE

WE present herewith our third issue of the YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY. The reception accorded our two earlier issues has been kind and encouraging in the highest degree. Such criticisms as have reached us will be found to have borne fruit in the current issue, which we trust our friends will acknowledge to be a further step in the right direction.

A volume which covers so wide a field and which aims at providing a complete work of reference to wireless telegraphy must necessarily occupy a large number of pages. But we have endeavoured to keep its bulk within the smallest possible dimensions, and although the subjects dealt with have been increased, and the information already given revised and amplified, we shall not be found to have added more than 40 pages to the number in our 1914 issue.

On account of the crisis in public affairs which has spread the veil of secrecy over much private as well as public enterprise, we have thought it well to altogether omit the article contributed by Mr. G. E. Turnbull on "Wireless Telegraphy in the Merchant Service," although a further paper on this important subject was promised in our last issue. We shall be found, however, to have included some fresh matter of first-rate importance. Amongst these new items we should like to direct special attention to the article on "Wireless and War at Sea," contributed by Mr. Archibald Hurd, the eminent naval expert of the *Daily Telegraph*, and author of standard works on the subject. "The Influence of Wireless Telegraphy on Modern Strategy" constitutes another important addition. We feel sure that this paper from the pen of Col. Maude, whose contributions on this and kindred subjects have brought his name so prominently before the

public during the present crisis, cannot fail to be extensively appreciated. The article on "Wireless Telephony," by Mr. H. J. Round, forms an authoritative pronouncement on the present stages of a development of wireless work from which great hopes are entertained in the future.

We still feel that we are groping towards perfection, and have not yet attained it. If our friends will continue to criticise in the kindly manner which has marked their attitude towards us in the past, our future progress will be assured. At all events, the present volume will be recognised as an improvement on its predecessors and an earnest of 'better things to come."

THE EDITOR.

Marconi House, Strand,
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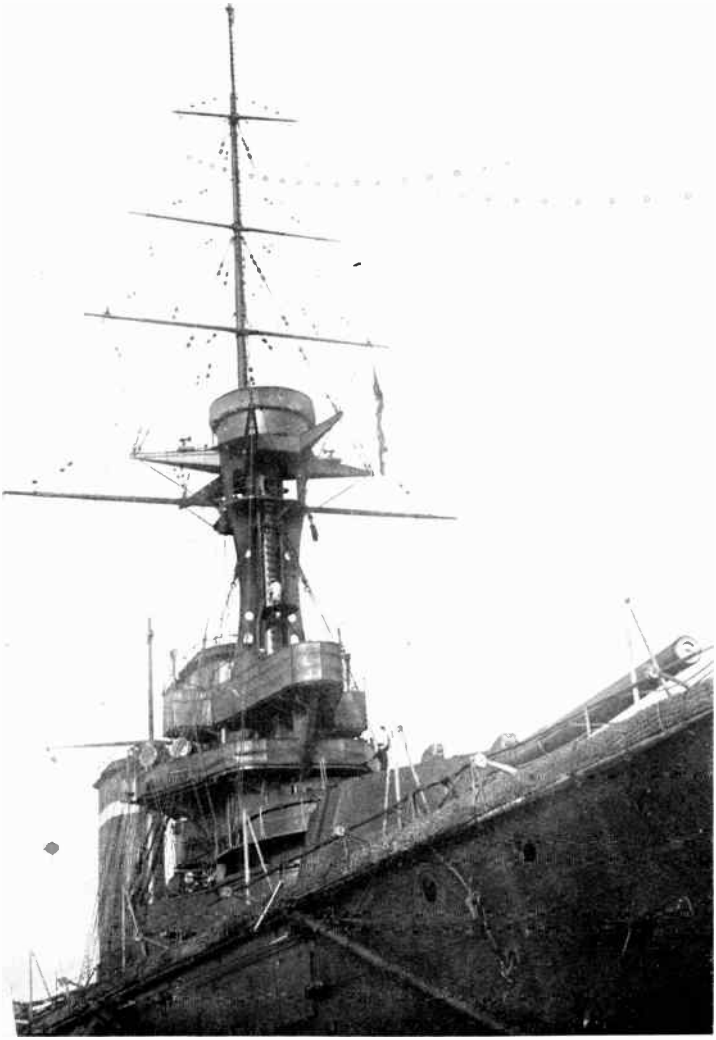

New Type of Aerial on H.M.S. "King George V."

[To face page 1

JANUARY, 1915

1	F	NEW YEAR'S DAY. Prof. Hertz died, 1894. Ship messages accepted at British post offices, 1905.
2	S	Capitulation of Port Arthur, 1905.
3	S	**2nd Sunday after Christmas**
4	M	
5	T	
6	W	**Epiphany.** Twelfth day.
7	Th	
8	F	
9	S	International Conference for Safety of Life at Sea closed, 1914.
10	S	**1st Sunday after Epiphany** British Penny Postage established, 1840.
11	M	
12	T	
13	W	
14	Th	Duke of Clarence died, 1892.
15	F	Sandwich Islands discovered, 1778.
16	S	
17	S	**2nd Sunday after Epiphany** Benjamin Franklin born, 1706 ; died, April 17th, 1790.
18	M	Captain Scott reached S. Pole, 1912.
19	T	
20	W	London Docks opened, 1805.
21	Th	
22	F	
23	S	"Republic" wrecked, 1909. Passengers and crew saved.
24	S	**3rd Sunday after Epiphany**
25	M	
26	T	
27	W	William II., Emperor of Germany, born, 1859.
28	Th	Peter the Great died, 1725.
29	F	Capitulation of Paris, 1871.
30	S	Anglo-Japanese Treaty signed, 1902.
31	S	**Septuagesima Sunday** "Great Eastern" steamer launched, 1858.

FEBRUARY, 1915

1	M	
2	T	
3	W	Telegraphs transferred to Government, 1870.
4	Th	
5	F	Thomas Carlyle died, 1881.
6	S	
7	S	**Sexagesima Sunday**
8	M	War between Japan and Russia began, 1904.
9	T	
10	W	
11	Th	Thomas Alva Edison born, 1847.
12	F	
13	S	
14	S	**Quinquagesima Sunday.**
15	M	Sir Wm. Preece born, 1834 ; died, November 6th, 1913.
16	T	SHROVE TUESDAY.
17	W	**Ash Wednesday**
18	Th	
19	F	Alessandro Volta born, 1745 ; died, March 5th, 1827.
20	S	
21	S	**Quadragesima** Validity of "Four Sevens" Patent upheld by Justice Parker, 1911.
22	M	George Washington born, 1732 ; died, Dec. 14th, 1799. Prof. H. Hertz born, 1857 ; died, January 1st, 1894.
23	T	Johann Karl Friedrich died, 1855 ; born April 30th, 1777.
24	W	
25	Th	
26	F	"Birkenhead" lost, 1852.
27	S	
28	S	**2nd Sunday in Lent**

MARCH, 1915

1	M	Wireless Service inaugurated Hawaiian Islands, 1901.
2	T	
3	W	Dr. Alexander Graham Bell born, 1847.
4	Th	Inauguration Day, U.S.A.
5	F	Frederick Anthony Mesmer died, 1815. Alessandro Volta died, 1827 ; born, February 19th, 1745.
6	S	
7	S	**3rd Sunday in Lent**
8	M	
9	T	Fight between " Merrimac " and " Monitor."
10	W	
11	Th	
12	F	John Frederick Daniell born, 1790 ; died, March 13th, 1845.
13	S	
14	S	**4th Sunday in Lent** Millwall Docks opened, 1868.
15	M	
16	T	Georg Simon Ohm born, 1787 ; died, July 7th, 1854.
17	W	ST. PATRICK'S DAY.
18	Th	Grover Cleveland born, 1837.
19	F	
20	S	Sir Isaac Newton died, 1727 ; born, December 25th, (O.S.), 1642.
21	S	**5th Sunday in Lent**
22	M	
23	T	
24	W	H.M.S. " Eurydice " foundered, 1878.
25	Th	
26	F	
27	S	English Channel spanned by wireless, 1899.
28	S	**Palm Sunday**
29	M	
30	T	First Transatlantic Marconigram published in *The Times*, 1903.
31	W	Robert Wilhelm Bunsen born, 1811 ; died, August 16th, 1899.

APRIL, 1915.

1	Th	Bismarck born, 1815; died, July 30th, 1898.
2	F	**Good Friday**
3	S	
4	S	**Easter Day**
5	M	**Easter Monday**
6	T	Prof. Adolf Slaby died, 1913; born, 1850. Commander Peary reached North Pole, 1909.
7	W	
8	Th	Anglo-French Convention signed, 1904.
9	F	
10	S	
11	S	**1st Sunday after Easter** American Civil War began, 1861.
12	M	
13	T	EASTER LAW SITTINGS BEGIN.
14	W	President Lincoln assassinated, 1865.
15	Th	"Titanic" disaster, 1912; 1,513 lives lost.
16	F	
17	S	Benjamin Franklin died, 1790; born, January 17th, 1706.
18	S	**2nd Sunday after Easter**
19	M	Byron died, 1824.
20	T	
21	W	
22	Th	
23	F	Shakespeare born, 1564; died, 1616.
24	S	Russo-Turkish War began, 1877.
25	S	**3rd Sunday after Easter** Commendatore G. Marconi, LL.D., D.Sc., born, 1874. Marconi International Marine Communication Co., Ltd., formed, 1900.
26	M	"Four Sevens" Patent, 1900.
27	T	Samuel F. B. Morse born, 1791; died, 1872.
28	W	"Bounty" Mutiny, 1789.
29	Th	
30	F	Johann Karl Friedrich born, 1777; died, February 23rd, 1855.

MAY, 1915

1	S	
2	S	**4th Sunday after Easter**
3	M	Jamaica discovered, 1494.
4	T	
5	W	Napoleon I. died, 1821 ; born August 15th, 1769.
6	Th	ACCESSION OF KING GEORGE V. (1910).
7	F	
8	S	Treaty on Alabama Claims, 1871.
9	S	**Rogation Sunday**
10	M	Sir H. M. Stanley died, 1904.
11	T	
12	W	
13	Th	**Ascension Day** Hudson's Bay Company founded, 1670. Joseph Henry died, 1878 ; born December 17th, 1797.
14	F	
15	S	
16	S	**Sunday after Ascension**
17	M	
18	T	New Eddystone Lighthouse opened, 1882.
19	W	Czar of Russia born, 1868.
20	Th	Christopher Columbus died, 1506.
21	F	EASTER LAW SITTINGS END. " Lake Champlain," first British merchant vessel equipped with wireless, left Liverpool, 1901.
22	S	
23	S	**Whit Sunday**
24	M	**Whit Monday** EMPIRE DAY. Queen Victoria born, 1819.
25	T	Lloyd's Incorporated, 1871.
26	W	Queen Mary born, 1867.
27	Th	
28	F	
29	S	
30	S	**Trinity Sunday** Decoration Day, U.S.A. " Empress of Ireland " disaster, 1914 ; 959 lives lost.
31	M	Union Day, South Africa, 1910.

JUNE, 1915

1	T	
2	W	First British Wireless Patent application lodged, 1896.
3	Th	KING GEORGE V.'S BIRTHDAY (1865). Lord Kelvin sent first paid Marconigram, 1898.
4	F	International Radiotelegraphic Conference opened, London, 1912.
5	S	Adam Smith born, 1723.
6	S	**1st Sunday after Trinity** Radiotelegraph Act of Canada passed, 1913.
7	M	Union of Sweden and Norway dissolved, 1905.
8	T	
9	W	Charles Dickens died, 1870.
10	Th	
11	F	
12	S	Sir Oliver Lodge born, 1851.
13	S	**2nd Sunday after Trinity**
14	M	Flag Day, U.S.A.
15	T	Magna Charta, 1215.
16	W	
17	Th	Sir W. Crookes born, 1832.
18	F	War with U.S.A., 1812. Waterloo, 1815.
19	S	"Alabama" sunk by "Kearsage," 1864.
20	S	**3rd Sunday after Trinity**
21	M	
22	T	
23	W	Prince of Wales born, 1894.
24	Th	
25	F	
26	S	Lord Kelvin born, 1824; died December 17th, 1907.
27	S	**4th Sunday after Trinity**
28	M	Massacre at Cawnpore, 1857.
29	T	Rubens born, 1577.
30	W	Tower Bridge opened, 1894.

JULY, 1915

1	Th	DOMINION DAY (Canada), 1867.
2	F	
3	S	Sadowa, 1866.
4	S	**5th Sunday after Trinity** INDEPENDENCE DAY, U.S.A.
5	M	International Radiotelegraphic Convention signed, London, 1912.
6	T	
7	W	George Simon Ohm died, 1854 ; born March 16th, 1787.
8	Th	
9	F	Edmund Burke died, 1797.
10	S	
11	S	**6th Sunday after Trinity** Sir Wm. Robert Grove born, 1811 ; died, August 1st, 1896.
12	M	
13	T	Berlin Treaty, 1878.
14	W	Bastille stormed, 1789. French Holiday.
15	Th	ST. SWITHIN'S DAY.
16	F	
17	S	War between France and Prussia, 1870.
18	S	**7th Sunday after Trinity**
19	M	
20	T	Marconi's Wireless Telegraph Co., Ltd., formed, 1897.
21	W	
22	Th	
23	F	
24	S	Honorary G.C.V.O., conferred by the King on Mr. Marconi, 1914.
25	S	**8th Sunday after Trinity**
26	M	
27	T	Bank of England founded, 1694.
28	W	Austria-Hungary declared war on Serbia, 1914.
29	Th	Dispersal of the Spanish Armada, 1588.
30	F	
31	S	TRINITY LAW SITTINGS END.

AUGUST, 1915

1	S	9th Sunday after Trinity LAMMAS DAY. Germany declared War on Russia, 1914. Germany sent ultimatum to Belgium.
2	M	BANK HOLIDAY.
3	T	Columbus's first voyage, 1492.
4	W	Great Britain declared war on Germany. First International Conference on Wireless Telegraphy met at Berlin, 1903.
5	Th	First British American Cable worked, 1858.
6	F	
7	S	
8	S	10th Sunday after Trinity
9	M	Heligoland formally ceded to Germany, 1890.
10	T	Royal Observatory, Greenwich, founded, 1675.
11	W	
12	Th	Great Britain declared war on Austria-Hungary.
13	F	
14	S	Relief of Peking, 1900.
15	S	11th Sunday after Trinity Wireless Telegraph Act of Great Britain passed, 1904.
16	M	Robert William Bunsen died, 1899; born March 31st, 1811.
17	T	
18	W	
19	Th	
20	F	Brussels entered by Germans, 1914.
21	S	
22	S	12th Sunday after Trinity Wireless News Message Service to liners inaugurated, 1903.
23	M	Japan declared war on Germany, 1914.
24	T	
25	W	
26	Th	West India Docks opened, 1802.
27	F	First hydrogen balloon ascent, 1783.
28	S	Loss of the "Royal George," 1782.
29	S	13th Sunday after Trinity
30	M	
31	T	

SEPTEMBER, 1915

1	W	
2	Th	Board of Trade (Great Britain) constituted, 1786.
3	F	
4	S	Proclamation of French Republic, 1870.
5	S	**14th Sunday after Trinity**
		Malta taken, 1805.
6	M	" Mayflower " sailed, 1620.
		President McKinley shot, 1901.
7	T	
8	W	Sir John Henniker Heaton died, 1914 ; born, 1848.
9	Th	Luigi Galvani born, 1737 ; died, December 4th, 1798.
10	F	
11	S	
12	S	**15th Sunday after Trinity**
13	M	Quebec taken, 1759.
14	T	
15	W	Liverpool and Manchester Railway opened, 1830.
16	Th	
17	F	
18	S	Dr. Samuel Johnson born, 1709.
19	S	**16th Sunday after Trinity**
20	M	Prof. Sir Samuel Dewar born, 1842.
21	T	
22	W	Michael Faraday born, 1791 ; died, August 25th, 1867.
23	Th	
24	F	
25	S	
26	S	**17th Sunday after Trinity**
27	M	
28	T	Strassburg capitulated, 1870.
29	W	
30	Th	Earl Roberts born, 1832 ; died, November 14th, 1914.

OCTOBER, 1915

1	F	
2	S	Major André hanged by Washington, 1780.
3	S	**18th Sunday after Trinity** International Radiotelegraphic Conference met at Berlin, 1906.
4	M	
5	T	Republic of Portugal proclaimed, 1910.
6	W	
7	Th	
8	F	Great Fire at Chicago, 1871.
9	S	
10	S	**19th Sunday after Trinity** Panama Canal completed, 1913.
11	M	"Volturno" burnt in Mid-Atlantic, 1913. Saved, 521.
12	T	America discovered, 1492. Robert Stephenson died, 1859.
13	W	First Aeroplane flight in U.S.A., 1893.
14	Th	Hastings, 1066.
15	F	The Gregorian Calendar introduced, 1582.
16	S	
17	S	**20th Sunday after Trinity** Wireless Transatlantic Public Service inaugurated, 1907.
18	M	
19	T	
20	W	Battle of Navarino, 1827.
21	Th	TRAFALGAR DAY. Death of Lord Nelson, 1805.
22	F	
23	S	Edouard Branly born, 1844.
24	S	**21st Sunday after Trinity**
25	M	
26	T	
27	W	Metz capitulated, 1870.
28	Th	Present Royal Exchange opened, 1844.
29	F	George Morland, painter, died, 1804.
30	S	Admiral Lord Dundonald died, 1860.
31	S	**22nd Sunday after Trinity** ALL HALLOW EVE. Sir Joseph Wilson Swan born, 1828.

NOVEMBER, 1915

1	M	East India Company abolished, 1858.
2	T	
3	W	International Radiotelegraphic Convention, Berlin, signed, 1906.
4	Th	
5	F	
6	S	Sir William Preece died, 1913; born, February 15th, 1834.
7	S	**23rd Sunday after Trinity**
		London Gazette established, 1665.
8	M	John Milton died, 1674; born, 1608.
9	T	Lord Mayor's Day. King Edward VII. born, 1841.
10	W	Martin Luther born, 1483; died, February 18th, 1546.
11	Th	MARTINMAS.
12	F	Lord Rayleigh born, 1842.
		International Conference for Safety of Life at Sea opened, 1913.
13	S	Professor Clerk Maxwell born, 1831; died, November, 5th, 1879.
14	S	**24th Sunday after Trinity**
15	M	*Transatlantic Times* published at sea, 1899.
16	T	Inauguration of the Suez Canal, 1869.
17	W	
18	Th	
19	F	Ferdinand de Lesseps born, 1805; died, December 7th, 1894.
20	S	
21	S	**25th Sunday after Trinity**
22	M	
23	T	
24	W	Tasmania discovered, 1642.
25	Th	Sir Isaac Newton born, 1642; died March 20th, 1727.
26	F	
27	S	
28	S	**1st Sunday in Advent**
29	M	
30	T	William Gilbert died, November 30th, 1603; born, 1540.

DECEMBER, 1915

1	W	H.M. Queen Alexandra born, 1844.
2	Th	
3	F	
4	S	Luigi Galvani died, 1798 ; born, September 9th, 1737.
5	S	2nd Sunday in Advent
6	M	
7	T	
8	W	British Pacific Cable opened, 1902.
9	Th	John Milton born, 1608 ; died, November 8th, 1674.
10	F	Royal Academy instituted, 1768.
11	S	
12	S	3rd Sunday in Advent First wireless signals transmitted across the Atlantic, 1901.
13	M	" Delhi " disaster, 1911.
14	T	George Washington died, 1799 ; born, February 22nd, 1732.
15	W	
16	Th	Amundsen reached the South Pole, 1911.
17	F	First Transatlantic message sent, 1902. Sir Humphry Davy born, 1778 ; died, May 29th, 1829.
18	S	
19	S	4th Sunday in Advent
20	M	
21	T	
22	W	
23	Th	
24	F	Wireless communication with East Goodwin light-ship, 1898.
25	S	Christmas Day
26	S	1st Sunday after Christmas
27	M	BANK HOLIDAY.
28	T	
29	W	
30	Th	Rudyard Kipling born, 1865.
31	F	Charter granted to East India Company, 1600.

Admiral Giulio Bertolini

Director of Wireless Telegraphy in the Italian Navy.

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JEWISH CALENDAR

(A.M. 5675 and part of A.M. 5676).

A.M. 5675.		A.D. 1914.		
Tishri	1	September	21	Rosh Hashanah (New Year).
,,	3	,,	23	Fast of Guedaliah.
,,	10	,,	30	Yom Kippur (Day of Atonement).
,,	15	October	5	Feast of Tabernacles.
,,	21	,,	11	Hosana Rabah.
,,	22	,,	12	Feast of the 8th day.
,,	23	,,	13	Rejoicing of the Law.
Hesvan	1	,,	21	New Moon.
Kislev	1	November	19	New Moon.
,,	25	December	13	Dedication of the Temple.
Tebet	1	,,	18	New Moon.
,,	10	,,	27	Fast. Siege of Jerusalem.
		A.D. 1915.		
Sebat	1	January	16	New Moon.
Adar	1	February	15	New Moon.
,,	11	,,	25	Fast of Esther.
,,	14	,,	28	Purim.
,,	15	March	1	Shusan.
Nisan	1	,,	16	New Moon.
,,	15	,,	30	Festival of Passover.
,,	16	,,	31	,, ,, 2nd day.
,,	21	April	5	,, ,, 7th day.
,,	22	April	6	Festival of Passover ends.
Yiar	1	,,	15	New Moon.
Sivan	1	May	14	New Moon.
,,	6	,,	19	Festival of Weeks.
Tamuz	1	June	13	New Moon.
,,	18	,,	30	Fast of Tamuz.
Ab	1	July	12	New Moon.
,,	10	,,	21	Fast of Ab.
Elul	1	August	11	New Moon.

A.M. 5676.				
Tishri	1	September	9	Rosh Hashanah (New Year).
,,	4	,,	12	Fast of Guedaliah.
,,	10	,,	18	Yom Kippur (Day of Atonement).
,,	15	,,	23	Feast of Tabernacles.
,,	21	,,	29	Hosana Rabah.
,,	22	,,	30	Feast of the 8th day.
,,	23	October	1	Rejoicing of the Law.
Hesvan	1	,,	9	New Moon.
Kislev	1	November	8	New Moon.
,,	25	December	2	Dedication of the Temple.
Tebet	1	,,	8	New Moon.
Tebet	10	,,	17	Fast. Siege of Jerusalem.

NOTE.—All Jewish Sabbaths and Festivals commence the previous Evening at Sunset.

MUHAMMADAN CALENDAR

(1333rd Year of Hejira, A.D. 1914-15).

Year of Hejira 1333.	A.D. 1914.		Year of Hejira 1333.	A.D. 1915.	
Muharram	November	19	Shaaban	June	14
Saphar	December	19	Ramadán	July	13
	A.D. 1915.		Shawall	August	12
Rabia I.	January	17	Dulkaada	September	10
Rabia II.	February	16	Dulheggia	October	10
Jomada I.	March	17	1334.		
Jomada II.	April	16	Muharram	November	9
Rajab	May	15	Saphar	December	9

OLD STYLE CALENDAR, 1915.

(Used in Russia and the Balkan States).

A.D. 1915. A.M. 7423.

Old Style.		Certain Holy Days.	New Style.	
January	1	Circumcision	January	14
,,	6	Theophany (Epiphany)	,,	19
February	1	Carnival Sunday	February	14
,,	2	Hypapante	,,	15
,,	8	First Sunday in Lent	,,	21
March	9	Forty Martyrs	March	22
,,	15	Palm Sunday	,,	28
,,	20	Great Friday	April	2
,,	22	Holy Pasch	,,	4
,,	25	Annunciation of Theotokos	,,	7
April	23	St. George	May	6
,,	30	Ascension	,,	13
May	9	St. Nicolas	,,	22
,,	10	Pentecost	,,	23
,,	11	Holy Ghost	,,	24
,,	14	Coronation of the Emperor*	,,	27
June	29	Peter and Paul, Chief Apostles	July	12
August	1	First day of Fast of Theotokos	August	14
,,	6	Transfiguration	,,	19
,,	15	Repose of Theotokos (Assumption)	,,	28
,,	30	St. Alexander (Nevsky)*	September	12
September	8	Nativity of Theotokos	,,	21
,,	14	Exaltation of the Cross	,,	27
October	1	Patronage of Theotokos*	October	14
,,	21	Accession of the Emperor*	November	3
November	15	First day Fast of the Nativity	,,	28
,,	21	Entrance of Theotokos	December	4
December	6	St. Nicolas	,,	19
,,	9	Conception of Theotokos	,,	22
,,	25	Nativity	January	7

* Peculiar to Russia.

1916 CALENDAR 1916

JANUARY.						
S	2	9	16	23	30	
M	3	10	17	24	31	
Tu	4	11	18	25		
W	5	12	19	26		
Th	6	13	20	27		
F	7	14	21	28		
S	1	8	15	22	29	

FEBRUARY.						
S		6	13	20	27	
M		7	14	21	28	
Tu	1	8	15	22	29	
W	2	9	16	23		
Th	3	10	17	24		
F	4	11	18	25		
S	5	12	19	26		

MARCH.						
S		5	12	19	26	
M		6	13	20	27	
Tu		7	14	21	28	
W	1	8	15	22	29	
Th	2	9	16	23	30	
F	3	10	17	24	31	
S	4	11	18	25		

APRIL.						
S	2	9	16	23	30	
M	3	10	17	24		
Tu	4	11	18	25		
W	5	12	19	26		
Th	6	13	20	27		
F	7	14	21	28		
S	1	8	15	22	29	

MAY.						
S		7	14	21	28	
M	1	8	15	22	29	
Tu	2	9	16	23	30	
W	3	10	17	24	31	
Th	4	11	18	25		
F	5	12	19	26		
S	6	13	20	27		

JUNE.						
S		4	11	18	25	
M		5	12	19	26	
Tu		6	13	20	27	
W		7	14	21	28	
Th	1	8	15	22	29	
F	2	9	16	23	30	
S	3	10	17	24		

JULY.						
S	2	9	16	23	30	
M	3	10	17	24	31	
Tu	4	11	18	25		
W	5	12	19	26		
Th	6	13	20	27		
F	7	14	21	28		
S	1	8	15	22	29	

AUGUST.						
S		6	13	20	27	
M		7	14	21	28	
Tu	1	8	15	22	29	
W	2	9	16	23	30	
Th	3	10	17	24	31	
F	4	11	18	25		
S	5	12	19	26		

SEPTEMBER.						
S		3	10	17	24	
M		4	11	18	25	
Tu		5	12	19	26	
W		6	13	20	27	
Th		7	14	21	28	
F	1	8	15	22	29	
S	2	9	16	23	30	

OCTOBER.						
S	1	8	15	22	29	
M	2	9	16	23	30	
Tu	3	10	17	24	31	
W	4	11	18	25		
Th	5	12	19	26		
F	6	13	20	27		
S	7	14	21	28		

NOVEMBER.						
S		5	12	19	26	
M		6	13	20	27	
Tu		7	14	21	28	
W	1	8	15	22	29	
Th	2	9	16	23	30	
F	3	10	17	24		
S	4	11	18	25		

DECEMBER.						
S	3	10	17	24	31	
M	4	11	18	25		
Tu	5	12	19	26		
W	6	13	20	27		
Th	7	14	21	28		
F	1	8	15	22	29	
S	2	9	16	23	30	

RECORD OF THE DEVELOPMENT OF WIRELESS TELEGRAPHY

1831.

MICHAEL FARADAY discovered electro-magnetic induction between two entirely separate circuits.

1837.

The first patent for an electric telegraph taken out by Cooke and Wheatstone (London) and by Morse (U.S.A.).

1838.

K. A. Steinheil (Munich) discovered the use of the earth return, and suggested that the remaining metallic portion of the circuit might be dispensed with entirely, and a system of wireless telegraphy established.

1840.

Joseph Henry (U.S.A.) first produced high-frequency electric oscillations, and pointed out that the discharge of a condenser is oscillatory.

1842.

S. F. B. Morse made wireless experiments by electric conduction through water across Washington Canal and across wide rivers.

Joseph Henry noticed that a single electric spark about one inch long thrown into a circuit of wire in an upper room could magnetise steel needles included in a parallel circuit of wire placed in a cellar underground thirty feet below with two floors intervening. He was one of many observers prior to Hertz who had noticed curious effects due to electric sparks produced at a distance, which were commonly ascribed to ordinary electro-magnetic induction.

1843.

James Bowman Lindsay, of Dundee, suggested that if it were possible to provide stations of not more than twenty miles apart all the way across the Atlantic, there would be no need to lay any cable.

1845.

Lindsay began making experiments in 1845 across the river Tay, his method being to transmit messages by means of electricity or magnetism through and across the water without submerged wires, the water being utilised as the conducting medium.

1849.

Dr. O'Shaughnessy (afterwards Sir William O'Shaughnessy Brooke) succeeded in passing intelligible signals without any metallic conduction across the River Hooghly, 4,200 ft. wide, in India, but he found the cost of power prohibitive.

1859.

Bowman Lindsay gave a demonstration of his conduction system to the British Association Meeting, at which Michael Faraday and Sir William Thompson (Lord Kelvin) were both present.

William H. Preece (afterwards Sir William) was deputed by the Electric Telegraph Company to report on Lindsay's system.

1862.

John Heyworth patented a method of conveying electric signals without the intervention of any continuous artificial conductor.

Cromwell Varley tried this method, but found it a failure.

1867.

James Clerk Maxwell read a paper before the Royal Society, in which he laid down the theory of electro-magnetism, which he developed more fully in 1873, in his great treatise on electricity and magnetism. He predicted the existence of the electric waves that are now used in wireless telegraphy.

1870.

Von Bezold discovered that oscillations set up by a condenser discharge in a conductor give rise to interference phenomena.

1872.

Henry Highton made various experiments across the River Thames with Morse's method.

1879.

David E. Hughes discovered the phenomena on which depends the action of coherers, which many years later were used in early electric-wave signalling. He found that a tube of metallic filings was sensitive to electric sparks made in its vicinity, and he was able to obtain such effects on a tube connected to a battery and a telephone at a distance of five hundred yards.

1880.

John Trowbridge, of Harvard, systematically studied the problem of propagation of electric current through "earth," either soil or water, and he found that signalling might be carried on over considerable distances by electric conduction through the earth or water between places not metallically connected.

1882.

Graham Bell experimented with Trowbridge's method on the Potomac River, when signals were detected at a distance of 1½ miles.

Sir William H. Preece made an experiment, using Morse's method to connect the Isle of Wight with the mainland across the Solent on two occasions during the failure of the submarine cable in the Solent.

1883.

Willoughby Smith, in a paper before the Institution of Civil Engineers, London, suggested that electric induction might be employed for railway signalling.

Heinrich Rudolph Hertz became *privat docent* at Kiel, where he began studies in Maxwell's electro-magnetic theory.

G. F. Fitzgerald suggested a method of producing electro-magnetic waves in space by the discharge of a condenser.

1885.

Thomas A. Edison, with the assistance of Messrs. Gilliland, Phelps, and W. Smith, worked out a system of communication

between railway stations and moving trains by means of induction and without the use of conducting wires.

Sir W. H. Preece made experiments at Newcastle-on-Tyne which showed that in two completely insulated circuits of square form, each side being 440 yards, placed a quarter of a mile apart, telephonic speech was conveyed from one to the other by induction.

1886.

A. E. Dolbear, of Tuft's College, Boston, patented a plan for establishing wireless communication by means of two insulated elevated plates, but there is no evidence that the method proposed by him did, or could, effect the transmission of signals between stations separated by any distance.

1887.

Heinrich Rudolph Hertz discovered the progressive propagation of electro-magnetic action through space, and was able to measure the length and velocity of electro-magnetic waves, and to show that in the transverse nature of their vibration, and their susceptibility to refraction and polarisation, they are in complete accordance with the waves of light and heat.

Hertz employed as a detector of the electric wave a simple nearly closed circuit of wire, called the " Hertz Resonator," but it was subsequently discovered that the metallic microphone of Hughes was a far more sensitive detector.

A. W. Heaviside established communication by telephonic speech between the surface of the earth and the subterranean galleries of the Broomhill Collieries, 350 ft. deep, by laying above and below ground two complete metallic circuits, each about $2\frac{1}{4}$ miles in length, and parallel to each other.

1889.

Elihu Thompson suggested that electric waves were particularly suitable for the transmission of signals through fogs and material objects.

1891.

John Trowbridge suggested that by means of magnetic induction between two separate and completely insulated circuits communication could be effected between distances.

1892.

Edouard Branly devised an appliance for detecting electro-magnetic waves, which was known as a "coherer." He discovered that these waves had the power of affecting the electric conductivity of materials when in the state of a powder.

Sir W. H. Preece adopted a method which united both conduction and induction as the means of affecting one circuit by the current in another. In this way he established communication between two points on the Bristol Channel, and at Lochness, in Scotland.

C. A. Stevenson, of the Northern Lighthouse Board, Edinburgh, advocated the use of an inductive system for communication between the mainland and isolated lighthouses.

1894.

E. Rathenau of Berlin experimented with a conductive system of wireless telegraphy, and signalled through three miles of water.

1895.

Mr. G. Marconi's investigations led him to the conclusion that Hertzian waves could be used for telegraphing without wires, and he made important experiments at his father's home in Italy.

Willoughby Smith established communication by conduction with the lighthouse on the Fastnet.

1896.

In February Mr. Marconi came to England, and on June 2nd lodged his application for the first British Patent for Wireless Telegraphy, No. 12,039 of 1896.

In July of that year he was introduced to Sir William H. Preece, the Chief Electrical Engineer of the Post Office, at whose request Mr. Marconi conducted experiments over a distance of about 100 yards before the officials of the Post Office. Shortly afterwards a further series of trials was conducted by Mr. Marconi on Salisbury Plain, when communication was successfully established over a distance of 1¾ miles.

On December 11th, 1896, Sir William H. Preece lectured on "Telegraphy without Wires," Mr. Marconi conducting the experiments.

1897.

In March, 1897, Mr. Marconi demonstrated before the representatives of various Government Departments, communication being established over a distance of 4 miles.

In May further trials were made between Lavernock and Flatholm, a distance of over 3 miles; and on the 13th of that month the late Professor Slaby was present at further trials when communication was established over a distance of about 8 miles.

In July Mr. Marconi gave a demonstration of his invention at the Admiralty in Rome, and before King Humbert at the Royal Palace of the Quirinal. Between July 10th and 18th trials were made at Spezia, and on the 17th and 18th communication was maintained between the shore and the Italian cruiser *San Martin* at sea, at distances up to 16 k.m.

On July 20th, 1897, the Wireless Telegraph and Signal Company, Limited, was incorporated, with a capital of £100,000, to acquire Mr. Marconi's patents in all countries except Italy and her dependencies.

On August 27th, 1897, the late Professor Slaby lectured on Wireless Telegraphy at the Sailors' Home, Potsdam, before the German Emperor and Empress and the King of Spain.

In September and October Mr. Marconi further experimented on Salisbury Plain. Trials were also made by officials of the Post Office at Dover. Receiving apparatus was erected at Bath, and signals received from Salisbury, 34 miles away.

The first Marconi Station was erected at the Needles, Isle of Wight, in November, and experiments conducted between that Station and Bournemouth, a distance of 14½ miles.

In December, in the presence of Captain Kennedy, R.E., tests were made between the Needles Station and a steamer, readable signals being received up to a distance of 18 miles.

1898.

In May, 1898, Mr. Marconi experimented between St. Thomas's Hospital and the House of Commons. In the same month experiments were carried out between Ballycastle and Rathlin Island, a distance of 7½ miles.

On June 3rd Lord Kelvin visited the Needles Station and sent from there, to his friend Sir George Stokes, the first paid Marconigram.

On July 20th and 22nd the events of the Kingstown Regatta were reported by wireless telegraphy for the Dublin *Daily Express* from the steamer *Flying Huntress,* equipped with the Marconi system.

On August 3rd wireless telegraphic communication was established between the Royal yacht *Osborne* and Ladywood Cottage, Osborne, in order that Queen Victoria might communicate with the Prince of Wales. Constant and uninterrupted communication was maintained during the sixteen days the system was in use.

In September the installation at Bournemouth was removed to Poole Harbour, Dorset.

Under arrangement with the Trinity House officials the value of wireless telegraphy as a means of communication between lightships and the shore was demonstrated by the installation of apparatus in December, 1898, on the East Goodwin Lightship and at the South Foreland Lighthouse, the intervening distance being 12 miles.

1899.

During a gale in January, 1899, the East Goodwin Lightship was damaged, and the mishap reported by wireless telegraphy to Trinity House.

On March 2nd Mr. Marconi read a paper on Wireless Telegraphy at the Institution of Electrical Engineers.

On March 3rd the s.s. *R. F. Matthews* ran into the East Goodwin Lightship. The accident was reported by wireless telegraphy to the South Foreland Lighthouse, and lifeboats were promptly sent to the assistance of the lightship.

On March 27th communication was established between Wimereux, near Boulogne, and the South Foreland Lighthouse.

During the naval manœuvres in July three British warships, equipped with Marconi apparatus, correctly interchanged messages at distances up to 74 nautical miles (about 85 land miles).

In September Marconi Stations were installed at Chelmsford and Dovercourt.

During the meetings of the British Association at Dover and of the Association Française pour l'Avancement de Science at Boulogne, in August, communication was maintained by means of apparatus installed at the Dover Town Hall and at Wimereux.

The international yacht races which took place in September and October were reported by wireless telegraphy for the *New York Herald.* At the conclusion of the races, series of trials were made between the United States cruiser *New York* and the battleship *Massachusetts,* signals being exchanged between the vessels at distances up to about 36 miles. On the return journey from America Mr. Marconi fitted the s.s. *St. Paul* with his apparatus, and on November 15th established communication with the Needles Station when 36 miles away. Reports of the progress of the war in South Africa were telegraphed to the vessel, and published in a leaflet entitled "The Transatlantic Times," printed on board.

In October the War Office adopted the Marconi apparatus for use in the field in South Africa, and on November 2nd six electricians left for South Africa with sets of apparatus. These proved of considerable service to the army and the navy, to which latter they were subsequently transferred.

On November 22nd, the Marconi Wireless Telegraph Company of America was formed for the purpose of exploiting Marconi patents in the United States of America and possessions.

1900.

On February 2nd Mr. Marconi delivered a discourse on Wireless Telegraphy at the Royal Institution.

In March the Marconi system was adopted by the Norddeutscher Lloyd Steamship Co., and apparatus installed on the Borkum Riff Lightship, Borkum Lighthouse, and *Kaiser Wilhelm der Grosse.*

On April 25th the Marconi International Marine Communication Company was incorporated with offices in London and Brussels, and agencies in Paris and Rome, for the maritime working of the Marconi system.

On July 4th a contract was made with the British Admiralty for the installation of apparatus on twenty-six of His Majesty's ships and six Admiralty coast stations.

In October the erection of the High Power Station at Poldhu was commenced. The aerials were at first supported by 20 masts, each 210 ft. high.

In November, the *Princesse Clémentine,* plying between Ostend and Dover, was fitted, and a Wireless Telegraph Station installed at La Panne, on the Belgian coast.

Wireless Telegraphy was adopted by the Metropolitan Fire Brigade, and apparatus fitted at Mitcham Lane Station Box and Streatham Fire Station.

1901.

On January 1st, the *Princesse Clémentine* reported the barque *Medora,* waterlogged on Ratel Bank. A tug was promptly despatched from Ostend and the barque towed off. Early in the year, a station, similar to that at Poldhu, was commenced at Cape Cod, Mass., U.S.A.

On January 8th wireless telegraph experiments on the *Princesse Clémentine* were carried out during a storm, communication being maintained the whole way from Ostend to Dover. On January 19th *Princesse Clémentine* ran ashore, and news of the accident was telegraphed to Ostend by wireless.

In February communication was established between Niton Station, Isle of Wight, and the Lizard Station, a distance of 196 miles.

On March 1st a public Wireless Telegraph Service was inaugurated between the five principal islands of the Hawaiian group, viz., Oahu, Kauai, Molaki, Maui, and Hawaii.

In April a demonstration of the Marconi system was carried out for the French Government, communication being successfully established and maintained for some time between a Station at Calvi, Corsica, and another at Antibes in the Riviera.

On May 15th, 1901, Mr. Marconi read a paper on Syntonic Wireless Telegraphy at the Royal Society of Arts, London.

The first British ship, the s.s. *Lake Champlain,* was equipped with wireless telegraphic apparatus on May 21st. About the same date coast stations in England and Ireland were opened for communication with ships at sea as follows :—Crookhaven, Co. Cork ; Rosslare, Co. Wexford ; Holyhead ; Withernsea, near Hull ; Caister, near Yarmouth ; North Foreland.

The masts at Poldhu were wrecked during a very heavy

gale on September 20th, and the masts at Cape Cod shared a like fate in the November following. The masts were then replaced by four towers, 210 ft. high, built of timber.

On September 26th a 14 years' contract was made for the installation of the wireless apparatus at ten of Lloyd's Signal Stations.

The Compagnie de Télégraphie sans Fil of Brussels was formed on October 26th to develop and work the Marconi system on the Continent.

Signals were received by Mr. Marconi at St. John's, Newfoundland, from Poldhu Station, Cornwall, a distance of 1,800 miles, across the Atlantic on December 12th and 13th.

1902.

Considerable progress in transatlantic work was accomplished, and also in long-distance communication throughout Europe. In February Mr. Marconi received on board the s.s. *Philadelphia* readable messages up to a distance of 1,551½ statute miles, and signals up to a distance of 2,099 statute miles from Poldhu Station, Cornwall.

Mr. Marconi lectured on the "Progress of Electric Space Telegraphy" at the Royal Institution of Great Britain on June 13th.

On July 14th-16th Mr. Marconi received messages from Poldhu on the Italian battleship *Carlo Alberto,* lying at Cape Skagen, a distance of 800 miles; and at Kronstadt, 1,600 miles.

A demonstration of Mr. Marconi's inventions was given before officials of the Dutch Government, and the Colonial Premiers who were in England for King Edward's Coronation witnessed a demonstration on board the *Koh-i-noor.*

The Marconi Wireless Telegraph Company of Canada was formed on November 1st, and in December wireless messages were despatched by the Cape Breton Station from Mr. Marconi and from the Earl Minto to His Majesty King Edward VII. Mr. Marconi also sent a message to King Victor Emmanuel of Italy. Mr. Marconi was made a member of the Italian Order of Merit.

1903.

President Roosevelt sent a Transatlantic message to King Edward VII. *viâ* Cape Cod and Poldhu Stations on January 19th. High power and other stations were ordered by the Italian

Government, and the Italian Senate and Chamber of Deputies tendered a vote of thanks to Mr. Marconi for the results obtained with wireless telegraphy.

The first Transatlantic Marconigram was published in *The Times* on March 30th.

On April 5th the first Italian licence for the erection of a high power station was granted.

The Compagnie Française Maritime et Coloniale de Télégraphie Sans Fil was formed on April 24th to exploit the Marconi system in France.

An agreement was made on July 24th by the British Admiralty for the general use of the Marconi system in the Navy.

The first International Conference upon Wireless Telegraphy was held in Berlin on August 4th.

The passengers of the Red Star Liner *Kroonland,* which was disabled on December 8th, 130 miles west of the Fastnet, were saved great inconvenience by wireless communication being established with the Crookhaven Station.

Mr. Marconi was made a Knight of the Order of St. Anne of Russia.

1904.

On April 28th a contract was made by the Admiralty for the installation of a coast station at Guernsey.

A Wireless Telegraph Act was passed by the British Government on August 15th.

Meteorological information was supplied by wireless to the *Daily Telegraph.*

Accidents to s.s. *New York* and the s.s. *Friesland* early in the year were reported by wireless telegraphy.

In August an arrangement was made by the Postmaster-General whereby British post offices undertook the collection, transmission and delivery of long-distance and ship-to-shore messages on behalf of the Marconi Company.

1905.

Judgment given by Judge Townsend in New York on May 4th in favour of the Marconi Company in its action against the De Forest Wireless Telegraph Company for infringement of patents.

On May 12th the Canadian Government ordered stations for Cape Sable (N.S.) and St. John (N.B.), and on May 30th instructions were given for five more lightships to be installed with wireless apparatus for Trinity House.

Erection of the Clifden High-Power Station (Ireland) was commenced in October.

Mr. Marconi was made a Civil Member of the Royal Order of Savoy.

In 1905 Mr. Marconi took out his patent for the horizontal directional aerial (No. 14,788), which marked a step of great importance in the progress of long-distance work.

1906.

A contract was made by the British Post Office in May for the erection of stations at Tobermory and Loch Boisdale, Scotland, by the Marconi Company.

On August 4th the Argentine Marconi Company was formed to work the Marconi patents in Argentina and Uruguay.

In October and November an International Radiotelegraphic Conference was held at Berlin, and a convention was signed by the majority of the countries of the world.

1907.

Marconi Transatlantic Stations at Clifden and Glace Bay were opened for limited public service on October 17th.

1908.

Transatlantic Stations were opened to the general public for transmission of messages between the United Kingdom and the principal towns in Canada on February 3rd.

Mr. Marconi lectured on "The Commercial Application of Wireless Telegraphy" at Liverpool on February 24th.

The Russian Company of Wireless Telegraphs and Telephones was formed on October 8th.

1909.

The *Republic,* after collision with the s.s. *Florida* off the coast of the United States on January 23rd, succeeded in calling assistance by wireless, with the result that all her passengers and crew were saved before the vessel sank.

Mr. Marconi lectured before the Dutch Royal Institute of Engineers in May and in December.

The *Slavonia* was stranded off the Azores on June 10th, when the passengers and crew, numbering 410, were rescued from the wreck by the assistance of vessels summoned by wireless.

The Marconi British Coast Stations were taken over by the Postmaster-General on September 29th, who was granted a licence to use the company's patents.

In December Mr. Marconi lectured at the Royal Academy of Science, Stockholm, and (with Prof. Braun) was awarded the Nobel Prize for Physics.

1910.

Mr. Marconi, *en route* for Buenos Aires on board the *Principessa Mafalda,* received messages from Clifden at a distance of 4,000 miles by day and 6,735 miles by night.

The Compania Nacioñal de Telegrafia sin Hilos was formed on December 24th to exploit the Marconi system in Spain.

1911.

On February 21st judgment was given in the action instituted in December, 1910, by the Marconi Company against the British Radiotelegraph and Telephone Company for infringement of their tuning patent No. 7777 of 1900. Mr. Justice Parker's decision was in favour of the Marconi Company, and he granted them a certificate of validity of their patent and an injunction, together with costs and damages.

A contract was made between the Marconi Company and the Canadian Government for operating wireless telegraph stations in Canada for a period of 20 years.

Stations at Teneriffe, Cadiz, Barcelona, and Las Palmas were opened for public business by the Compania Nacioñal de Telegrafia sin Hilos, the *concessionaires* of the public wireless telegraph service of Spain.

The Imperial Conference held in May approved the proposal that an Imperial Wireless Telegraph System should be created.

Mr. Marconi lectured on " Radiotelegraphy " at Royal Institution on June 2nd.

The P. and O. Liner *Delhi,* with the Duke and Duchess of Fife on board, was reported in distress off Cape Spartel on

December 13th. Assistance was obtained by means of wireless and everyone was safely landed.

The Lodge-Muirhead patents were acquired by the Marconi Company, and Sir Oliver Lodge became a scientific adviser to the company.

1912.

Early in the year, owing to the improved position of the Marconi Wireless Telegraph Company of America, through its absorption of the business of the United Wireless Company, further capital was subscribed by the shareholders, sufficient to develop its projects for the erection of long-distance stations.

On January 27th the central station of the Spanish wireless service (Aranjuez) was opened by King Alfonso XIII. Stations at Vigo and Soller were also opened during the year.

In February the Marconi Company secured the patents of Bellini and Tosi, including those for the wireless direction-finder.

The disastrous loss of life occasioned by the wreck of the *Titanic* on April 15th was mitigated to some extent through the help secured by its wireless call.

Mr. Marconi, whilst in America, delivered an address on the "Progress of Wireless Telegraphy" before the New York Electrical Society on April 17th.

The International Radiotelegraphic Conference, opened in London on June 4th, approved important regulations to secure uniformity of practice in Wireless Telegraphic Services.

The British Government entered into a contract in July with the Marconi Company for the erection of a chain of High-Power Wireless Telegraphic Stations, as recommended at the Imperial Conference held in 1911. When the contract was submitted for the ratification of the House of Commons it was referred to a Select Committee to report thereon.

The Marconi Wireless Telegraph Company of Canada was entrusted by the Dominion Government on September 17th with the working of the existing stations on the Great Lakes until 1931 and the erection of further stations. A similar arrangement was made in December with the Newfoundland Government for stations at Belle Isle and on the Labrador coast.

In September the Norwegian Government entered into a contract with the Marconi Company for the erection of a High-Power Station in Norway to communicate with a station to be erected by the Marconi Company at New York.

Mr. Marconi was decorated with the Grand Cross of the Order of Alfonso XII., and made a Grand Officer of the Order of St. Maurice and Lazarus.

In December an important contract was made by the Portuguese Government for the erection of Stations at Lisbon, Oporto, and the Azores.

1913.

During this year the Governments of France and the United States experimented between the Eiffel Tower Station and Washington by wireless, in securing exact data for comparing the velocity of grounded electro-magnetic waves to that of light. Several organisations took steps towards almost world-wide simultaneous observations of signals and disturbances in such ways that the resulting data is of vast assistance in demonstrating accurate transmission theories.

The use of wireless telegraphy in the Balkan Wars resulted in considerable developments from the military standpoint.

In January, the High Court of Justice of France delivered a judgment declaring the validity of all claims of the Marconi patent 305060, which corresponds with the "four sevens" patent.

On January 23rd the Postmaster-General appointed a committee "To consider and report on the merits of the existing systems of long-distance wireless telegraphy, and in particular as to their capacity for continuous communication for the distances required by the Imperial Chain." The committee reported that "The Marconi system is at present the only system of which it can be said with any certainty that it is capable of fulfilling the requirements of the Imperial Chain."

As a result of the official enquiry into the loss of the *Titanic*, the *Scotia*, equipped with a Marconi wireless installation, left Dundee on March 8th to patrol the waters of the North Atlantic and to collect information regarding the movement of ice in that region.

On June 28th the Norwegian *Storthing* ratified a contract with the Marconi Company for the erection of a high-power Transatlantic Wireless Telegraph Station near Stavanger.

In August the Budget Commission of the French Chamber of Deputies framed a Bill proposing the establishment of a wireless telegraphy system between France and the French Colonies at an estimated cost of £631,800.

On October 11th, the *Volturno* was burnt in mid-Atlantic, and in response to the wireless appeal ten vessels came to the rescue and 521 lives were saved.

The Wireless Society of London was formed in October.

On November 12th an International Conference for the purpose of considering means of saving life at sea was opened in London by the President of the Board of Trade.

On November 24th the first practical trials with wireless apparatus on trains were made on board one of the trains belonging to the Delaware, Lackawanna and Western Railroad.

In November the Postmaster-General appointed a committee to consider how far and by what methods the State could make provision for research in the science of wireless telegraphy.

On November 25th Commander H. A. Edwards, who was at the head of the Bolivian Survey Commission appointed to determine the boundary line between Brazil and Bolivia reported that the Commission had been able to determine the difference of longitude between Mañaos and Porto Velho by means of exchange of wireless signals.

The wireless station at Macquerie Island was the means of keeping Dr. Mawson, the Australian explorer, in touch with the outer world.

1914

On January 20th the Safety of Life at Sea Convention, drawn up by the International Conference which met on November 14th, 1913, was signed at London. That section of the Convention which deals with Wireless Telegraphy lays down the minimum wireless telegraphy equipment to be carried by vessels of different grades. The Radiotelegraph Convention, 1912 divided ship stations into three classes according to the hours for which they were open for service. The Safety of Life at Sea Convention indicates in which of the three classes vessels shall be placed according to the nature of the service performed.

Early in the year an International Wireless Conference met at Brussels. The object of the conference was to adopt a programme whereby operators in all the countries of Europe could take careful observations with a view to arriving at some practical explanation of the laws governing the variation in the strength of wireless signals.

During the early part of March Mr. Marconi joined, at Augusta, one of the Italian war vessels attached to the squadron commanded by H.R.H. the Duke of Abruzzi. For four days he carried on experiments of far-reaching importance with the most satisfactory results. During the first day clear radio-telegraphic communications were received from Rome over a distance of 575 km. (356 miles); from Vienna over a distance of 970 km. (600 miles); and from Clifden in Ireland, 2,800 km. (1,750 miles).

These communications took place during the day, and new high-resonance receivers with phonographic register-repeaters were employed with excellent results.

Experiments in wireless telephony were carried out on the following day between several vessels lying at anchor one kilometre apart, ordinary receivers being used with great success. At night wireless telegraphic signals were received from Glace Bay, Canada, over a distance of 6,500 km. (4,062 miles).

The wireless telephone experiments were continued on the third day between two warships on the high seas, and the reception was consistently perfect over a distance of 30 km. On the fourth and last days successful wireless telephone experiments were carried out, communications being effected using only very limited energy between vessels on the high seas 70 km. (45 miles) apart. These experiments were repeated between two vessels situated at a distance of about 20 km. (16 miles), where land interfered between the communicating vessels, and in this case again excellent results were obtained. On this day radio-telephonic communication was constantly maintained for twelve hours, and the continuous working of the apparatus did not cause the slightest inconvenience.

On March 27th Dr. J. A. Fleming, lecturing on "Improvements in Long-Distance Telephony" at the Royal Institution, called attention to some of the great advances made of late years both in the scientific theory and in the practical appliances of wireless telephony. He remarked that continuous waves, which are an essential feature of wireless telephony, could be produced either by a high-frequency alternator, such as that of Goldschmidt, by the continuous wave disc generator of Mr. Marconi, or by some form of Poulsen or Moretti arc generator.

A new departure in the application of Wireless Telegraphy to the safety of life at sea was the equipment of the motor lifeboats of ss. *Aquitania* with wireless apparatus. The Marconi's Wireless Telegraph Company having designed a special type of apparatus for such a purpose.

On April 15th, at Godalming, a memorial was unveiled to the memory of Jack Phillips, chief wireless telegraphist of the ill-fated *Titanic,* who "died at his post when the vessel foundered in mid-Atlantic on the 15th day of April 1912."

On May 29th a tragic disaster occurred in the loss of the s.s. *Empress of Ireland.* The vessel was in collision with the Norwegian collier *Storstad,* and of the 1,500 persons on board less than 500 were saved. In response to the wireless call for assistance two vessels, the s.s. *Lady Evelyn* and the s.s. *Eureka,* made all speed to the scene of the disaster and rendered very material assistance. Had the *Empress* not been fitted with wireless telegraphy, it is probable that many more lives would have been lost.

During the year high-power trans-oceanic stations were completed at Carnarvon (Wales), Belmar, New Jersey (U.S.A.), Honolulu (Hawaiian Islands) and San Francisco (Cal.), whilst considerable progress was made towards the completion of the high power station at Stavanger (Norway). The Carnarvon and Belmar stations when open for public service will bring London and New York into direct wireless communication. The Honolulu and San Francisco stations were formally opened to public service on September 24th, and Honolulu is destined to link up San Francisco with Japan when the high-power station now in course of construction at Yokohama has been completed.

On May 13th, in answer to a question in the House of Commons, the Postmaster-General announced that a successful demonstration had been made by the Marconi Co. in high-speed Wireless Telegraphy. Messages had been transmitted at a speed of 100 words a minute between the stations at Chelmsford and Clifden (Galway). He stated that this method of working was to be adopted between the existing Post Office station near Newcastle-on-Tyne and a new station to be constructed at Stonehaven, the object being to provide a stand-by in case of the interruption of the existing telegraph lines.

On June 8th a report was issued by the Committee appointed by the Postmaster-General to consider how far and by what methods the State should make provision for research work in Wireless Telegraphy. The report dealt with the objects of such a research department, the expenditure which would be involved, and set forth the nature of the research work to be undertaken.

In June important tests, which proved highly satisfactory, were made with the Marconi-Bellini-Tosi wireless direction finder. The apparatus was installed on board the s.s. *Royal George,* and during a voyage from Bristol to Montreal the liner, even in the thickest weather and without the aid of compass or sextant, was enabled to find her position when within a radius of about fifty miles of a land wireless station.

The record of progress and development in wireless telegraphy and telephony for 1914 stops abruptly with the outbreak of the European conflict. This was only to be expected, for in both neutral and belligerent countries research work on a large scale has been postponed and international co-operation in scientific investigation is almost at a standstill. War service work now engages the whole of the attention of those who in peace time would be engaged in progressive work, both scientific and commercial. It is common knowledge that extensive use is being made of wireless telegraphy in the present struggle, and no doubt such wide practical application of the new science under the most varied conditions will result in the collection of a great volume of data leading up to important progress after the close of the mighty conflict, when opportunities will again be afforded for peaceful pursuits and scientific research.

Hon. William Cox Redfield
United States Secretary of Commerce

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WIRELESS TELEGRAPH LAWS AND REGULATIONS

THE signing of the International Convention for the Safety of Life at Sea on January 20th, 1914, constituted a most noteworthy advance in the legislation relating to Wireless Telegraphy. The Convention was drawn up by an International Conference which met at London on November 12th, 1913, and laid down, *inter alia*, the minimum Wireless Telegraphy equipment to be carried by ships of different grades. For the purpose of defining the hours of service (*i.e.*, setting out the times when the various stations are to open for the receipt and transmission of messages) the Radiotelegraphic Convention, 1912, divided ship stations into three classes, but did not specify which vessels (by virtue of the services maintained on board) should be placed in the various classes. Under the provisions of the Safety of Life at Sea Convention which deal with Wireless Telegraphy these classes are clearly defined.

In order to give effect to this International Convention, the British Government has amended the laws relating to merchant ships by the Merchant Shipping (Convention) Act, 1914. Part III. of the Act deals with Wireless Telegraphy, and is reprinted under "*Great Britain*" in the "*Laws and Regulations*" section of this book. The Act was to have come into force on July 1st, 1915, but it is possible that this date may be altered in view of recent occurrences.

Legislation relating to Wireless Telegraphy does not date back further than the year 1903, although four years earlier (in 1899) the Marconi system had reached a point of development sufficiently advanced for the British Admiralty to think it desirable to obtain sets of the apparatus for trial, and two years later (in 1901) an agreement of a limited nature was entered into between the Admiralty and the Company for the supply of Marconi apparatus. In July, 1903, a further and more complete agreement was concluded. At that time the increasing use of Wireless Telegraphy for maritime purposes throughout the world had raised questions of international interest and circumstances had clearly demonstrated that international agreement was desirable with regard to many points dealing with the interchange of messages through the newly-established medium.

A conference met at Berlin in August, 1903, on the invitation of the German Government. As a result of that conference all the Powers, with the exception of Great Britain and Italy, agreed

to certain proposals, to be considered at a subsequent conference, for the international regulation of Wireless Telegraphy. The British delegates had been instructed to maintain an attitude of reserve owing to the position in which Wireless Telegraphy was placed in the United Kingdom, the fact being that in the state of the law at that time the Government had not sufficient control over Wireless Telegraphy to enable them to give effect to the provisions of the Convention. The Wireless Telegraphy Act, which was passed in 1904 for two years only, and which was renewed in 1906 without modification (and is still in force), prohibits the installation or working of wireless telegraph apparatus in the United Kingdom, or on board British ships, except under licence from the Postmaster-General. Its principal objects were, by means of systematic regulations, to make Wireless Telegraphy more useful for purposes of defence and general communication. The memorandum which was laid before the House of Commons in explanation of the Bill stated that the necessity for legislation depended, firstly, on the importance from the naval point of view of giving the Government control over wireless stations in time of war or emergency; and, secondly, on the desirability of placing the Government in such a position as to have the power of entering into an agreement on the subject with other countries if it should be found expedient to do so.

In October, 1906, a second International Conference was held in Berlin, and its primary objects may be classified under the following headings:—(1) The acceptance and transmission of telegrams. (2) The adoption of rules of working. (3) The provision of means of collecting charges and settling accounts between the different countries. (4) Arrangements for the publication of all information necessary for inter-communication. (5) Rules to prevent interference and confusion in working, with adequate provisions for enforcement. (6) Provision that, with certain exceptions, inter-communication must not be refused on account of the differences in the systems of Wireless Telegraphy employed.

The documents signed at Berlin on November 3rd, 1906, consisted of:—(*a*) The Convention; (*b*) the Additional Undertaking; (*c*) the Final Protocol; (*d*) the Service Regulations. These documents were revised at the London Convention held in 1912, and the Radiotelegraphic Convention which came into operation on July 1st, 1913, is printed *in extenso* in the following pages.

At the outbreak of the present war immediate steps were taken by the Governments of the belligerent countries to bring the use of Wireless Telegraphy under direct official control, and

all stations not operated under Government supervision were ordered by the respective Governments to be dismantled.

This action, as might well have been expected, did not stop at the belligerent countries, but extended to neutral Governments almost all over the world. It was necessary that steps should be taken by non-belligerent powers to ensure that their neutrality obligations were not violated by the utilisation of wireless stations in their territory for the transmission of communications of a non-neutral character. Consequently, almost all countries throughout the world issued special regulations relating to the use of Wireless Telegraphy; but as these regulations were all made with the same object in view they naturally differ but slightly from one another. In the section of this book devoted to Laws and Regulations the more important of these regulations have been reprinted.

The central agency established for the purpose of collecting and distributing information in accordance with the requirements of the International Radiotelegraphic Convention is commonly known as the "Berne Bureau." This is merely a branch of the Bureau of the International Telegraph Union, situated at Berne, in Switzerland. It possesses neither powers for initiating new regulations nor for dealing with those already existing; its functions are practically entirely confined to the collection and circulation of information.

Notwithstanding this, the International Bureau at Berne has become an organisation of supreme importance, thanks to the zealous, economical and efficient manner in which it is conducted. To this organisation is entrusted the work of preparing and circulating, in accordance with Article 13 of the Convention, particulars regarding every station located in countries adhering to the Convention, such as their names, nationality, geographical position, call signals, normal range, wave length, nature of service performed, hours open, etc.

The normal supplementary expenses resulting from the work of the International Bureau in connection with radiotelegraphy must not exceed 80,000 francs per annum. This sum, however, does not include any special expenditure such as would be necessitated by the holding of an International Conference. For the purpose of fixing their respective contributions towards the expenses, the governing bodies of the contracting States are divided into six classes, as set forth in Article 43 of the regulations.

The outbreak of war has necessitated the temporary suspension of the distribution of information by the "Berne Bureau."

INTERNATIONAL RADIO-TELEGRAPHIC CONVENTION

London, July 5th, 1912

International Radiotelegraphic Convention concluded between Great Britain and various British Colonies and Protectorates, the Union of South Africa, the Commonwealth of Australia, Canada, British India, New Zealand, Greece, Italy and the Italian Colonies, Germany and the German Protectorates, the United States of America and the Possessions of the United States of America, the Argentine Republic, Austria, Hungary, Bosnia-Herzegovina, Belgian Congo, Brazil, Bulgaria, Chili, Denmark, France and Algeria, French West Africa, French Equatorial Africa, Indo-China, Madagascar, Tunis, Japan and Chosen, Formosa, Japanese Sakhalin and the Leased Territory of Kwantung, Morocco, Monaco, Norway, the Netherlands, the Dutch Indies and the Colony of Curaçao, Persia, Portugal and the Portuguese Colonies, Roumania, Russia and the Russian Possessions and Protectorates, the Republic of San Marino, Siam, Sweden, Turkey and Uruguay.

The undersigned Plenipotentiaries of the Governments of the countries enumerated above, being assembled in Conference in London, have, by mutual consent, and subject to ratification, concluded the following Convention :—

ARTICLE 1.

The High Contracting Parties undertake to apply the provisions of the present Convention at all the radiotelegraph stations (coast stations and ship stations) which are established or worked by the Contracting Parties and open for the service of public correspondence between the land and ships at sea.

They undertake, moreover, to impose the observance of these provisions upon private enterprises authorised either to establish or to work radiotelegraphic coast stations open to the service of public correspondence between the land and ships at sea, or to establish or to work radiotelegraphic stations whether open for public correspondence or not on board the ships which carry their flag.

ARTICLE 2.

The term coast station means radiotelegraphic station established on land or on board any ship permanently anchored and used for the exchange of correspondence with ships at sea.

The term ship station means any radiotelegraphic station established on board a ship other than a permanently moored ship.

ARTICLE 3.

Coast stations and ship stations are bound to exchange radiotelegrams reciprocally without regard to the radiotelegraph system adopted by such stations.

Each ship station is bound to exchange radiotelegrams with any other ship station without distinction as to radiotelegraphic system adopted by such stations.

Nevertheless, in order not to impede scientific progress, the provisions of the present Article do not prevent the contingent employment of a radiotelegraphic system incapable of communicating with other systems, provided that such incapacity be due to the specific nature of such system and that it be not caused by devices adopted solely with the object of preventing intercommunication.

ARTICLE 4.

Notwithstanding the provisions of Article 3, a station may be appropriated to a restricted public service determined by the object of the correspondence or by other circumstances independent of the system employed.

ARTICLE 5.

Each of the High Contracting Parties undertakes to cause the coast stations to be connected with the telegraph system by means of special wires, or, at least, to take such other measures as will ensure a rapid exchange between the coast stations and the telegraph system.

ARTICLE 6.

The High Contracting Parties shall mutually notify one another of the names of the coast stations and ship stations covered by Article 1, as well as of all the particulars necessary to facilitate and accelerate the radiotelegraphic exchanges as specified in the Detailed Regulations.

ARTICLE 7.

Each of the High Contracting Parties reserves to itself the right to prescribe or to permit in the stations covered by

Article 1—independently of the installation of which the particulars are published conformable to Article 6—the installation and working of other arrangements designed for special radiotelegraphic transmission without publication of the details of such devices.

ARTICLE 8.

The working of radiotelegraphic stations shall be organised as far as possible in such a manner as not to interfere with the working of other stations of the kind.

ARTICLE 9.

Radiotelegraphic stations shall be obliged to accept with absolute priority calls of distress from whatever source, to reply in like manner to such calls, and to give the effect to them which they require.

ARTICLE 10.

The charge for a radiotelegram shall include, according to the circumstances :—

1. *(a)* The "coast charge" which accrues to the coast station.
   (*b*) The "ship charge" which accrues to the ship station.
2. The charge for transmission over the lines of the telegraph system, calculated in accordance with the ordinary rules.
3. The transit charges of the intermediate coast or ship stations and the charges appertaining to special services required by the sender.

The rate of the coast charge shall be subject to the approval of the Government to whose authority the coast station is subject, and the rate of the ship charge to the approval of the Government to which the ship belongs.

ARTICLE 11.

The provisions of the present Convention are completed by Detailed Regulations which have the same validity and come into force at the same time as the Convention.

The provisions of the present Convention and of the Regulations relating thereto may be modified at any time by mutual consent of the High Contracting Parties. Conferences of Plenipotentiaries having power to modify the Convention and the Regulations shall take place periodically; each Conference shall itself fix the place and time of the succeeding Conference.

ARTICLE 12.

These Conferences shall be composed of Delegates of the Governments of the Contracting Parties.

In the deliberations each country shall have one vote only.

If a Government adhere to the Convention for its colonies, possessions or protectorates, subsequent Conferences may determine that the whole or part of such colonies, possessions or protectorates is to be regarded as forming a country for the purposes of the foregoing clauses. But the number of votes to be exercised by a Government, including its colonies, possessions or protectorates, may not exceed six.

The following are regarded as forming a single country for the purposes of the present Article :—

The Union of South Africa.
The Australian Commonwealth.
Canada.
British India.
New Zealand.
German East Africa.
German South-West Africa.
The Cameroons.
Togoland.
The German Pacific Protectorates.
Alaska.
Hawaii and the other American possessions in Polynesia.
The Philippine Islands.
Porto Rico and the American possessions in the Antilles.
The zone of the Panama Canal.
The Belgian Congo.
The Spanish Colony of the Gulf of Guinea.
French West Africa.
French Equatorial Africa.
Indo-China.
Madagascar.
Tunisia.
Erythrea.
Italian Somaliland.
Chosen, Formosa, Japanese Sakhalin and the leased territory of Kwantung.
The Dutch Indies.
The Colony of Curaçao.
Portuguese West Africa.

Portuguese East Africa and the Portuguese possessions in Asia.
Russian Central Asia (littoral of the Caspian Sea).
Bokhara.
Khiva.
Western Siberia (littoral of the Arctic Ocean).
Eastern Siberia (littoral of the Pacific Ocean).

ARTICLE 13.

The International Bureau of the Telegraph Union shall be entrusted with the duty of collecting, co-ordinating, and publishing information of every kind relating to radiotelegraphy; of circulating in proper form proposals for the modification of the Convention, and of the Regulations; of notifying the changes adopted, and, generally, of carrying out any Administrative work which it may be called upon to undertake in the interests of International Radiotelegraphy.

The expenses of this institution shall be borne by all the Contracting Parties.

ARTICLE 14.

Each of the High Contracting Parties reserves to itself the right to fix the conditions under which it will admit radiotelegrams coming from or destined for a station, whether a ship station or a coast station, which is not subject to the provisions of the present Convention.

If a radiotelegram is admitted, the ordinary charges must be applied to it.

Every radiotelegram originating at a ship station and received by a coast station of the contracting country, or accepted in transit by the Administration of a contracting country, shall be sent forward.

Every radiotelegram intended for a ship shall also be sent forward if the Administration of the contracting country has accepted it from the sender, or if the Administration of a contracting country has accepted it in transit from a non-contracting country, subject to the right of the coast station to refuse transmission to a ship station belonging to a non-contracting country.

ARTICLE 15.

The provisions of the Articles 8 and 9 of this Convention are equally applicable to radiotelegraphic installations other than those indicated in Article 1.

ARTICLE 16.

Governments which have not taken part in the present Convention shall be allowed to become party to it at their own request.

Such adherence shall be notified through diplomatic channels to that one of the contracting Governments in whose territory the last Conference was held, and by that Government to the others.

Such adherence shall involve complete acceptance of all the clauses of the present Convention and admission to all the advantages stipulated therein.

The adherence to the Convention of the Government of a country having colonies, possessions, or protectorates shall not carry with it the adherence of the colonies, possessions, or protectorates of such Government, unless a declaration be made to that effect by such Government. These colonies, possessions, or protectorates as a whole, or each one of them separately, may form the subject of a separate adherence or of a separate denunciation under the conditions indicated in the present Article and in Article 22.

ARTICLE 17.

The provisions of Articles 1, 2, 3, 5, 6, 7, 8, 11, 12, and 17, of the International Telegraph Convention of St. Petersburg dated 10/22 July 1875 shall be applicable to International Radiotelegraphy.

ARTICLE 18.

In cases of difference of opinion between two or more contracting Governments concerning the interpretation or the execution either of the present Convention or of the Regulations provided for by Article 11, the question at issue may, by mutual consent, be submitted to arbitration. In that event each of the Governments concerned shall choose another not interested in the question.

The decision of the Arbitrators shall be made by an absolute majority of votes.

In the event of an equality of votes, the Arbitrators shall appoint, in order to settle the difficulty, another Contracting Government not concerned in the question in dispute. In default of an agreement with regard to such choice, each Arbitrator shall propose a Contracting Government not interested in the dispute; and lots shall be drawn as between the Governments proposed.

The drawing of lots shall be the prerogative of the Government in whose territory the International Bureau provided for in Article 13 performs its work.

ARTICLE 19.

The High Contracting Parties undertake to adopt or to propose to their respective legislatures the measures necessary to ensure the execution of the present Convention.

ARTICLE 20.

The High Contracting Powers shall communicate to one another such laws as may have been already enacted or which may be about to be so enacted in their countries, relating to the subject of the present Convention.

ARTICLE 21.

The High Contracting Parties maintain their entire liberty concerning the radiotelegraphic installations not covered by Article 1, and particularly with regard to naval and military installations, and also to stations carrying out communications between fixed points. All such installations and stations shall remain subject solely to the obligations provided for in Articles 8 and 9 of the present Convention.

Nevertheless when these installations and stations carry out an exchange of maritime public correspondence, they shall conform, in carrying out such service, to the requirements of the Regulations so far as concerns the method of transmission and accounting.

If, on the other hand, coast stations carry out, at the same time as public correspondence with ships at sea, communications between fixed points, they shall not be subject, in the execution of this latter service, to the provisions of the Convention, except as to the observance of Articles 8 and 9 of this Convention.

However, fixed stations which carry out correspondence between land and land must not refuse the exchange of radiotelegrams with another fixed station on account of the system adopted by such station; nevertheless, the liberty of each country shall remain complete in respect of the organisation of the service for correspondence between fixed points and the decision as to the correspondence to be carried out by the stations appropriated to such service.

ARTICLE 22.

The present Convention shall come into execution on and from the 1st of July 1913, and shall remain in force for an inde-

terminable period and until the expiry of one year from the day upon which it is denounced.

Denunciation shall only take effect as regards the Government in whose name it is made. So far as the other Contracting Parties are concerned, the Convention shall remain in force.

ARTICLE 23.

The present Convention shall be ratified, and the ratification thereof shall be deposited in London with as little delay as possible.

If one or more of the High Contracting Parties shall not ratify the Convention, it shall not be less valid thereby for the Parties which have ratified it.

In witness whereof the respective Plenipotentiaries have signed the Convention in a single copy, which shall remain deposited in the archives of the British Government, and of which a copy shall be sent to each Party.

London, the 5th of July, 1912.

FINAL PROTOCOL.

At the time of proceeding to the signature of the Convention adopted by the International Radiotelegraphic Conference of London, the undersigned Plenipotentiaries have agreed as follows :—

I.

The exact nature of the adherence notified on the part of Bosnia-Herzegovina not being yet determined, it is recognised that Bosnia-Herzegovina is entitled to a vote, a decision at a later date being necessary on the question whether this vote belongs to Bosnia-Herzegovina in virtue of the second paragraph of Article 12 of the Convention, or whether this vote is accorded to it conformably to the provisions of the third paragraph of that Article.

II.

The following declaration is placed on record :—

The Delegation of the United States declares that its Government is under the necessity of abstaining from all action with regard to tariffs, because the transmission of radiotelegrams as well as of telegrams in the United States is undertaken, wholly or in part, by commercial or private companies.

III.

The following declaration was also placed on record :—

The Government of Canada reserves to itself the right to fix

separately, for each of its coast stations, a total sea charge for radiotelegrams originating from North America and intended for any ship whatever, the coast charge amounting to three-fifths and the ship charge to two-fifths of such total charge.

In witness whereof the respective Plenipotentiaries have drawn up the present Final Protocol, which shall have the same force and the same validity as if the provisions thereof had been inserted in the text itself of the Convention to which it belongs, and they have signed it in a single copy which shall remain deposited in the archives of the British Government, and of which a copy shall be sent to each party.

London, the 5th of July, 1912.

SERVICE REGULATIONS ANNEXED TO THE INTERNATIONAL RADIOTELEGRAPHIC CONVENTION.

CONTENTS.

I.—ORGANISATION OF RADIOTELEGRAPHIC STATIONS.

1.

The choice of radiotelegraphic apparatus and devices to be used by coast stations and ship stations is free. The installation

of these stations must, as far as possible, be in keeping with scientific and technical progress.

II.

Two wave-lengths, one of 600 and the other of 300 metres, shall be admitted for the service of general public correspondence. Every coast station open to this service must be equipped in such a way as to be able to use these two wave-lengths, of which one shall be designated as the normal wave-length of the station. During the whole time that it is open every coast station must be in a position to receive calls made by means of its normal wave-length. Nevertheless, for the correspondence covered by paragraph 2 of Regulation XXXV., use shall be made of a wave-length of 1,800 metres. Further, each Government may authorise the use, in a coast station, of other wave-lengths for the purpose of securing a long-range service or a service other than that of general public correspondence, and established in conformity with the provisions of the Convention, with the reservation that these wave-lengths do not exceed 600 metres, or that they do exceed 1,600 metres.

In particular, stations used exclusively for the despatch of signals intended to determine the position of ships must not use wave-lengths exceeding 150 metres.

III.

1. Every ship station must be equipped in such a way as to be able to use the wave-lengths of 600 metres and of 300 metres. The first shall be the normal wave-length, and may not be exceeded in transmission, the case of Regulation XXXV. (paragraph 2) excepted.

Use may be made of other wave-lengths not exceeding 600 metres in special cases, and subject to the approval of the Administrations to which the coast stations and ship stations concerned are subject.

2. During the whole time that it is open every ship station must be able to receive calls made by means of its normal wave-length.

3. Ships of small tonnage, in the case of which it would be materially impossible to use the wave-length of 600 metres for transmission, may be authorised to employ exclusively the wave-length of 300 metres; they must be able to receive by means of the wave-length of 600 metres.

IV.

Communications between a coast station and a ship station, or between two ship stations, must be exchanged on both sides by means of the same wave-length. If, in a particular case, communication is difficult, the two stations may, by mutual consent, pass from the wave-length by means of which they are communicating to the other regulation wave-length. Both stations shall resume their normal wave-lengths when the radiotelegraphic exchange is finished.

V.

1. The International Bureau shall prepare, publish and revise periodically an official map showing the coast stations, their normal ranges, the principal lines of navigation, and the time normally taken by ships for the voyage between the various ports of call.

2. It shall draw up and publish a Nomenclature of the radiotelegraphic stations covered by Article I. of the Convention, and also periodical supplements for additions and modifications. This Nomenclature shall give, in the case of each station, the following information :—

1st.—For coast stations : the name, nationality, and geographical position indicated by the territorial sub-division and by the longitude and latitude of the place ; for ship stations : the name and nationality of the ships ; when the case arises, the name and address of the contractor.

2nd.—The call signal. (The call signals must be differentiated from one another, and each one must consist of a group of three letters.)

3rd.—The normal range.

4th.—The radiotelegraphic system with the characteristics of the system of discharge (musical sparks, tone expressed by the number of double vibrations, etc.).

5th.—The wave-lengths used (the normal wave-length to be underlined).

6th.—The nature of the services performed.

7th.—The hours of working.

8th.—When necessary the hour and method of despatch of time signals and meteorological telegrams.

9th.—The coast or ship charge.

3. There shall also be included in the Nomenclature such information relating to radiotelegraphic stations other than those

covered by Article 1 of the Convention, as shall be communicated to the International Bureau by the Administrations to which such stations are subject, provided that these are either Administrations which are parties to the Convention, or, if they are not parties to it, have made the declaration provided for in Regulation XLVIII.

4. The following notations shall be adopted in documents for the use of the international service to designate radiotelegraph stations :—

PG—station open for general public correspondence.
PR—station open for restricted public correspondence.
P—private station.
O—station open only for official correspondence.
N—station always open.
X—station not having fixed working hours.

5. The name of a ship station indicated in the first column of the Nomenclature must be followed, when there is duplication of the name, by the call-signal of such station.

VI.

The exchange of unnecessary signals and words is forbidden to the stations covered by Article 1 of the Convention. Experiments and practice shall not be allowed in these stations, except so far as they do not disturb the service of other stations.

Practice must be carried out with wave-lengths different from those allowed for public correspondence, and with the minimum of power necessary.

VII.

1. All stations are bound to exchange traffic with the minimum of energy necessary to ensure good communication.

2. Every coast and ship station must comply with the following conditions :—

(*a*) The waves emitted must be as pure and as little damped as possible.

In particular, the use of transmitting devices in which the production of the waves emitted is obtained by discharging the aerial direct by sparks (plain aerial) shall not be allowed except in cases of distress.

It may, however, be allowed in the case of certain special stations (for example those of small ships) in which the primary power does not exceed 50 watts.

(*b*) The apparatus must be capable of transmitting and

receiving at a speed at least equal to 20 words per minute, the word being reckoned at the rate of five letters.

New installations bringing into play an energy of more than 50 watts shall be equipped in such a way that it may be possible to obtain easily several ranges less than the normal range, the shortest being of approximately 15 nautical miles. Installations already established bringing into play an energy of more than 50 watts shall be transformed as far as possible in such a manner as to satisfy the foregoing requirements.

(*c*) Receiving apparatus must allow of receiving, with the greatest possible amount of protection from disturbance, transmissions made with the wave-lengths specified in present Regulations, up to 600 metres.

3. Stations serving solely for determining the position of ships (*radiophares*) must not operate over an area of greater radius than 30 nautical miles.

VIII.

Independently of the general conditions specified in Regulation VII., ship stations must also satisfy the following conditions :—

(*a*) The power transmitted to the radiotelegraphic apparatus, measured at the terminals of the generator of the station, must not under normal circumstances exceed one kilowatt.

(*b*) Subject to the provisions of Regulation XXXV., par. 2, a power exceeding one kilowatt may be used, if the ship is under the necessity of corresponding at a distance of more than 200 nautical miles from the nearest coast station, or if, in consequence of exceptional circumstances, communication cannot be realised except by means of an increase of power.

IX.

1. No ship station may be established or worked by private enterprise without a licence issued by the Government to which the ship is subject.

Stations on board ship having their port of register in a colony, possession, or protectorate may be described as being subject to the authority of such colony, possession, or protectorate.

2. Every ship station holding a licence issued by one of the contracting Governments must be regarded by the other Governments as having an installation fulfilling the conditions imposed by the present Regulations.

The competent authorities of the countries where the ship calls may demand the production of the licence. In default of such production, these authorities may ascertain whether the radiotelegraph installations of the ship satisfy the conditions imposed by the present Regulations.

When an Administration has practical evidence that a ship station is not fulfilling these conditions, it must, in every case, address a complaint to the Administration of the country to which the ship is subject. From that point onwards the procedure shall be, when necessary, as provided in Regulation XII., paragraph 2.

X.

1. The service of the ship station must be carried out by a telegraphist holding a certificate issued by the Government to which the ship is subject, or, in an emergency and for one voyage only, by another Government party to the convention.

2. There shall be two classes of certificates :

The first-class certificate shall state the professional qualifications of the operator with regard to :—

(*a*) the adjustment of the apparatus and knowledge of their working ;

(*b*) transmitting and receiving by ear, at a speed which must not be less than 20 words per minute.

(*c*) knowledge of the regulations applying to the exchange of radiotelegraphic communications.

The second-class certificate may be issued to a telegraphist who only attains to a speed in transmitting and receiving of 12 to 19 words per minute, but who fulfils the other conditions mentioned above. Telegraphists holding a second-class certificate may be allowed :—

(*a*) on ships only using radiotelegraphy for their own service and for the correspondence of the ship's company, in particular on fishing vessels ;

(*b*) on all ships as substitutes, provided that such ships have on board at least one operator holding a first-class certificate. Nevertheless, on ships placed in the first class indicated in Reg. XIII., the service must be carried

out by at least two telegraphists holding first-class certificates.

In ship stations, transmissions may only be made by a telegraphist holding a first or second-class certificate, an exception being made of cases of emergency, in which it would be impossible to conform to this provision.

3. Further, the certificate shall testify that the Government has placed the telegraphist under the obligation of preserving the secrecy of correspondence.

4. The radiotelegraph service of the ship station shall be placed under the supreme authority of the captain of the ship.

XI.

Ships provided with radiotelegraph installations and placed in the first two classes indicated in Reg. XIII. shall be bound to have emergency radiotelegraph installations of which all the parts shall be placed in conditions of the greatest safety possible, such conditions to be determined by the Government which issues the licence. These emergency installations must have at command a source of power of their own, must be capable of being set working speedily, must be able to work for six hours at least, and must have a minimum range of 80 nautical miles in the case of ships in the first class, and of 50 miles in the case of those of the second class. This emergency installation shall not be required in the case of ships whose ordinary installation fulfils the conditions of the present article.

XII.

1. If an Administration has information of a breach of the Convention or of the Regulations committed in one of the stations which it has authorised, it shall ascertain the facts and fix the responsibility.

In the case of ship stations, if the responsibility rests on the operator, the Administration shall take the necessary steps, and, if necessary, shall withdraw the certificate. If it is shown that the breach was due to the condition of the apparatus or to instructions given to the telegraphist, the same procedure shall be followed in respect of the licence issued to the ship.

2. In the event of repeated breaches by the same ship, if the representations made to the Administration to which the ship is subject, by another Administration, remain without effect, the latter shall have the right, after notice given, of authorising its coast stations not to accept communications coming from the ship

in question. In case of a difference between the two Administrations, the question shall be submitted to Arbitration on the request of one of the Governments concerned. The procedure is indicated in Article XVIII. of the Convention.

II.—HOURS OF SERVICE OF STATIONS.

XIII.

(a) *Coast Stations.*

1. The service of coast stations shall be, as far as possible, permanent, day and night, without interruptions.

Nevertheless certain coast stations may have a service of limited duration. Each Administration shall fix the hours of service.

2. Coast stations whose service is not permanent may not close before having transmitted all their radiotelegrams to the ships which are in their radius of action nor before having received from such ships all the radiotelegrams of which notice has been given. This provision shall also apply when ships notify their presence before work has actually ceased.

(b) *Ship Stations.*

3. Ship stations shall be placed in three classes:—

1st, stations always open;

2nd, stations having limited working hours;

3rd, stations having no fixed working hours.

During navigation, the following must remain permanently on the watch: 1st, ships of the first class; 2nd, those of the second class, during the hours that they are open for service; out of these hours, the latter stations must remain on the watch for the first 10 minutes of each hour. The stations of the third class are not bound to perform any regular "listening" service.

It shall fall to the Governments which issue the licences specified in Article IX. to fix the class in which the ship is to be placed, in respect of its obligations in the matter of keeping watch. This classification shall be mentioned in the licence.

III.—DRAWING UP AND HANDING IN OF RADIOTELEGRAMS.

XIV.

1. Radiotelegrams shall bear, as the first word of the preamble, the service instructions "radio."

2. In the transmission of radiotelegrams coming from a ship

at sea, the date and the hour of the handing in at the ship station shall be indicated in the preamble.

3. On forwarding over the telegraph system, the coast station shall insert, as the indication of the office of origin, the name of the ship of origin as it appears in the Nomenclature, and also, when the case arises, that of the last ship which served as an intermediary. These particulars shall be followed by the name of the coast station.

XV.

1. The address of radiotelegrams intended for ships must be as complete as possible. It shall be compulsorily drawn up as follows :—

(*a*) Name or title of the addressee, with supplementary particulars if necessary.

(*b*) Name of the ship, as it appears in the first column of the Nomenclature.

(*c*) Name of the coast station, as it appears in the Nomenclature.

Nevertheless the name of the ship may be replaced, at the risks and perils of the sender, by the particulars of the voyage taken by such ship and determined by the names of the ports of origin and destination or by any other equivalent particulars.

2. In the address, the name of the ship, as it appears in the first column of the Nomenclature, shall be counted in every case, and independently of its length, as one word.

3. Radiotelegrams drawn up by means of the International Signal Code shall be forwarded to their destination without being de-coded.

IV.—CHARGES.

XVI.

1. The coast charge and the ship charge shall be fixed in accordance with the tariff per word pure and simple, on the basis of a fair remuneration for radiotelegraphic work, with optional application of a minimum charge per radiotelegram.

The coast charge may not exceed 60 centimes per word, nor the ship charge 40 centimes per word. Nevertheless each Administration shall have the right to authorise coast and ship charges higher than these maxima in the case of stations having a range of more than 400 nautical miles, or if stations exceptionally onerous on account of the material conditions of their installation or working.

The optional minimum charge per radiotelegram may not exceed the coast or ship charge for a radiotelegram of 10 words.

2. In the case of radiotelegrams originating from or intended for a country or exchanged directly with the coast stations of that country, the charge applying to the transmission over the lines of the telegraph system must not exceed, on the average, that of the inland rate of that country.

This charge shall be reckoned per word pure and simple, with an optional minimum charge not exceeding the charge for 10 words. It shall be notified in francs by the Administration of the country to which the coast station is subject.

In the cases of countries in the European system, with the exception of Russia and Turkey, there shall only be a single charge for the territory of each country.

XVII.

1. When a radiotelegram originating from a ship and intended for *terra firma* passes through one or two ship stations, the charge shall include, in addition to those of the ship of origin, the coast station, and the telegraph system, the ship charge of each of the ships taking part in the transmission.

2. The sender of a radiotelegram originating from *terra firma* and intended for a ship may require that his message be transmitted by way of one or two ship stations; he shall deposit for this purpose the amount of the radiotelegraphic and telegraphic charges, and besides, as a deposit, a sum to be fixed by the office of origin with a view to the payment to the intermediate ship stations of the transit charges fixed in paragraph 1; he must further pay, as he may choose, either the charge for a telegram of five words or the cost of postage of a letter to be sent by the coast station to the office of origin giving the information necessary to the liquidation of the sum deposited.

The radiotelegram shall then be accepted at the risks and perils of the sender; it shall bear before the address the paid additional particulars "x retransmissions telegraphe" or "x retransmissions lettre" (x representing the number of retransmissions required by the sender) accordingly as the sender desires that the information necessary for the liquidation of the deposit be furnished by telegram or by letter.

3. The charge for radiotelegrams originating from a ship, intended for another ship, and sent by way of one or two intermediate coast stations, shall include:—

The ship charges of both ships, the charge of the coast

station or the two coast stations, as the case may be, and when necessary the telegraph charge appropriate to the transit between the two coast stations.

4. The charge for radiotelegrams exchanged between ships without the aid of a coast station includes the ship charges of the ship of origin and of the ship of destination, with the ship charges of the intermediate stations added thereto.

5. The coast and ship charges due to the stations of transit shall be the same as those fixed for such stations when these are stations of origin and destination. In no case shall they be collected more than once.

6. In the case of any intermediate coast station, the charge to be collected for the transit service shall be the highest of the coast charges appertaining to the direct exchange with the two ships in question.

XVIII.

The country in whose territory is established a coast station acting as intermediary for the exchange of radiotelegrams between a ship station and another country shall be regarded, for the purpose of applying telegraphic charges, as the country of origin or of destination of such radiotelegrams and not as the country of transit.

V.—COLLECTION OF CHARGES.

XIX.

1. The total charge for radiotelegrams shall be collected from the sender, with the exception—1st, of the cost of express delivery (Article LVIII., paragraph 1, of the Telegraph Regulations); 2nd, of the charges applying to inadmissible joinings or alterations of words noted by the office or station of destination (Article XIX., paragraph 9, of the Telegraph Regulations), these charges being collected from the addressee.

Ship stations must possess the necessary tariffs for this purpose. They shall have, however, the right to obtain information from coast stations with regard to charges for radiotelegrams for which they do not possess all the necessary information.

2. The counting of words by the office of origin shall be decisive in the case of radiotelegrams addressed to ships, and that of the ship station of origin shall be decisive in the case of radiotelegrams originating in ships, both for the purpose of transmission and for that of the international accounts. Nevertheless when the radiotelegram is worded wholly or in part either

in one of the languages of the country of destination, in the case of radiotelegrams originating in ships, or in one of the languages of the country to which the ship belongs, in the case of radiotelegrams addressed to ships, and when the radiotelegram contains joinings or alterations of words contrary to the common use of that language, the office or ship station of destination, as the case may be, shall have the right to recover from the addressee the amount of the charge not collected. In the case of a refusal to pay the radiotelegram may be withheld.

VI.—TRANSMISSION OF RADIOTELEGRAMS.

(a) *Signals of Transmission.*

XX.

The signals employed shall be those of the International Morse Code.

XXI.

Ships in distress shall make use of the following signal,

. . . — — — . . .

repeated at short intervals, followed by the necessary particulars.

As soon as a station hears the signal of distress, it must suspend all correspondence and must not resume the same until after it has made sure that the communication consequent upon the call for help is finished.

The stations which hear a call of distress must act according to indications given by the ship which makes the call, with regard to the order of messages or their cessation.

When, at the end of a series of distress calls, there is added the call signal of the particular station, the reply to the call is proper to that station only, unless that station does not reply. Failing the indication of a particular station in the call for help, every station that hears the call shall be bound to reply thereto.

XXII.

For the purpose of giving or asking information concerning the radiotelegraph service, stations must make use of the signals contained in the list appended to the present Regulations. (See p. 72.)

(b) *Order of Transmission.*

XXIII.

Between two stations, radiotelegrams of the same class shall be transmitted singly in alternate order or by series of several radiotelegrams, according to the instructions given by the coast

station, on condition that the duration of the transmission of each series do not exceed 15 minutes.

(c) *Calling of Stations and Transmission of Radiotelegrams.*

XXIV.

1. As a general rule, it shall be the ship station that calls the coast station, whether it has radiotelegrams to transmit or not.

2. In waters where the radiotelegraphic traffic is congested (the Channel, etc.), the call of a ship to a coast station may not, as a general rule, be made unless the latter is within the normal range of the ship station and the ship station has approached to a distance less than 75 per cent. of the normal range of the coast station.

3. Before proceeding to make a call, the coast station or the ship station must adjust its receiving system to the highest possible degree of sensitiveness, and must make sure that no other communication is being made within its radius of action; if it is otherwise, it shall await the first break, unless it finds that its call is not likely to disturb the communication in progress. The same applies when the station wishes to answer a call.

4. For making a call, every station shall use the normal wave of the station to be called.

5. If, in spite of these precautions, a radiotelegraphic transmission be impeded, the call must cease on the first request made by a coast station open to public correspondence. This station must then indicate the approximate duration of the wait.

6. The ship station must make known to each coast station to which it has notified its presence the time at which it proposes to cease its operations, and also the probable duration of the interruption.

XXV.

1. The call comprises the signal — . — . —, the call signal of the station called, sent three times, and the word "de," followed by the call signal of the sending station, sent three times.

2. The station called shall reply by giving the signal — . — . —, followed by the call signal, sent three times, of the calling station, by the word "de" its own call signal and the signal — . —

3. Stations which wish to enter into communication with ships, without, however, knowing the names of those ships which are within their radius of action, may use the signal

— . — . — — . — (signal of enquiry). The provisions of paragraphs 1 and 2 are also applicable to the transmission of the signal of enquiry and to the reply to that signal.

XXVI.

If a station when called does not reply when the call (Regulation XXV.) has been sent three times at intervals of 2 minutes, the call may not be resumed until after an interval of 15 minutes, the station making the call first making sure of the fact that no radiotelegraphic communication is in progress.

XXVII.

Every station which has to make a transmission necessitating the use of high power shall first send out three times the warning signal — — . . — —, with the minimum of power necessary to reach the neighbouring stations. It shall not then begin to transmit with the high power until 30 seconds after sending the warning signal.

XXVIII.

1. As soon as the coast station has replied, the ship station shall furnish it with the following information if it has messages to transmit to it; this information shall also be given when the coast stations ask for it:—

(*a*) The approximate distance, in nautical miles, of the vessel from the coast station;

(*b*) The position of the ship given in a concise form and adapted to the circumstances of the individual case;

(*c*) The next port at which the ship will touch;

(*d*) The number of radiotelegrams if they are of normal length or the number of words if the messages are of exceptional length.

The speed of the ship in nautical miles shall be given specially at the express request of the coast station.

2. The coast station shall reply giving, as provided in paragraph 1, either the number of telegrams or the number of words to be transmitted to the ship and also the order of transmission.

3. If transmission cannot take place immediately the coast station shall inform the ship station of the approximate length of the wait.

4. If a ship station when called cannot receive for the moment it shall inform the calling station of the approximate length of the wait.

5. In the case of exchanges between two ship stations it shall rest with the station called to fix the order of transmission.

XXIX.

When a coast station is called by several ship stations, it shall decide the order in which these stations shall be allowed to exchange their messages.

In the regulation of this order, the coast station shall be guided solely by the necessity for allowing every station concerned to exchange the greatest possible number of radiotelegrams.

XXX.

Before beginning to exchange correspondence, the coast station shall inform the ship station whether the transmission is to be made in alternate order by series (Regulation XXIII.); it shall then begin to transmit, or shall follow up these instructions by the signal — . —

XXXI.

The transmission of a radiotelegram shall be preceded by the signal — . — . — and ended by the signal . — . — . followed by the call signal of the sending station and by the signal — . —

In the case of a series of radiotelegrams, the call-letter of the sending station and the signal — . — shall only be given at the end of the series.

XXXII.

When the radiotelegram to be transmitted contains more than 40 words, the sending station shall interrupt the transmission by the signal . . — — . . after each series of 20 words or thereabouts, and it shall not resume transmission until after having obtained from the station in correspondence the repetition of the last word clearly received, followed by the said signal, or, if the reception is clear, the signal — . —

In the case of transmission in series, the acknowledgment of receipt shall be given after each radiotelegram.

Coast stations engaged in transmitting long radiotelegrams must suspend transmission at the end of each period of 15 minutes, and must remain silent during a period of 3 minutes before continuing transmission.

Coast and ship stations which work in the conditions laid down in Regulation XXXV., paragraph 2, must suspend work at the end of each period of 15 minutes, and keep watch on the wave-length

of 600 metres during a period of 3 minutes before continuing transmission.

XXXIII.

1. When the signals become doubtful, all possible resources must be drawn upon to accomplish transmission. To this end, the radiotelegram shall be transmitted three times at most, at the request of the receiving station. If in spite of this triple transmission the signals are still unintelligible, the radiotelegram shall be cancelled.

If the acknowledgment of receipt does not come to hand, the sending station shall again call the station with which it is in correspondence. When no reply is made after three calls, the transmission shall not be persevered with. In such case, the sending station shall have the right to obtain the acknowledgment of receipt through the medium of another radiotelegraph station, using, when necessary, the lines of the telegraph system.

2. If the receiving station considers that, in spite of defective receiving, the radiotelegram can be delivered, it shall insert at the end of the preamble the service advice "Reception douteuse" and shall forward the radiotelegram. In such case, the Administration to which the coast station is subject shall claim the charges, in conformity with Clause XLII. of the present Regulations. Nevertheless, if the ship station later on transmits the radiotelegram to another coast station of the same Administration, the latter can only claim the charges appertaining to a single transmission.

(d) *Acknowledgment of Receipt and End of Work.*

XXXIV.

1. The acknowledgment of receipt shall be given in the form prescribed by the International Telegraph Regulations; it shall be preceded by the call signal of the sending station and followed by the call signal of the receiving station.

2. The end of the work between two stations shall be indicated by each one of them by means of the signal . . . — . — followed by its own call signal.

(e) *Route to be taken by Radiotelegrams.*

XXXV.

1. As a general principle, the ship station shall transmit its radiotelegrams to the nearest coast station.

However, if the ship station has the choice between several coast stations at equal or nearly equal distances, it shall give

the preference to that which is established on the territory of the country of destination or of normal transit of its radiotelegrams.

2. Nevertheless, a sender on board a ship shall have the right to indicate the coast station by which he wishes his radiotelegram to be forwarded. The ship station shall then wait until this coast station is the nearest.

Exceptionally, transmission may be made to a more distant coast station, provided :—

(*a*) that the radiotelegram is intended for the country in which such coast station is situated and that it comes from a ship subject to that country;

(*b*) that for calls and transmission both stations use a wave length of 1,800 metres;

(*c*) that transmission by this wave-length does not disturb any transmission made, by means of the same wave-length, by a nearer coast station;

(*d*) that the ship station is more than 50 nautical miles distant from any coast station shown in the Nomenclature. The distance of 50 miles may be reduced to 25 miles, subject to the reservation that the maximum power at the terminals of the generator do not exceed 5 kilowatts and that the ship stations be established in conformity with Regulations VII. and VIII. This reduction of distance shall not apply in the seas, bays or gulfs of which the shores belong to one country only and of which the opening to the high sea is less than 100 miles wide.

VII.—DELIVERY OF RADIOTELEGRAMS.

XXXVI.

When for any cause whatsoever a radiotelegram coming from a ship at sea and intended for *terra firma* cannot be delivered to the addressee an advice of non-delivery shall be sent out. This advice shall be transmitted to the coast station which received the original radiotelegram. The latter, after verifying the address, shall forward the advice to the ship, if possible, and, if need be, by way of another coast station of the same country or of a neighbouring country.

When a radiotelegram, having arrived at the ship station, cannot be delivered, that station shall inform the office or ship station of origin by means of a service advice. In the case of radiotelegrams coming from *terra firma* this advice shall be trans-

mitted, whenever possible, to the coast station by way of which the radiotelegram passed, or, if necessary, to another coast station of the same country or of a neighbouring country.

XXXVII.

If the ship to which the radiotelegram is addressed has not notified its presence to the coast station within the time specified by the sender, or, in the absence of such specification, up to the morning of the eighth day following, such coast station shall give notice of the fact to the office of origin, which shall inform the sender of the same.

This latter shall have the option of requiring by paid service advice, telegraphic or postal, addressed to the coast station, that his radiotelegram be kept for a fresh period of nine days, for transmission to the ship, and so on. In the absence of such request the radiotelegram shall be returned as undelivered at the end of the ninth day (the day of handing in not to be included).

However, if the coast station is sure that the ship has left its radius of action before the station could have transmitted the radiotelegram to it, such station shall immediately inform the office of origin, which shall without delay advise the sender of the cancellation of the message. Nevertheless, the sender may, by paid service advice, request the coast station to transmit the radiotelegram when the ship next passes.

VIII.—SPECIAL RADIOTELEGRAMS.

XXXVIII.

The following only shall be allowed :—

1st, *Reply Paid Radiotelegrams.*—These radiotelegrams shall bear, before the address, the indication, " Réponse payée," or " RP," completed by the mention of the amount paid in advance for the reply—for example : " Réponse payée fr. x," or " RP, fr. x."

The reply voucher issued on board a ship shall give the right to send, up to the limit of its value, a radiotelegram to any address whatever from the ship station which issues such voucher.

2nd, *Collated Radiotelegrams.*

3rd, *Express Delivery Radiotelegrams.*—But only in cases in which the amount of the cost of express delivery is collected from the addressee. The countries which cannot adopt these radiotelegrams must notify the fact to the International Bureau. Radiotelegrams for express delivery, with collection of the cost from the sender, may be allowed when they are intended for the

country in whose territory the corresponding coast station is situated.

4th, *Radiotelegrams for Delivery by Post.*

5th, *Multiple Radiotelegrams.*

6th, *Radiotelegrams with Acknowledgment of Receipt.*—But only with regard to notification of the date and time at which the coast station has transmitted to the ship station the telegram addressed to the latter.

7th, *Paid Service Advices.*—Except those asking for repetition of information. Nevertheless, all paid service advices shall be allowed on the route over the telegraph lines.

8th, *Urgent Radiotelegrams.*—But only in transmission over the telegraph lines, and subject to the application of the International Telegraph Regulations.

XXXIX.

Radiotelegrams may be transmitted by a coast station to a ship, or by a ship to another ship, with the object of being forwarded by post, the posting to take place from a port of call of the receiving ship.

The address of these radiotelegrams must be drawn up as follows :—

1st, Paid instruction "poste," followed by the name of the port where the radiotelegram is to be posted;

2nd, Full name and address of the addressee;

3rd, Name of the ship station which is to carry out the posting;

4th, When necessary, name of the coast station.

Example: Poste Buenos Aires, Martinez, 14 Calle Prat, Valparaiso, Avon Lizard.

The charge shall include, as well as the radiotelegraph and telegraph charges, a sum of 25 centimes for the postage of the radiotelegram.

IX.—ARCHIVES.

XL.

The originals of radiotelegrams, as well as the documents relating thereto, retained by the Administrations, shall be kept with all necessary precautions in respect of secrecy for at least fifteen months, counting from the month following that in which the radiotelegrams were handed in.

These originals and documents shall be sent, as far as

possible, at least once a month by the ship stations to the Administrations to which they are subject.

X.—REFUNDS AND REIMBURSEMENTS.

XLI.

With regard to refunds and reimbursements, the provisions of the International Telegraph Regulations shall apply, bearing in mind the restrictions laid down in Clauses XXXVIII. and XXXIX. of the present Regulations and subject to the following reservations :—

The time occupied in radiotelegraphic transmission, and also the time during which the radiotelegram remains at the coast station in the case of radiotelegrams addressed to ships, or in the ship station in the case of radiotelegrams originating in ships, shall not be counted in the period of delay giving rise to refunds and reimbursements.

If the coast station informs the office of origin that a radiotelegram cannot be transmitted to the ship to which it is addressed, the Administration of the country of origin shall immediately initiate the reimbursement to the sender of the coast and ship charges in respect of such radiotelegram. In this case, the charges reimbursed shall not appear in the account for which provision is made by Regulation XLII., but the radiotelegram shall be mentioned therein as a memorandum.

Reimbursements shall be borne by the various Administrations and private enterprises which have taken part in the forwarding of the radiotelegram, each one of them relinquishing its share of the charge. Nevertheless, radiotelegrams falling under the provision of Articles VII. and VIII. of the Convention of St. Petersburg shall remain subject to the provisions of the International Telegraph Regulations, except when it is due to an error of service that such radiotelegrams have been accepted.

When the acknowledgment of receipt of a radiotelegram has not reached the station which transmitted the message, the charge shall not be refunded until it has been proved that the radiotelegram is one which gives occasion for reimbursement.

XI.—ACCOUNTING.

XLII.

1. Coast and ship charges shall not be entered in the accounts provided for by the International Telegraph Regulations.

The accounts relating to these charges shall be settled by the Administrations of the countries concerned. They shall be pre-

pared by the Administrations to which the coast stations belong, and communicated by them to the Administrations concerned. In cases in which the working of the coast stations is independent of the Administration of the country, the person working these stations may be substituted in respect of accounts for the Administration of such country.

2. As to transmission over the lines of the telegraph system the radiotelegram shall be treated in respect of accounts in conformity with the Telegraph Regulations.

3. In the case of radiotelegrams originating from ships the Administration to which the coast station is subject shall debit the Administration to which the ship station of origin is subject with the coast and ordinary telegraph charges, the total charges collected for prepaid replies, the coast and telegraph charges collected for collations, the charges appertaining to express delivery (in the case provided for in Regulation XXXVIII.) or delivery by post, and with those collected for supplementary copies (TM). The Administration to which the coast station is subject shall credit, when the case arises, through the channel of the telegraph accounts and through the medium of the offices which have taken part in the transmission of the radiotelegrams, the Administration to which the office of destination is subject with the total charges relating to prepaid replies. With regard to telegraph charges and charges relating to express delivery or delivery by post, and to supplementary copies, the procedure shall be in conformity with the telegraph regulations, the coast station being regarded as the telegraph office of origin.

In the case of radiotelegrams intended for a country lying beyond that to which the coast station belongs, the telegraph charges to be liquidated conformably to the above provisions are those which arise either from tables "A" and "B" appended to the International Telegraph Regulations or from special arrangements concluded between the Administrations of adjoining countries, and published by those Administrations, and not the charges which might be made under the special provisions of Regulations XXIII. (paragraph 1) and XXVII. (paragraph 1) of the Telegraph Regulations.

In the case of radiotelegrams and paid-service advices addressed to ships, the Administration to which the office of origin is subject shall be debited directly by that to which the coast station is subject with the coast and ship charges. Nevertheless,

the total charges appertaining to prepaid replies shall be credited, if there is occasion, from country to country through the channel of the telegraph accounts, until they reach the Administration to which the coast station is subject. In respect of the telegraph charges and charges relating to delivery by post and for supplementary copies, the procedure shall be in conformity with the telegraph regulations. The Administration to which the coast station is subject shall credit that to which the ship of destination is subject with the ship charge, if there is occasion, with the charges belonging to the intermediate ship stations, with the total charge collected for prepaid replies, with the ship charge relating to collation, and also with the charges made for preparing supplementary copies and for delivery by post.

The paid service advices, and the prepaid replies themselves, shall be treated, in the radiotelegraph accounts, in all respects like other radiotelegrams.

In the case of radiotelegrams forwarded by means of one or two intermediate ship stations, each of the latter shall debit the ship station of origin, if the radiotelegram is one coming from a ship, or the ship station of destination if the radiotelegram is one intended for a ship, with the ship charge due to it for transit.

4. In principle the settlement of account appertaining to exchanges between ship stations shall be made directly as between the companies working those stations, the station of origin being debited by the station of destination.

5. The monthly accounts serving as a basis for the special accounting in respect of radiotelegrams shall be drawn up radiotelegram by radiotelegram, with all necessary particulars, and within a period of six months counting from the month to which they belong.

6. The Governments reserve to themselves the option of making between themselves and with private companies (contractors working radiotelegraphic stations, shipping companies, etc.) special arrangements with a view to the adoption of other provisions respecting accounts.

XII.—INTERNATIONAL BUREAU.

XLIII.

The supplementary expenses resulting from the work of the International Bureau in connection with radiotelegraphy must not exceed 80,000 fcs. per annum, not including special expenses to which the meeting of an International Conference gives rise.

The Administrations of the contracting States shall be, for purposes of contribution towards the expenses, divided into six classes as follows :—

1st Class.—Union of South Africa, Germany, United States of America, Alaska, Hawaii, and the other American possessions in Polynesia, the Philippine Islands, Porto Rico and the American possessions in the Antilles, the zone of the Panama Canal, the Argentine Republic, Australia, Austria, Brazil, Canada, France, Great Britain, Hungary, British India, Italy, Japan, New Zealand, Russia, Turkey.

2nd Class.—Spain.

3rd Class.—Russian Central Asia (littoral of the Caspian Sea), Belgium, Chili, Chosen, Formosa, Japanese Sakhalin and the leased territory of Kwantung, Dutch Indies, Norway, Holland, Portugal, Roumania, Western Siberia (littoral of the Arctic Ocean), Eastern Siberia (littoral of the Pacific Ocean), Sweden.

4th Class.—German East Africa, German South-West Africa, The Cameroons, Togoland, German Pacific Protectorates, Denmark, Egypt, Indo-China, Mexico, Siam, Uruguay.

5th Class.—French West Africa, Bosnia-Herzegovina, Bulgaria, Greece, Madagascar, Tunis.

6th Class.—French Equatorial Africa, Portuguese West Africa, Portuguese East Africa and the Portuguese possessions in Asia, Bokhara, the Belgian Congo, the Colony of Curaçao, the Spanish Colony of the Gulf of Guinea, Erythrea, Khiva, Morocco, Monaco, Persia, San Marino, Italian Somaliland.

XLIV.

The various Administrations shall forward to the International Bureau a form modelled on that hereto appended (see pp. 71 and 72) and containing the particulars enumerated in the form with regard to the stations covered by Clause V. of the Regulations. Any modifications which may take place and additions shall be communicated by the Administrations to the International Bureau from the 1st to the 10th of each month. With the help of these communications the International Bureau will draw up the Nomenclature provided for by Regulation V. The Nomenclature shall be distributed to the Administrations concerned. It may also, with the supplements relating thereto, be sold to the public at cost price.

The International Bureau shall take care that the adoption of identical call signals for radiotelegraph stations be avoided.

XIII. — METEOROLOGICAL TRANSMISSIONS, TIME SIGNALS, AND OTHER TRANSMISSIONS.

XLV.

1. The Administrations shall take the necessary steps to supply their coast stations with meteorological telegrams containing the particulars of interest to the district of such stations. These telegrams, the text of which must not exceed twenty words, shall be sent to the ships which ask for them. The charge for these meteorological telegrams shall be carried to the account of the ships to which they are addressed.

2. The meteorological observations, made by certain ships appointed for that purpose by the country to which they belong, may be sent once a day as paid service advices to the coast stations authorised to receive them by the Administrations concerned, who shall also appoint the meteorological offices to which these observations shall be addressed by the coast station.

3. Time signals and meteorological telegrams shall be transmitted in succession one to another in such a way that the total duration of their transmission does not exceed ten minutes. In principle, while they are being sent, all radiotelegraph stations, transmission by which might disturb the reception of these signals and telegrams, shall keep silent so as to allow all stations which desire to do so to receive these telegrams and signals. Exception shall be made in the case of distress calls and State telegrams.

4. The Administrations shall facilitate the communication to the marine information agencies which they may appoint of the information respecting wrecks and casualties at sea, or presenting a general interest for navigation, which the coast stations can communicate regularly.

XIV.—MISCELLANEOUS PROVISIONS.

XLVI.

Transmission exchanged between ship stations must be carried out in such a way as not to interfere with the service of coast stations, as the latter must have, as a general rule, right of priority for public correspondence.

XLVII.

Coast stations and ship stations shall be bound to take part in the retransmission of radiotelegrams in cases in which com-

munication cannot be established directly between the stations of origin and destination.

Nevertheless, the number of transmissions shall be limited to two.

In the case of radiotelegrams intended for *terra firma* use may only be made of retransmissions to reach the nearest coast station.

Retransmission shall be in all cases subject to the condition that the intermediate station which receives the radiotelegram in transit is in a position to send it on.

XLVIII.

If the transmission of a radiotelegram is carried out partly on the telegraph lines or through radiotelegraph stations belonging to a non-contracting Government, such radiotelegram may be sent forward, subject to the reservation that at least the Administrations to which these lines or stations belong shall have declared that they are willing to apply, when the case arises, the provisions of the Convention and of the Regulations, which are indispensable, in order that radiotelegrams may be regularly forwarded, and that accounting may be assured.

Such declaration shall be made to the International Bureau, and brought to the knowledge of the offices of the Telegraph Union.

XLIX.

The modifications of the present Regulations which may be rendered necessary in consequence of the decisions of future Telegraph Conferences shall come into force on the date fixed for the application of the provisions decided upon by each one of these later Conferences.

L.

The provisions of the International Telegraph Regulations shall apply by analogy to radiotelegraph correspondence in so far as they are not contrary to the provisions of the present Regulations.

The following in particular apply to radiotelegraph correspondence :—

The provisions of Article XXVII., paragraphs 3 to 6, of the Telegraph Regulations referring to the collection of charges; those of Articles XXXVI. and XLI. referring to the indication of the route to be taken; those of Articles LXXV., paragraph 1, LXXVIII., paragraphs 2 to 4, and LXXIX., para-

E. T. Chamberlain

United States Commissioner of Navigation.

See Biographical Notices, page 755.

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graphs 2 to 4, relating to preparing of accounts. Nevertheless, first, the period of six months provided by paragraph 2 of Article LXXIX. of the Telegraph Regulations for the verification of accounts is extended to nine months in the case of radiotelegrams; second, the provisions of Article XVI., paragraph 2, are not considered as authorising the free transmission by radiotelegraph stations of service telegrams relating exclusively to the telegraph service, nor the free transmission over the lines of the telegraph system of service telegrams relating exclusively to the radiotelegraph service; third, the provisions of Article LXXIX., paragraphs 3 and 5, do not apply to radiotelegraph accounting. For the purposes of applying the provisions of the Telegraph Regulations coast stations shall be regarded as offices of transit, except when the Radiotelegraphic Regulations stipulate expressly that these stations are to be considered as offices of origin or destination

Conformable to Article II. of the Convention of London the present regulations will come into force on the 1st of July, 1913.

In witness whereof the respective Plenipotentiaries have signed these Regulations on a single copy, which will remain deposited in the archives of the British Government, and of which a copy will be sent to each party.

APPENDIX

I.

Table referred to in Regulation XLIV. (p. 68).

(*a*) Coast Stations

Name.	Nationality.	Geographical Position. E=East longitude; O=West longitude; N=North latitude; S=South latitude. Territorial subdivisions.	Call Signal.	Normal Range in Nautical Miles.	Radiotelegraph System, with the characteristics of the System of emission.	Wave-lengths in metres (the normal wave-length is underlined).	Nature of Services effected.	Working hours (Time according to the Meridian).	Coast Charge.		*Observations* (if occasion, Time and Method of sending Time-Signals and Meteorological Telegrams).
									Per Word in Francs.	Minimum per Radiotelegram in Francs.	

(*b*) SHIP STATIONS.

Name.	Nationality.	Call Signal.	Normal Range in Nautical Miles.	Radiotelegraph System, with the characteristics of the System of emission.	Wave-lengths in Metres.

Nature of Services effected.	Working Hours.	Ship Charge.		*Observations* (if occasion, Name and Address of the person working the Station).
		Per Word in Francs.	Minimum per Radiotelegram in Francs.	

1° WARSHIPS.

2° MERCHANT SHIPS.

II.

LIST OF ABBREVIATIONS TO BE USED IN RADIOTELEGRAPH TRANSMISSIONS (referred to in Article XXII, p. 57).

Abbreviation. 1.	Question. 2.	Answer or Advice. 3.
—.—.	——.— (CQ)	Inquiry signal employed by a station which desires to correspond.
—.—.	(TR)	Signal announcing the sending of indications concerning a ship station (article XXVIII).
——..——	—(!)	Signal indicating that a station is about to send with high power.
PRB	Do you wish to communicate with my station by means of the International Signal Code ?	I wish to communicate with your station by means of International Signal Code.
QRA	What is the name of your station ?	This station is ....
QRB	How far are you from my station ?	The distance between our stations is .... nautical miles.
QRC	What are your true bearings ? ..	My true bearings are .... degrees.
QRD	Where are you bound ?	I am bound for ....
QRF	Where are you coming from ? ..	I am coming from ....
QRG	To what company or line of navigation do you belong ?	I belong to ....
QRH	What is your wave-length ? ..	My wave-length is .... metres.
QRJ	How many words have you to transmit ?	I have .... words to transmit.
QRK	How are you receiving ?	I am receiving well.
QRL	Are you receiving badly ? Shall I transmit 20 times ...—. so that you can adjust your apparatus ?	I am receiving badly. Transmit 20 times ...—. so that I can adjust my apparatus.
QRM	Are you disturbed ?	I am disturbed.
QRN	Are the atmospherics very strong	The atmospherics are very strong.
QRO	Shall I increase my power ? ..	Increase your power.
QRP	Shall I decrease my power ? ..	Decrease your power.
QRQ	Shall I transmit faster ?	Transmit faster.
QRS	Shall I transmit more slowly ? ..	Transmit more slowly.
QRT	Shall I stop transmitting ?	Stop transmitting.
QRU	Have you anything for me ? ..	I have nothing for you.
QRV	Are you ready ?	I am ready. All is in order.
QRW	Are you busy ?	I am busy with another station (or with .... please do not interrupt).

QRX	Shall I wait?	Wait. I will call you at .... o'clock (or when I want you).
QRY	What is my turn?	Your turn is No. ....
QRZ	Are my signals weak?	Your signals are weak.
QSA	Are my signals strong?	Your signals are strong.
QSB	Is my tone bad?	The tone is bad.
	Is my spark bad?	The spark is bad.
QSC	Is the spacing bad?	The spacing is bad.
QSD	Let us compare watches. My time is .... What is your time?	The time is ....
QSF	Are the radiotelegrams to be transmitted alternately or in series?	Transmission will be in alternate order.
QSG	—	Transmission will be in series of five radiotelegrams.
QSH	—	Transmission will be in series of ten radiotelegrams.
QSJ	What is the charge to collect for .... ?	The charge to collect is ....
QSK	Is the last radiotelegram cancelled?	The last radiotelegram is cancelled.
QSL	Have you got the receipt?	Please give a receipt.
QSM	What is your true course?	My true course is .... degrees.
QSN	Are you communicating with land?	I am not communicating with land.
QSO	Are you in communication with another station (or with ....)?	I am in communication with .... (through the medium of ....).
QSP	Shall I signal to .... that you are calling him?	Inform .... that I am calling him.
QSQ	Am I being called by .... ? ..	You are being called by ....
QSR	Will you dispatch the radiotelegram?	I will forward the radiotelegram.
QST	Have you received a general call? ..	General call to all stations.
QSU	Please call me when you have finished (or at .... o'clock)	I will call you when I have finished.
QSV	Is public correspondence engaged?	Public correspondence is engaged. Please do not interrupt.
QSW	Must I increase the frequency of my spark?	Increase the frequency of your spark.
QSY	Shall I transmit with a wave-length of .... metres?	Let us transfer to the wave-length of .... metres.
QSX	Must I diminish the frequency of my spark?	Diminish the frequency of your spark.

When an abbreviation is followed by a mark of interrogation it applies to the question indicated in respect of that abbreviation.

EXAMPLES.

Station.		
A	QRA?	What is the name of your station?
B	QRA Campania	This is the Campania.
A	QRG?	To what company or line of navigation do you belong?
B	QRG Cunard. QRZ	I belong to the Cunard Line. Your signals are weak.

Station A then increases the power of its transmitter and sends:

A	QRK?	How are you receiving?
B	QRK	I am receiving well.
	QRB 80	The distance between our stations is 80 nautical miles.
	QRC 62	My true bearings are 62 degrees, etc.

INTERNATIONAL CONVENTION
ON
SAFETY OF LIFE AT SEA

London, January 20, 1914.

THE London International Conference on the Safety of Life at Sea, by which the Convention signed on January 20th, 1914, has been drawn up, met for the first time on November 12th, 1913, at the Foreign Office, London. The suggestion that such a Conference should be held emanated from the German Emperor, and the task of convening it was undertaken by the British Government. The following States were represented:—Great Britain, Germany, the United States, Australia, Austria-Hungary, Belgium, Canada, Denmark, Spain, France, Italy, Japan, Norway, the Netherlands, Russia, Sweden, and New Zealand. The delegations from the different States were composed, not of the representatives of the shipping trade, but of administrators, experts and jurists.

Lord Mersey was appointed Chairman of the Conference. To deal with the specific subjects submitted to it the Conference appointed five sub-committees, together with a sixth sub-committee for drafting the Convention, which was to embody the recommendations of the Committees as approved by the whole Conference.

The Convention contains 74 Articles, of which we present below the articles governing the use of wireless telegraphy:—

Chapter I.—Safety of Life at Sea.

Article 1.—The High Contracting Parties undertake to give effect to the provisions of this Convention, for the purpose of securing safety of life at sea, to promulgate all regulations and to take all steps which may be necessary to give the Convention full and complete effect.

The provisions of this Convention are completed by Regulations which have the same force and take effect at the same time as the Convention. Every reference to the Convention implies at the same time a reference to the Regulations annexed thereto.

CHAPTER II.—SHIPS TO WHICH THIS CONVENTION APPLIES.

Article 2.—Except where otherwise provided by this Convention, the merchant ships of any of the States of the High Contracting Parties, which are mechanically propelled, which carry more than 12 passengers, and which proceed from a port of one of the said States to a port situated outside that State, or conversely, are subject to the provisions of this Convention. Ports situated in the Colonies, Possessions, or Protectorates of the High Contracting Parties are considered to be ports outside the States of the High Contracting Parties.

Persons who are on board by reason of *force majeure* or in consequence of the obligation laid upon the master to carry shipwrecked or other persons, are not deemed to be passengers.

Article 3.—There are excepted from this Convention, save in the cases where the Convention otherwise provides, ships making voyages specified in a schedule to be communicated by each High Contracting Party to the British Government at the time of ratifying the Convention.

No schedule may include voyages in the course of which the ships go more than 200 sea miles from the nearest coast.

Each High Contracting Party has the right subsequently to modify its schedule of voyages in conformity with this Article on condition that it notifies the British Government of such modification.

Each High Contracting Party has the right to claim from another Contracting Party the benefit of the privileges of the Convention for all of its ships which are engaged in any one of the voyages mentioned in its own schedule. For this purpose the Party claiming such benefit shall impose on the said ships the obligations prescribed by the Convention in so far as, having regard to the nature of the voyage, these obligations would not be unnecessary or unreasonable.

Article 4.—No ship, not subject to the provisions of the Convention at the time of its departure, can be subjected to the Convention in the course of its voyage, if stress of weather or any other cause of *force majeure* compels it to take refuge in a port of one of the States of the High Contracting Parties.

CHAPTER III.—SAFETY OF NAVIGATION.

Article 5.—When the expression "every ship" is used in this chapter and in the corresponding part of the annexed Regulations, it includes all merchant ships, whether they are the ships

defined in Article 2 or not, which belong to any of the Contracting States.

Article 6.—The High Contracting Parties undertake to take all steps to ensure the destruction of derelicts in the northern part of the Atlantic Ocean east of a line drawn from Cape Sable to a point situated in latitude 34° north and longitude 70° west. Further, they will establish in the North Atlantic with the least possible delay a service for the study and observation of ice conditions and a service of ice patrol. For this purpose :—

Two vessels shall be charged with these three services.

During the whole of the ice season they shall be employed in ice patrol.

During the rest of the year the two vessels shall be employed in the study and observation of ice conditions and in the destruction of derelicts; nevertheless the study and observation of ice conditions shall be effectively maintained, in particular from the beginning of February to the opening of the ice season.

While the two vessels are employed in ice patrol the High Contracting Parties, to the extent of their ability and so far as the exigencies of the Naval Service will permit, will send warships or other vessels to destroy any dangerous derelicts, if this destruction is considered necessary at that time.

Article 7.—The Government of the United States is invited to undertake the management of the three services of derelict destruction, study and observation of ice conditions, and ice patrol. The High Contracting Parties which are specially interested in these services, and whose names are given below, undertake to contribute to the expense of establishing and working the said services in the following proportions :—

	Per cent.
Austria-Hungary	2
Belgium	4
Canada	2
Denmark	2
France	15
Germany	15
Great Britain	30
Italy	4
Netherlands	4
Norway	3
Russia	2
Sweden	2
United States of America	15

Each of the High Contracting Parties has the right to discontinue its contribution to the expense of working these services after September 1st, 1916. Nevertheless, the High Contracting Party which avails itself of this right will continue responsible for the expenses of working up to the 1st September following the date of denunciation of the Convention on this particular point. To take advantage of the said right, it must give notice to the other Contracting Parties at least six months before the said 1st September; so that, to be free from its obligations on September 1st, 1916, it must give notice on March 1st, 1916, at the latest, and similarly for each subsequent year.

In case the United States Government should not accept the proposal made to them, or in case one of the High Contracting Parties, for any reason, should not assume responsibility for the pecuniary contribution defined above, the High Contracting Parties shall settle the question in accordance with their mutual interests.

The Government of the High Contracting Party which undertakes the management of the service of derelict destruction is invited to devise means of granting, at the expense of this service, to merchant ships, which have contributed in an effective manner to the destruction of ocean derelicts, rewards to be fixed by the Government in accordance with the services rendered.

The High Contracting Parties which contribute to the cost of the three above-mentioned services shall have the right by common consent to make from time to time such alterations in the provisions of this Article and of Article 6 as appear desirable.

Article 8.—The master of every ship which meets with dangerous ice or a dangerous derelict is bound to communicate the information by all the means of communication at his disposal to the ships in the vicinity, and also to the competent authorities at the first point of the coast with which he can communicate.

Every Administration which receives intelligence of dangerous ice or a dangerous derelict shall take all steps which it thinks necessary for bringing the information to the knowledge of those concerned and for communicating it to the other Administrations.

The transmission of messages respecting ice and derelicts is free of cost to the ships concerned.

It is desirable that the said information should be sent in a uniform manner. For this purpose a code, the use of which is optional, appears in Article I. of the Regulations annexed hereto.

Article 9.—The master of every ship fitted with a radio-telegraph installation, on becoming aware of the existence of an imminent and serious danger to navigation, shall report it immediately in the manner prescribed by Article II. of the Regulations annexed hereto.

Article 10.—When ice is reported on, or near, his course, the master of every ship is bound to proceed at night at a moderate speed, or to alter his course so as to go well clear of the danger zone.

Article 11.—The ships defined by Article 2 shall have on board a Morse signalling lamp of sufficient range.

The use of Morse signals is regulated by the Code appearing in Article III., as well as by Article IV. of the Regulations annexed hereto.

Article 12.—The use of the international distress signals for any other purpose than that of signals of distress is prohibited on every ship.

The use of private signals which are liable to be confused with the international distress signals is prohibited on every ship.

Article 13.—The selection of the routes across the North Atlantic in both directions is left to the responsibility of the steamship companies. Nevertheless the High Contracting Parties undertake to impose on these companies the obligation to give public notice of the regular routes which they propose their vessels should follow, and of any changes which they make in them.

The High Contracting Parties undertake, further, to use their influence to induce the owners of all vessels crossing the Atlantic to follow as far as possible the routes adopted by the principal companies.

Article 14.—The High Contracting Parties undertake to use all diligence to obtain from the Governments which are not parties to this Convention their agreement to the revision of the International Regulations for Preventing Collisions at Sea as indicated below:—

(*A*) The Regulations shall be completed or revised in regard to the following points:—

(1) The second white light.

(2) The stern light.

(3) A day signal for motor vessels.

(4) A sound signal for a vessel towed.

(5) The prohibition of signals similar to distress signals.

(*B*) Articles 2, 10, 14, 15, 31 of the said Regulations shall be amended in accordance with the following provisions:—

Article 2. The second white mast-head light to be compulsory.

Article 10. A permanent fixed stern light to be compulsory.

Article 14. A special day signal to be compulsory for motor vessels.

Article 15. A special sound signal to be established for use by a vessel in tow, or if the tow is composed of several vessels, by the last vessel of the tow.

Article 31. Article 31 to be modified in the following manner:—Add to the lists of both day and night signals the international radiotelegraph distress signal.

Article 15.—The Governments of the High Contracting Parties undertake to maintain, or, if it is necessary, to adopt, measures for the purpose of ensuring that from the point of view of safety of life at sea, the ships defined in Article 2 shall be sufficiently and efficiently manned.

Chapter IV., which contains Articles 16 to 30, refers to construction.

Chapter V.—Radiotelegraphy.

Article 31.—All merchant ships belonging to any of the Contracting States, whether they are propelled by machinery or by sails, and whether they carry passengers or not, shall, when engaged on the voyages specified in Article 2, be fitted with a radiotelegraph installation if they have on board fifty or more persons in all.

Advantage may not be taken of the provisions of Articles 2 and 3 of this Convention to exempt a ship from the requirements of this chapter.

Article 32.—Ships on which the number of persons on board is exceptionally and temporarily increased up to or beyond fifty as the result of *force majeure*, or because the master is under the necessity of increasing the number of his crew to fill the places of those who are ill, or is obliged to carry shipwrecked or other persons, are exempted from the above obligation.

Moreover, the Governments of each of the Contracting States, if they consider that the route and the conditions of the voyage are such as to render a radiotelegraph installation

unreasonable or unnecessary, may exempt from the above requirement the following ships :—

(1) Ships which in the course of their voyage do not go more than 150 sea miles from the nearest coast.

(2) Ships on which the number of persons on board is exceptionally or temporarily increased up to or beyond fifty by the carriage of cargo hands for a part of the voyage, provided that the said ships are not going from one continent to another, and that, during that part of their voyage, they remain within the limits of latitude 30° N. and 30°. S.

(3) Sailing vessels of primitive build, such as *dhows*, *junks*, etc., if it is practically impossible to instal a radiotelegraph apparatus.

Article 33.—Ships which, in accordance with Article 31 above, are required to be fitted with a radiotelegraph installation are divided, for the purpose of radiotelegraph service, into three classes, in accordance with the classification established for ship stations in Article XIII. (*b*) of the Regulations annexed to the Radiotelegraph Convention, signed in London on July 5th, 1912, viz. :—

First Class.—Ships having a continuous service.

There shall be placed in the First Class ships which are intended to carry twenty-five or more passengers :—

(1) if they have an average speed in service of fifteen knots or more;

(2) if they have average speed in service of more than thirteen knots, but only subject to the two-fold condition that they have on board two hundred persons or more (passengers and crew), and that, in the course of their voyage, they go a distance of more than five hundred sea miles between any two consecutive ports. Nevertheless these ships may be placed in the Second Class on condition that they have a continuous watch.

Second Class.—Ships having a service of limited duration.

There shall be placed in the Second Class all ships which are intended to carry twenty-five or more passengers, if they are not, for other reasons, placed in the First Class.

Ships placed in the Second Class must, during navigation, maintain a continuous watch for at least seven hours a day, and a watch of ten minutes at the beginning of every other hour.

Third Class.—Ships which have no fixed periods of service.

All ships which are placed neither in the First nor in the Second Class shall be placed in the Third Class.

The owner of a ship placed in the Second or in the Third Class has the right to require that, if the ship complies with all the requirements for a superior class, a statement to the effect that it belongs to that superior class shall be inserted in the Safety Certificate.

Article 34.—Ships which are required by Article 31 above to be fitted with a radiotelegraph installation shall be required, by the Governments of the countries to which they belong, to maintain a continuous watch during navigation as soon as the said Governments consider that it will be of service for the purpose of safety of life at sea.

Meanwhile, the High Contracting Parties undertake to require, from the date of the ratification of the present Convention, subject to the delays specified below, a continuous watch on the following ships:—

(1) Ships whose average speed in service exceeds 13 knots, which have on board 200 persons or more, and which, in the course of their voyage, go a distance of more than 500 sea miles between two consecutive ports, when these ships are placed in the Second Class.

(2) Ships in the Second Class, for the whole of the time during which they are more than 500 sea miles from the nearest coast.

(3) Other ships specified in Article 31, when they are engaged in the Trans-Atlantic trade, or when they are engaged in other trades if their route takes them more than 1,000 sea miles from the nearest coast.

Ships connected with all kinds of fishing business, including whaling, which are required to be fitted with a radiotelegraph installation, shall not be required to maintain a continuous watch.

The continuous watch may be kept by one or more operators, holding certificates in accordance with Article X. of the Regulations annexed to the International Radiotelegraph Convention, 1912, together, if necessary, with one or more certificated watchers. Nevertheless, if an efficient automatic calling apparatus is invented, the continuous watch may be maintained by this

means by agreement between the Governments of the High Contracting Parties.

By "certificated watcher" is meant any person holding a certificate issued under the authority of the Administration concerned. To obtain this certificate, the applicant must prove that he is capable of receiving and understanding the radiotelegraph distress signal and the safety signal described in the Regulations annexed hereto.

The High Contracting Parties undertake to take steps to ensure that the certificated watchers observe the secrecy of correspondence.

Article 35.—The radiotelegraph installations required by Article 31 above shall be capable of transmitting clearly perceptible signals from ship to ship over a range of at least 100 sea miles by day under normal conditions and circumstances.

Every ship which is required, in conformity with the provisions of Article 31 above, to be fitted with a radiotelegraph installation, shall, whatever be the class in which it is placed, be provided in accordance with Article XI. of the Regulations annexed to the International Radiotelegraph Convention, 1912, with an emergency installation, every part of which is placed in a position of the greatest possible safety to be determined by the Government of the country to which the ship belongs.

In all cases the emergency installation must be placed, in its entirety, in the upper part of the ship, as high as practically possible.

The emergency installation includes, as provided by Article XI. of the Regulations annexed to the International Radiotelegraph Convention, 1912, an independent source of energy capable of being put into operation rapidly and of working for at least six hours with a minimum range of eighty sea miles for ships in the First Class and fifty sea miles for ships in the two other classes.

If the normal installation, which, in accordance with this Article, has a range of at least one hundred sea miles, satisfies all the conditions prescribed above, an emergency installation is not required.

The licence provided for in Article IX. of the Regulations annexed to the International Radiotelegraph Convention, 1912, may not be issued unless the installation complies both with the provisions of that Convention and also with the provisions of this Convention.

Article 36.—The matters governed by the International Radiotelegraph Convention, 1912, and the Regulations annexed thereto, and in particular the radiotelegraph installations on ships, the transmission of messages, and the certificates of the operators, remain and will continue subject to the provisions:

(1) of that Convention and the Regulations annexed thereto, or of any other instruments which may in the future be substituted therefor;

(2) of this Convention, in regard to all the points in which it supplements the aforementioned documents.

Article 37.—Every master of a ship who receives a call for assistance from a vessel in distress is bound to proceed to the assistance of the persons in distress.

Every master of a vessel in distress has the right to requisition from among the ships which answer his call for assistance the ship or ships which he considers best able to render him assistance, but he must exercise this right only after consultation, so far as may be possible, with the masters of those ships. Such ships are then bound to comply immediately with the requisition by proceeding with all speed to the assistance of the persons in distress.

The masters of the ships which are required to render assistance are released from this obligation as soon as the master or masters requisitioned have made known that they will comply with the requisition, or as soon as the master of one of the ships which has reached the scene of the casualty has made known to them that their assistance is no longer necessary.

If the master of a ship is unable, or considers it unreasonable or unnecessary, in the special circumstances of the case, to go to the assistance of the vessel in distress, he must immediately inform the master of the vessel in distress accordingly. Moreover, he must enter in his log-book the reasons justifying his action.

The above provisions do not prejudice the International Convention for the unification of certain rules with respect to Assistance and Salvage at Sea, signed at Brussels on September 23rd, 1910, and, in particular, the obligation to render assistance laid down in Article II. of that Convention.

Article 38.—The High Contracting Parties undertake to take all steps necessary for giving effect to the provisions of this chapter with the least possible delay. Nevertheless, they may allow:

A delay not exceeding one year, from the date of the

ratification of this Convention, for the provision and training of operators and for the installation of the apparatus on ships placed in the First and Second Classes.

A delay not exceeding two years, from the date of the ratification of this Convention, for the provision and training of the operators and watchers on the ships in the Third Class, for the installation of the apparatus on ships in the Third Class and for the establishment of a continuous watch on ships placed in the Second and Third Classes.

CHAPTER VI.—Refers to Life-saving Appliances and Fire Protection.

REGULATIONS.

SAFETY OF NAVIGATION.

ARTICLE 1.

CODE FOR THE TRANSMISSION BY RADIOTELEGRAPHY OF INFORMATION RELATING TO ICE, DERELICTS, AND WEATHER.

INSTRUCTIONS.

Transmission of Information.—The transmission of information concerning ice and derelicts is obligatory. This information may be sent from ship to ship or to the Hydrographic Office, Washington, either in clear or by means of the abbreviations used in Part I. of this Code.

The transmission of information relating to weather is optional. Part II. of this Code may be used for this purpose, but may be modified at any time by the Meteorological Congress.

Information required:

PART I.—ICE AND DERELICTS.

1. The kind of ice or derelict observed.
2. The position of ice or derelict when last determined.

PART II.—METEOROLOGICAL INFORMATION.

1. The direction and force of the wind.
2. The set and velocity of the current.
3. Weather or state of the sky at a fixed hour.
4. Height of barometer and air temperature.
5. Barometric tendency and sea-surface temperature.

The time to be adopted:

In all radiotelegrams relating to ice or derelicts the time shall be given in Greenwich mean time.

The Address:

Reports, when sent to the Hydrographic Office, Washington, should be addressed "Hydrographic"; reports to the Meteorological Office, London, should be addressed "Meteorology."

The Message:

1. When sending information about ice or derelicts alone, two groups of five figures each are used, preceded by the word "ice"; these groups may be repeated as often as necessary.

2. If meteorological information is to be sent in addition, a further four groups of five figures each are used, preceded by the word "weather." These groups are inserted at the end of the message after all the information relating to ice has been given.

N.B.—If the message contains the word "weather," all the code groups before that word give information relating to ice, and those after the word "weather" give meteorological information. If there is no word "weather" in the message, it only contains information about ice. (See examples of the two kinds of message given in this Article.)

PART I.

Ice and Derelicts.

Information respecting ice and derelicts is given by means of ten figures divided into two groups of five figures each. These groups are preceded by the word "ice."

Two figures... The day of the month (*dd*), according to Code I.
One figure ... The time of observation (*T*), according to Code II.
One figure ... The kind of ice observed (*I*), according to Code III.
Three figures The latitude of the ice observed (*p p p*), to tenths of a degree (see table below).
Three figures The longitude of the ice observed (*p' p' p'*), to tenths of a degree (see table below).

The first group consists of *ddTIp*.
The second group consists of *ppp'p'p'*.

Codes.

Code I.—*Day of the Month.*

The day of the month is given by two figures, of which the first may be zero: 01 to 31.

Code II.—*Time of observation.*

The time of observation is included between—

	Code No.
1 a.m. and 4 a.m. ... Greenwich Mean Time ...	1
4 a.m. and 7 a.m.	2
7 a.m. and 10 a.m.	3
10 a.m. and 1 p.m.	4
1 p.m. and 4 p.m.	5
4 p.m. and 7 p.m.	6
7 p.m. and 10 p.m.	7
10 p.m. and 1 a.m.	8

Code III.—*Nature of Ice or Derelict observed.*

0. No ice observed.
1. Single iceberg. Huge mass of floating ice.
2. Several icebergs.
3. Numerous icebergs.
4. Floeberg. Thick piece of salt-water ice like a small iceberg.
5. Field ice. Ice extending as far as the eye can reach, but through which it is possible to navigate.
6. Pack ice. Pieces of ice broken from berg or floe, partly closed together.
7. Land ice. Ice attached to the shore since the winter.
8. Derelict.
9. (Not allotted.)

EXAMPLE.

Message sent from Ship to Ship.

—	First Message.	Coded as	Second Message.	Coded as	Third Message.	Coded as	Fourth Message.	Coded as
Date of observation	15	15	15	15	15	15	16	16
Time of observation	10 a.m.–1 p.m.	4	4 p.m.–7 p.m.	6	7 p.m.–10 p.m.	7	4 p.m.–7 a.m.	2
Nature of ice or derelict	Field	5	Numerous icebergs	3	Derelict	8	Single iceberg	1
Position of ice or derelict	Latitude 45° 42′	457	Latitude 46° 5′	461	Latitude 46° 25′	464	Latitude 47° 19′	473
	Longitude 46° 11′	462	Longitude 44° 40′	447	Longitude 43° 58′	440	Longitude 40° 15′	402

The code of the above message would thus be:

S.S. to S.S.

Ice, 15454, 57462: 15634, 61447: 15784, 64440: 16214, 73402.

PART II.

Meteorological Information.

Information respecting weather, etc., is given by four groups of five figures each. These groups are preceded by the word "weather."

First Group (DDPPP):

The day of the month: two figures (*DD*), according to Code I.

The position of the ship when transmitting the message, indicated by three figures *(PPP)*, representing the 1° square in which the ship is situated, according to Code IV. and the numbered chart annexed to this Article.

Second Group (WWCCX):

Wind direction and force at 8 a.m. at the 75th meridian of west longitude: two figures *(WW)*, according to Code V.

Set and velocity of current: two figures *(CC)*, according to Code VI.

Weather or state of the sky at the same hour: one figure *(X)*, according to Code VII.

Third Group (BBBAA):

The barometric height to tenths of a millimetre at 8 a.m. at the 75th meridian of west longitude: three figures *(BBB)*, according to Code VIII.

Air temperature at the same hour: two figures *(AA)*, according to Code IX.

Fourth Group (bbSSS):

Barometric tendency at 8 a.m. at the 75th meridian of west longitude: two figures *(bb)*, according to Code X.

Sea surface temperature at the same hour: three figures *(SSS)*, according to Code XI.

Codes.

Code IV.—*Position of Ship.*

A chart gives the numbers to be assigned to each 1° square in the North Atlantic. The position of the ship, when the meteorological data given in Part II. were observed, is indicated by the three figures representing the 1° square in which the ship is situated. For example:—A position 51° 55′ N., 26° 49′ W. would be reported as 561.

Code V.

Wind Direction (to 16 points) and *Wind Force* at 8 a.m. mean time at the 75th meridian of west longitude *(WW)*.

—	Wind Force, Beaufort Scale.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E	S.S.E.	S.	S.S.W.	S.W.	W.S.W.	W	W.N.W.	N.W.	N.N.W.	N.
Calm	0	00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Light Breeze ...	1, 2, or 3	01	07	13	19	25	31	37	43	49	55	61	67	73	79	85	91
Moderate breeze	4 or 5	02	08	14	20	26	32	38	44	50	56	62	68	74	80	86	92
Strong wind ...	6 or 7	03	09	15	21	27	33	39	45	51	57	63	69	75	81	87	93
Gale Force ...	8 or 9	04	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
Storm Force ...	10 or 11	05	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
Hurricane ...	12	06	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96

N.B.—The wind direction is to be referred to true bearings.

Code VI.

Direction (to 16 points) and *Velocity of the Current (CC).*

Nautical Miles. per hour.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.	S.	S.S.W	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.	N.
0·25	01	07	13	19	25	31	37	43	49	55	61	67	73	79	85	91
0·5	02	09	14	20	26	32	38	44	50	56	62	68	74	80	86	92
1	03	09	15	21	27	33	39	45	51	57	63	69	75	81	87	93
2	04	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
3	05	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
4	06	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
	00	No current.														
	99	No observation.														

N.B.—The current is to be referred to true bearings.

Code VII.

The State of the Sky at 8 a.m. mean time at the 75th meridian of west longitude:

0. Sky quite clear.
1. Sky quarter clouded.
2. Sky half clouded.
3. Sky three-quarters clouded.
4. Sky entirely overcast.
5. Rain falling.
6. Snow or hail falling.
7. Haze or mist.
8. Fog.
9. Thunderstorm.

Code VIII.—*Height of Barometer.*

The reading of the mercury barometer is to be corrected for index error, and reduced to 0° C. and sea level. A table of corrections is given below.

The corrected reading is coded by omitting the first figure of the barometer reading in tenths of a millimetre: for example, 761·2 mm. is coded as 612.

A table for converting hundredths of an inch to tenths of a millimetre is given below.

Code IX.

Air Temperature is coded in two figures according to the following table :—

Degrees Centigrade.	Degrees Fahrenheit.	Code No.	Degrees Centigrade.	Degrees Fahrenheit.	Code No.
—15·0	5·0	00	10·0	50·0	50
—14·5	5·9	01	10·5	50·9	51
—14·0	6·8	02	11·0	51·8	52
—13·5	7·7	03	11·5	52·7	53
—13·0	8·6	04	12·0	53·6	54
—12·5	9·5	05	12·5	54·5	55
—12·0	10·4	06	13·0	55·4	56
—11·5	11·3	07	13·5	56·3	57
—11·0	12·2	08	14·0	57·2	58
—10·5	13·1	09	14·5	58·1	59
—10·0	14·0	10	15·0	59·0	60
— 9·5	14·9	11	15·5	59·9	61
— 9·0	15·8	12	16·0	60·8	62
— 8·5	16·7	13	16·5	61·7	63
— 8·0	17·6	14	17·0	62·6	64
— 7·5	18·5	15	17·5	63·5	65
— 7·0	19·4	16	18·0	64·4	66
— 6·5	20·3	17	18·5	65·3	67
— 6·0	21·2	18	19·0	66·2	68
— 5·5	22·1	19	19·5	67·1	69
— 5·0	23·0	20	20·0	68·0	70
— 4·5	23·9	21	20·5	68·9	71
— 4·0	24·8	22	21·0	69·8	72
— 3·5	25·7	23	21·5	70·7	73
— 3·0	26·6	24	22·0	71·6	74
— 2·5	27·5	25	22·5	72·5	75
— 2·0	28·4	26	23·0	73·4	76
— 1·5	29·3	27	23·5	74·3	77
— 1·0	30·2	28	24·0	75·2	78
— 0·5	31·1	29	24·5	76·1	79
0·0	32·0	30	25·0	77·0	80
0·5	32·9	31	25·5	77·9	81
1·0	33·8	32	26·0	78·8	82
1·5	34·7	33	26·5	79·7	83
2·0	35·6	34	27·0	80·6	84
2·5	36·5	35	27·5	81·5	85
3·0	37·4	36	28·0	82·4	86
3·5	38·3	37	28·5	83·3	87
4·0	39·2	38	29·0	84·2	88
4·5	40·1	39	29·5	85·1	89
5·0	41·0	40	30·0	86·0	90
5·5	41·9	41	30·5	86·9	91
6·0	42·8	42	31·0	87·8	92
6·5	43·7	43	31·5	88·7	93
7·0	44·6	44	32·0	89·6	94
7·5	45·5	45	32·5	90·5	95
8·0	46·4	46	33·0	91·4	96
8·5	47·3	47	33·5	92·3	97
9·0	48·2	48	34·0	93·2	98
9·5	49·1	49	34·5	94·1	99

Code X.—*Barometric Tendency.*

By the "barometric tendency at a given hour" is meant the amount by which the barometric height has changed during the preceding three hours. It is to be expressed in millimetres. For example, the barometric tendency at 8 a.m. could be obtained by comparing the reading taken at that hour, say 755·7 mm., with a reading taken at 5 a.m., say 759·3 mm. In this case the barometric tendency would be expressed by a fall of 3·6 millimetres. As a general rule the barometric tendency is to be determined from the trace of the barograph.

The barometric tendency is coded in two figures, according to the following table:—

Rise in Barometer.		Code No.	Fall in Barometer.		Code No.
Millimetres.	Inches.		Millimetres.	Inches.	
0·0— 0·4	0·00—0·01	01	0·0— 0·4	0·00—0·01	51
0·5— 0·9	0·02—0·03	02	0·5— 0·9	0·02—0·03	52
1·0— 1·4	0·04—0·05	03	1·0— 1·4	0·04—0·05	53
1·5— 1·9	0·06—0·07	04	1·5— 1·9	0·06—0·07	54
2·0— 2·4	0·08—0·09	05	2·0— 2·4	0·08—0·09	55
2·5— 2·9	0·10—0·11	06	2·5— 2·9	0·10—0·11	56
3·0— 3·4	0·12—0·13	07	3·0— 3·4	0·12—0·13	57
3·5— 3·9	0·14—0·15	08	3·5— 3·9	0·14—0·15	58
4·0— 4·4	0·16—0·17	09	4·0— 4·4	0·16—0·17	59
4·5— 4·9	0·18—0·19	10	4·5— 4·9	0·18—0·19	60
5·0— 5·4	0·20—0·21	11	5·0— 5·4	0·20—0·21	61
5·5— 5·9	0·22—0·23	12	5·5— 5·9	0·22—0·23	62
6·0— 6·4	0·24—0·25	13	6·0— 6·4	0·24—0·25	63
6·5— 6·9	0·26—0·27	14	6·5— 6·9	0·26—0·27	64
7·0— 7·4	0·28—0·29	15	7·0— 7·4	0·28—0·29	65
7·5— 7·9	0·30—0·31	16	7·5— 7·9	0·30—0·31	66
8·0— 8·4	0·32—0·33	17	8·0— 8·4	0·32—0·33	67
8·5— 8·9	0·34—0·35	18	8·5— 8·9	0·34—0·35	68
9·0— 9·4	0·36—0·37	19	9·0— 9·4	0·36—0·37	69
9·5— 9·9	0·38—0·38	20	9·5— 9·9	0·38—0·38	70
10·0—10·4	0·39—0·40	21	10·0—10·4	0·39—0·40	71
10·5—10·9	0·41—0·42	22	10·5—10·9	0·41—0·42	72
11·0—11·4	0·43—0·44	23	11·0—11·4	0·43—0·44	73
11·5—11·9	0·45—0·46	24	11·5—11·9	0·45—0·46	74
12·0—12·4	0·47—0·48	25	12·0—12·4	0·47—0·48	75
12·5—12·9	0·49—0·50	26	12·5—12·9	0·49—0·50	76
13·0—13·4	0·51—0·52	27	13·0—13·4	0·51—0·52	77
13·5—13·9	0·53—0·54	28	13·5—13·9	0·53—0·54	78
14·0—14·4	0·55—0·56	29	14·0—14·4	0·55—0·56	79
14·5—14·9	0·57—0·58	30	14·5—14·9	0·57—0·58	80
15·0—15·4	0·59—0·60	31	15·0—15·4	0·59—0·60	81
15·5—15·9	0·61—0·62	32	15·5—15·9	0·61—0·62	82

BAROMETRIC TENDENCY TABLE—*continued.*

Rise in Barometer.		Code No.	Fall in Barometer.		Code No.
Millimetres.	Inches.		Millimetres.	Inchs.	
16·0—16·4	0·63—0·64	33	16·0—16·4	0·63—0·64	83
16·5—16·9	0·65—0·66	34	16·5—16·9	0·65—0·66	84
17·0—17·4	0·67—0·68	35	17·0—17·4	0·67—0·68	85
17·5—17·9	0·69—0·70	36	17·5—17·9	0·69—0·70	86
18·0—18·4	0·71—0·72	37	18·0—18·4	0·71—0·72	87
18·5—18·9	0·73—0·74	38	18·5—18·9	0·73—0·74	88
19·0—19·4	0·75—0·76	39	19·0—19·4	0·75—0·76	89
19·5—19·9	0·77—0·78	40	19·5—19·9	0·77—0·78	90
20·0—20·4	0·79—0·80	41	20·0—20·4	0·79—0·80	91
20·5—20·9	0·81—0·82	42	20·5—20·9	0·81—0·82	92
21·0—21·4	0·83—0·84	43	21·0—21·4	0·83—0·84	93
21·5—21·9	0·85—0·86	44	21·5—21·9	0·85—0·86	94
22·0—22·4	0·87—0·88	45	22·0—22·4	0·87—0·88	95
22·5—22·9	0·89—0·90	46	22·5—22·9	0·89—0·90	96
23·0—23·4	0·91—0·92	47	23·0—23·4	0·91—0·92	97
23·5—23·9	0·93—0·94	48	23·5—23·9	0·93—0·94	98
24·0—24·4	0·95—0·96	49	The barometric tendency cannot be reported.		99

Code XI.—*Sea Surface Temperature.*

Sea surface temperature to tenths of a degree Centigrade is coded by three figures, or, when necessary, by two figures preceded by zero. If the temperature is negative, the first of these three figures is 5.

For example :—

− 2·2° C. is coded as 522.
+ 1·0° C. ,, 010.
+ 15·6° C. ,, 156.

Table of Corrections for reducing Barometric Heights to 0° C. and to Sea Level.

NOTE.—The barometric reading should first be corrected for index error. This error may be neglected if it is less than 0·3 mm.

The + sign indicates that the correction is to be *added* to the barometric reading.

The − sign indicates that the correction is to be *subtracted.*

Sea Surface Temperature.

Temperature by the thermometer attached to the barometer.	−4° C. 24·8° F.	−2° C. 28·4° F.	0° C. 32° F.	+2° C. 35·6° F.	4° C. 39·2° F.	6° C. 42·8° F.	8° C. 46·4° F.	10° C 50° F.	12° C. 53·6° F.	14° C. 57·2° F.	16° C. 60·8° F.	18° C. 64·4° F.	20° C. 68° F.	22° C. 71·6° F.	24° C. 75·2° F.	26° C. 78·8° F.	28° C. 82·4° F
	Corrections to be made.																
Height of barometer cistern above sea level. M'tres.	Ft.	In.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
0	0	0	+0·5	+0·3	0·0	−0·2	−0·5	−0·7	−1·0	−1·2	−1·5	−1·7	−2·0	−2·2	−2·5	−2·7	−3·0	−3·2	−3·5
1	3	3	+0·6	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·6	2·9	3·1	3·4
2	6	7	+0·8	0·5	0·3	0·0	0·3	0·5	0·7	1·0	1·2	1·5	1·7	2·0	2·2	2·5	2·8	3·0	3·2
3	9	10	+0·9	0·6	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·6	2·9	3·1
4	13	1	+1·0	0·8	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·2	1·5	1·7	2·0	2·2	2·5	2·8	3·0
5	16	5	+1·2	0·9	0·7	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·7	2·9
6	19	8	+1·3	1·0	0·8	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·8	2·0	2·3	2·6	2·8
7	22	0	+1·4	1·2	0·9	0·6	0·3	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·2	2·4	2·7
8	26	3	+1·5	1·3	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·8	2·1	2·3	2·6
9	29	6	+1·7	1·4	1·2	0·8	0·6	0·3	+0·1	0·2	0·4	0·6	0·9	1·1	1·4	1·6	2·0	2·2	2·5
10	32	10	+1·8	1·6	1·3	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·9	2·1	2·4
11	36	1	+1·9	1·7	1·4	1·1	0·8	0·6	0·3	+0·1	0·2	0·4	0·7	0·9	1·2	1·4	1·8	2·0	2·2
12	39	4	+2·0	1·8	1·5	1·2	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·1	1·3	1·6	1·9	2·1
13	42	8	+2·2	1·9	1·7	1·3	1·1	0·8	0·6	0·3	+0·1	0·2	0·4	0·7	0·9	1·2	1·5	1·8	2·0
14	45	11	+2·3	2·0	1·8	1·5	1·2	0·9	0·7	0·4	0·2	0·0	0·3	0·6	0·8	1·1	1·4	1·6	1·9
15	49	3	+2·4	2·2	1·9	1·6	1·4	1·1	0·8	0·6	0·3	+0·1	0·2	0·5	0·7	1·0	1·3	1·5	1·8
16	52	6	+2·5	2·3	2·0	1·7	1·5	1·2	0·9	0·7	0·4	0·2	0·1	0·4	0·6	0·9	1·2	1·4	1·6
17	55	9	+2·6	2·4	2·1	1·9	1·6	1·3	1·1	0·8	0·6	0·3	+0·1	0·3	0·5	0·8	1·0	1·3	1·5
18	59	1	+2·8	2·5	2·3	2·0	1·7	1·4	1·2	0·9	0·7	0·4	0·2	0·1	0·4	0·6	0·9	1·2	1·4
19	62	4	+2·9	2·6	2·4	2·1	1·9	1·5	1·3	1·0	0·8	0·6	0·3	0·0	0·3	0·5	0·8	1·0	1·3
20	65	7	+3·0	2·8	2·5	2·3	2·0	1·7	1·4	1·2	0·9	0·7	0·4	+0·1	0·2	0·4	0·7	0·9	1·2
21	68	11	+3·1	2·9	2·6	2·4	2·1	1·8	1·5	1·3	1·0	0·8	0·5	0·2	0·1	0·3	0·6	0·8	1·1
22	72	2	+3·3	3·0	2·8	2·5	2·2	1·9	1·7	1·4	1·2	0·9	0·6	0·3	+0·1	0·2	0·4	0·7	0·9
23	75	6	+3·4	3·1	2·9	2·6	2·4	2·1	1·8	1·5	1·3	1·0	0·8	0·4	0·2	0·1	0·3	0·6	0·8

Table for converting barometric readings in inches into millimetres.

Inches and Tenths	Hundredths of an Inch.									
	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.
	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
27·0	685·8	686·0	686·3	686·6	686·8	687·1	687·3	687·6	687·8	688·1
·1	688·3	688·6	688·8	689·1	689·3	689·6	689·9	690·1	690·4	690·6
·2	690·9	691·1	691·4	691·6	691·9	692·1	692·4	692·7	692·9	693·2
·3	693·4	693·7	693·9	694·2	694·4	694·7	694·9	695·2	695·4	695·7
·4	696·0	696·2	696·5	696·7	697·0	697·2	697·5	697·7	697·9	698·2
·5	698·5	698·7	699·0	699·3	699·5	699·8	700·1	700·3	700·5	700·8
·6	701·0	701·3	701·5	701·8	702·0	702·3	702·6	702·8	703·1	703·3
·7	703·6	703·8	704·1	704·3	704·6	704·8	705·1	705·4	705·6	705·9
·8	706·1	706·4	706·6	706·9	707·1	707·4	707·6	707·9	708·1	708·4
·9	708·7	708·9	709·2	709·4	709·7	709·9	710·2	710·4	710·7	710·9
28·0	711·2	711·4	711·7	712·0	712·2	712·5	712·7	713·0	713·2	713·5
·1	713·7	714·0	714·2	714·5	714·7	715·0	715·3	715·5	715·8	716·0
·2	716·3	716·5	716·8	717·1	717·3	717·5	717·8	718·0	718·3	718·6
·3	718·8	719·1	719·3	719·6	719·8	720·1	720·3	720·6	720·8	721·1
·4	721·4	721·6	721·9	722·1	722·4	722·6	722·9	723·1	723·4	723·6
·5	723·9	724·1	724·4	724·7	724·9	725·2	725·4	725·7	725·9	726·2
·6	726·4	726·7	726·9	727·2	727·4	727·7	728·0	728·2	728·5	728·7
·7	729·0	729·2	729·5	729·7	729·9	730·2	730·5	730·7	731·0	731·3
·8	731·5	731·8	732·0	732·3	732·5	732·8	733·0	733·3	733·5	733·8
·9	734·1	734·3	734·6	734·8	735·1	735·3	735·6	735·8	736·1	736·3
29·0	736·6	736·8	737·1	737·4	737·6	737·9	738·1	738·4	738·6	738·9
·1	739·1	739·4	739·6	739·9	740·1	740·4	740·7	740·9	741·2	741·4
·2	741·7	741·9	742·2	742·4	742·7	742·9	743·2	743·4	743·7	744·0
·3	744·2	744·5	744·7	745·0	745·2	745·5	745·7	745·9	746·2	746·5
·4	746·8	747·0	747·3	747·5	747·7	748·1	748·3	748·5	748·8	749·0
·5	749·3	749·5	749·8	750·1	750·3	750·6	750·8	751·1	751·3	751·6
·6	751·8	752·1	752·3	752·6	752·8	753·1	753·4	753·6	753·9	754·1
·7	754·4	754·6	754·8	755·1	755·4	755·6	755·9	756·1	756·4	756·7
·8	756·9	757·2	757·4	757·7	757·9	758·2	758·4	758·7	758·9	759·2
·9	759·5	759·7	760·0	760·2	760·5	760·7	761·0	761·2	761·5	761·7
30·0	762·0	762·2	762·5	762·8	763·0	763·3	763·5	763·8	764·0	764·3
·1	764·5	764·8	765·0	765·3	765·5	765·8	766·1	766·3	766·6	766·8
·2	767·1	767·3	767·6	767·8	768·1	768·3	768·6	768·8	769·1	769·4
·3	769·6	769·9	770·1	770·4	770·6	770·9	771·1	771·4	771·6	771·9
·4	772·2	772·4	772·7	772·9	773·2	773·4	773·7	773·9	774·2	774·4
·5	774·7	774·9	775·2	775·5	775·7	776·0	776·2	776·5	776·7	777·0
·6	777·2	777·5	777·7	778·0	778·2	778·5	778·8	779·0	779·3	779·5
·7	779·8	780·0	780·3	780·5	780·8	781·0	781·3	781·5	781·8	782·1
·8	782·3	782·6	782·8	783·1	783·3	783·6	783·8	784·1	784·3	784·6
·9	784·9	785·1	785·4	785·6	785·9	786·2	786·4	786·6	786·9	787·1
31·0	787·4	787·6	787·9	788·2	788·4	788·7	788·9	789·2	789·4	789·7
·1	789·9	790·2	790·4	790·7	790·9	791·2	791·5	791·7	792·0	792·2
·2	792·5	772·7	793·0	793·2	793·5	793·7	794·0	794·2	794·5	794·8
·3	795·1	795·3	795·5	795·8	796·0	796·3	796·5	796·8	797·0	797·3
·4	797·6	797·8	798·1	798·3	798·6	798·8	799·1	799·3	799·6	799·8

Table for converting Minutes to tenths of a Degree.

Minutes.	Tenths of a degree.
0–3	0
4–9	1
10–15	2
16–21	3
22–27	4
28–33	5
34–39	6
40–45	7
46–51	8
52–57	9
58–59	10

EXAMPLE.

Message containing Meteorological Information.

Ice :

	First Message.	Coded as	Second Message.	Coded as
Date of observation	21	21	22	22
Time of observation	1 p.m.—4 p.m.	5	4 a.m.—7 a.m.	2
Nature of ice or derelict	Single iceberg	1	Field ice	5
Position of ice or derelict	Latitude 44° 35′	446	Latitude 42° 58′	430
	Longitude 43° 15′	432	Longitude 47° 3′	470

Weather :

	First Message.	Coded as	Second Message.	Coded as
Date of observation	21	21	22	22
Position of ship	Latitude 45° 13′ Longitude 42° 5′	825	Latitude 43° 47′ Longitude 46° 33′	863
Direction and force of wind	E.S.E. 5	26	S.W. 2	55
Set and velocity of current	N.W. 2 m-h	82	S.S.E. 1 m-h.	39
Weather	Sky clear	0	Fog	8
Barometer	765·3 mm.	653	753·2 mm.	532
Air temperature	15·3° C.	61	9·8° C.	50
Barometric tendency	Rise ·8	02	Fall 2·7	56
Sea-surface temperature	1·4° C.	014	—·7° C.	507

The Code of the above message sent to the Meteorological Office would thus be :—

Meteorology : Ice 21514, 46432 : 22254, 30470 : Weather; 21825, 26820, 65361, 02014 : 22863, 55398, 53250, 56507.

ARTICLE II.

SAFETY SIGNAL.

The radiotelegraph stations which have to transmit to ships information involving safety of navigation and being of an urgent character (icebergs, derelicts, cyclones, typhoons, sudden changes

in the position or form of fixed obstructions or of land marks) shall make use of the following signal, called the safety signal, repeated at short intervals ten times at full power:

— — — (T T T)

In principle, all radiotelegraph stations receiving the safety signal, shall, if the transmission of messages by them would interfere with the receipt by any other station of the safety signal and the following safety message, keep silence, in order to allow all interested stations to receive that message. This does not apply to cases of distress.

The safety message shall be transmitted one minute after the safety signal has been sent out, and shall be repeated thereafter three times at intervals of ten minutes.

The Governments of the Contracting States will select the stations which are to send out to mariners safety information of an urgent character.

When the information in question has been sent out by stations performing the time service, it shall be again sent out after the transmission of the time signal and the weather report.

Article III.

MORSE CODE.

INTERNATIONAL SIGNALS.

These signals may be made at night or in thick weather, either by long and short flashes of light, or by long and short sound signals (whistles, fog-horns, etc.), or during the day by hand flags.

1.—URGENT AND IMPORTANT SIGNALS.

You are standing into danger	- - —
I want assistance; remain by me	- - - —
Have encountered ice	- — —
Your lights are out (*or*, burning badly) ...	- — — -
The way is off my ship; you may feel your way past me	- — -
Stop (*or*, heave to); I have something important to communicate	- — - -
Am disabled; communicate with me ...	- - — -

2.—GENERAL SIGNALS.

Meaning.	Signal.	Equivalent Letters and How Made.	How Answered.
Preparative ...	- - - - - - - - - &c.	A succession of E's in one group	By the general answer T.
Answer ...	—	T (singly).	
Spelling ...	- - — - - - — -	F F in one group.	By the general answer T.
Use International Code of Signals.	— — — — — —	M M M in one group.	By the general answer T.
International Code Flag Sign.	— — — —	M M in one group.	
Break sign ...	- - - -	I I as separate letters.	
Stop	- - - - - -	I I I as separate letters.	
Finish of the message.	- - - — -	V E as one group.	- — - R. — - - D. As separate letters.
Erase sign ...	- - - - &c.	A succession of E's as separate letters.	By a succession of E's as separate letters.
Annul ...	W W - — — - — —	W W as one group.	By W W as one group.
Repeat word after— (when a single word is required).	I M I - - — — - - W A - — — - - — Followed by the word preceding the one required.	I M I as one group. W A as separate letters	By the general answer T.
Repeat all after— (if more than one word is required)	I M I - - — — - - A A - — - —	I M I as one group. A A as separate letters.	By the general answer T.
Repeat all— (if the whole message is to be repeated.)	I M I - - — — - - A L L - — - — - - - — - -	I M I as one group. A L L as separate letters.	By the general answer T.

3.—NATIONALITY SIGNALS.

Meaning.	Signal.	Equivalent Letters and How Made.
American	— - — - — - -	C D as separate letters.
Argentine	— - — - - — — -	C G „ „
Austro-Hungarian ...	— - — - - - — -	C F „ „
Belgian	— - - — - — -	D C „ „
Brazilian	— - - -	D E „ „
British	- - — -	F.
Bulgarian	— - - - - — -	D F as separate letters
Chilian	— - - — — -	D G „ „
Chinese	- — - — -	E C „ „
Colombian	- — - -	E D „ „
Danish	... ...	- - - — -	E F „ „
Dutch	- — — -	E G „ „
French	-	E.
German	— — -	G.
Greek...	— — - - — - -	M M in one group followed by D.
Italian	— - — - -	C E as separate letters.
Japanese	— - — -	C.
Mexican	- - — - - - - - -	F C as separate letters.
Norwegian	— — — — - - - — -	M M in one group followed by C.
Peruvian	- - — - — - -	F D as separate letters.
Portuguese	- - — - -	F E „ „
Russian	— - -	D.
Siamese	- - — - — — -	F G as separate letters.
Spanish	— — - — - — - -	G C „ „
Swedish	— — — — -	M M in one group followed by E.
Turkish	— — - — - -	G D as separate letters
Uruguayan	— — - -	G E „ „
Venezuelan	— — - - - — -	G F „ „

4.—INSTRUCTIONS.

1. THE URGENT AND IMPORTANT SIGNALS may be made without the Preparative Signal being answered if it is supposed that the person addressed cannot reply, or in other special circumstances; but in this case a pause should be made between the Preparative Signal and the message.

2. THE SIGNAL - - — - - - — - (FF) is used previous to any letters which are intended to spell words.

3. THE SIGNAL — — — — — — (MMM) is used previous to any message sent by means of the International Code of Signals.

4. THE SIGNAL — — — — (MM) means the Code Flag of the International Code of Signals, and is used as indicated in the Code Book.

5. THE BREAK SIGN is used between the address of the receiver and the text of the message, and after the message if the name of the sender is to be signalled.

6. THE STOP is used, where necessary, in the text of the signal.

7. THE ERASE is used to cancel the last word or signal group, sent by mistake.

8. THE ANNUL is used to cancel *all* the message.

9. METHOD OF ANSWERING. Each word or signal group, when understood, is to be answered by one long flash — (T).

If a word or signal group is not answered, the sender is to repeat it until answered by a long flash.

At the end of the message, if understood, the receiver will make - — - — - - (RD).

The Erase and Annul signs are to be answered by their own signs.

10. THE NATIONALITY SIGNAL is made immediately after the answer to the Preparatory Signal has been received, to indicate the nationality of the vessel making the signal. It is answered by the nationality signal of the vessel receiving the message.

SAFETY CERTIFICATE.

Radiotelegraph installation :—

—	Class and numbers required by Articles 33 and 34 of the said Convention.	Actual class and numbers.
Class of ship :—	...	...
Number of { Operators of the 1st Class ...	...	...
Number of { ,, ,, 2nd ,, ...	...	...
Number of { Certificated Watchers ...	—	...

III. That in all other respects the ship complies with the requirements of the said Convention, so far as those requirements apply thereto.

This certificate is issued under the authority of the Government. It will remain in force until

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

(Signature)

Issued at the day of

Don Emilio Ortuno y Berte
Postmaster-General of Spain.

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LAWS AND REGULATIONS

ARGENTINE REPUBLIC

IN the Argentine Republic the administration of Wireless Telegraphy is in the hands of the Ministry of Marine, the Ministry of the Interior and the Ministry of War. It is the duty of the Director-General of Posts and Telegraphs to enforce the Laws and Regulations issued by the above-mentioned Departments.

The following Decree came into force on July 15th, 1913:—

ESTABLISHMENT AND ORGANISATION OF WIRELESS TELEGRAPH STATIONS.

1. The erection of wireless telegraph stations by the State is the attribute of—

(*a*) The Ministry of the Interior, when the object is to establish communication in any place for public use.

(*b*) The Ministry of Marine, when for strategical purposes they are erected on the sea coast, banks of navigable rivers, or on vessels of the Fleet.

(*c*) The Ministry of War, when, either fixed or portable, they are erected inland, and when they are for military purposes or for national defence.

2. Stations under the jurisdiction of the Ministries of War and Marine, which are selected by the Government, may be used for public service, shall be subject to the regulations in force and which may hereafter be issued in the matter.

3. It shall be the duty of the Directorate-General of Posts and Telegraphs to watch over and administer the public radiotelegraph service, in accordance with the powers conferred by the National Telegraph Law of 1875, and No. 4,408 of 1904, and the Decree of the Executive dated October 13th, 1908.

4. Authorisation to establish maritime wireless telegraph stations for public use will be granted by the Ministry of the Interior with the intervention of the Ministry of Marine.

5. Radiotelegraph experiments shall not be allowed in the territory of the nation without the permission of the Ministry of the Interior being first obtained. The Ministries of War and Marine shall in every case be informed when permits are granted. This requirement shall not be exacted in cases of official trials by the Departments of the Administration mentioned in Article 1.

6. Vessels of the National Mercantile Marine may instal stations of any radiotelegraph system on board, provided the latter allow of communication with those of the State, for which purpose application must be made to the Ministry of the Interior for a licence.

Coast stations opened in the country for the service of public correspondence and those of vessels flying the national flag are hereby subjected to such provisions of the International Radiotelegraph and Telegraph Conventions as may concern them.

7. All stations must exchange traffic with the minimum of energy necessary to insure good communication.

Coast and ship stations must satisfy the following conditions :—

(*a*) The waves emitted shall be as pure and as little damped as possible.

In particular, the use of transmitting devices in which the waves emitted by discharging the aerial directly by sparks is forbidden except in cases of danger, or in cases of special stations, such as small boats in which the primary power does not exceed 50 watts.

(*b*) The apparatus must be capable of transmitting and receiving at a speed of not less than 20 words a minute, reckoning a word at the rate of five letters.

New installations which employ an energy of more than 50 watts shall be equipped in such a way as to obtain easily several ranges less than the normal range, the shortest of which must be less than approximately 15 nautical miles. Installations already established which used an energy of more than 50 watts shall be altered as far as possible in such a manner as to satisfy the foregoing requirements.

(*c*) Receiving apparatus must allow of receiving with the maximum possible amount of protection from disturbance transmissions with wave lengths specified in the present Regulations up to 600 metres.

(*d*) Stations intended exclusively for determining the position of ships must not operate over a radius greater than 30 nautical miles.

8. Independently of the general conditions specified in the foregoing Article (7), ship stations must also satisfy the following conditions :—

(*a*) The power transmitted to the radiotelegraphic apparatus, measured at the terminals of the generator of the station, must not exceed one kilowatt in normal circumstances.

(*b*) Subject to the provisions of Article 58, power exceeding one kilowatt may be employed if the ship is under the necessity of communicating at a distance of more than 200 nautical miles from the nearest coast station, or if, in consequence of exceptional circumstances, the communication cannot be made without an increase of power.

9. Merchant vessels shall not be authorised to establish a radiotelegraphic service without a deposit being first made to the order of the Director-General of Posts and Telegraphs in the Bank of the Argentine

Nation as a guarantee for the exchange of its radiotelegraphic service, for an amount which shall be fixed according to circumstances, but which shall not be less than 100 dollars national currency (£8 14s. 3d.). Such deposit once made cannot be withdrawn until the interested parties give such notice that their steamships will no longer continue such service, as may be necessary for settling accounts; the itinerary of the vessels must be considered in this respect. Ship stations dependent on the administration of a country with which settlement of accounts is not carried out, shall be considered in the same category. In the latter case the deposit must be previously made by the agents of the company or the owners of the vessel.

10. When it is considered convenient to do so, the Directorate-General of Posts and Telegraphs may demand to be shown the certificate issued to a foreign vessel by its Government licensing the use of the radiotelegraph apparatus.

In the absence of such certificates the Department can satisfy itself that the wireless installation on board comply with the conditions imposed by the International Regulations.

11. Vessels of the National Mercantile Marine which have radiotelegraphic stations installed on board can exchange communications with coast stations. Merchant vessels which have no radiotelegraphic station can make use of radiograms by signalling by means of flags to the State semaphores, lighthouses, or pontoons having radiotelegraphic installations, provided that the companies, to which such ships belong, have one or more vessels equipped with radiotelegraphic stations duly authorised for service inscribed in the National Register of Shipping.

12. Foreign vessels flying the flag of a country which has not adhered to the International Convention can exchange radiotelegrams with the Argentine stations provided their respective Agents in the Republic may have requested permission to do so and have complied with the necessary formalities.

13. Merchant ships which are in the ports or channels giving access to ports, may not, under any pretext except in case of danger, use their radiotelegraphic apparatus. A fine of 100 dollars (£8 14s. 3d.) will be imposed for the first breach, and 200 dollars (£17 8s. 6d.) for every subsequent breach of this regulation, without prejudice to the licences being withdrawn from the ships, should such a course be found necessary. The Maritime Police can intervene in these cases to prevent the use of the apparatus.

14. Persons who instal or make use of radiotelegraphic apparatus without previously obtaining a licence, or who clandestinely or surreptitiously tap communications, shall be liable to the penalties established by the law relating to National Telegraphs, unless in the cases where greater responsibility is involved, such as where the personnel of the Army or the Navy is concerned, if considered necessary, without prejudice, to the immediate demolition of the works.

15. The work of the radiotelegraphic stations, irrespective of the object for which they have been installed, shall be organised in such a manner as not to disturb the work of other similar stations. In the International Service, as regards the frontier stations not dealt with by the International Convention, the agreements and necessary service regulations drawn up between the departments of the Ministries interested and the respective foreign States shall be adopted.

The Ministries of War and Marine may combine the services of their stations for strategical purposes.

If stations are connected exclusively for official service, the cost shall be borne by the Ministry on which they depend.

16. The respective dependencies of the Ministries of War and Marine shall furnish the Directorate-General of Posts and Telegraphs with the reports which it may require regarding the public radiotelegraph service, and they are authorised to deal directly with that Department for such purpose.

17. The Directorate-General of Posts and Telegraphs shall intervene in matters connected with the international service, and is charged with the duty of seeing that the Convention and its regulations are complied with; it must deal with the Berne Bureau and other foreign Administrations when requesting and supplying the same concerning the radiotelegraphic services of the country in the same manner as is at present done as regards telegraph service.

18 to 31 (inclusive).—These articles relate to wave lengths, intercommunication, operators' certificates, the furnishing of information for the Berne list by the Directorate-General of Posts and Telegraphs, and other matters as required by the International Convention. Article 27 requires stations which are classified in the first two categories mentioned in Article 32, to have, independently of the power produced by the ships' propelling machinery, a reserve of electric energy, which may be storage batteries. The auxiliary power must be able to be utilised for at least six hours and have a minimum range of at least 80 nautical miles for ships in the first category and 50 nautical miles for those in the second category.

Ship Stations.

32. Ship stations shall be classified within the following categories:—

(1st) Stations of permanent service: for ocean-going steamships with a capacity to carry fifty or more passengers.

(2nd) Stations with limited service: for all kinds of steamships which carry passengers and are not included in the foregoing conditions.

(3rd) Stations without any fixed hours of service: for vessels which do not carry passengers.

When navigating the following must always be on the watch :—

(1st) The stations included in the first category.

(2nd) Those included in the second category during the hours appointed for their service, and after those hours during the first ten minutes of each hour.

Stations included in the third category are not bound to any regular service as regards being on the watch.

The category in which the vessel is included must be mentioned in the licences issued.

33 to 65 (inclusive).—These articles cover the drawing up and handing in of radiotelegrams, tariff, counting of words and collection of charges, signals, and order of transmission, delivery of radio-telegrams, etc., which are in accordance with the International Convention.

ACCOUNTS.

66. For the purpose of accounting coast stations shall be considered as the destination of radiotelegrams passing over the lines of the national telegraph system to be forwarded to ships' stations, and as stations of origin of radiotelegrams coming from ships' stations to be transmitted over the lines of the National telegraph system.

67. Merchant vessels on the National Register may interchange radiotelegrams between one another and with foreign ships.

The accounts for this interchange of service shall be settled directly as between the companies working those stations, the station of origin being debited by the station of destination.

68. Shipping companies or masters of vessels must balance their accounts monthly in the Administration of Posts and Telegraphs of the nation in accordance with the form of liquidation which that Department will draw up and prepare for the purpose.

69. The amount of charges received in the public service by the radiotelegraph stations of the State shall be paid every month to the Administration of Posts and Telegraphs. The form, filled in with the necessary information for keeping the accounts respecting radiotelegrams interchanged, together with the originals of the messages sent, re-transmitted and received, shall be sent every month to the Administrative Section of the Directorate-General of Posts and Telegraphs.

70. The provisions of the two preceding articles shall apply to the personnel of the Army in the radiotelegraph stations belonging to the Ministry of War; in this case the officers of the Administration of the corps shall be charged with the duty of collecting and rendering accounts to the Directorate-General of Posts and Telegraphs of the Nation.

71. Coast and ships' charges shall be settled by the Directorate-General of Posts and Telegraphs with foreign administrations, and the

companies to which the stations belong through which the interchange of radiotelegrams has been made in accordance with Article XIII. of the International Radiotelegraph Regulations.

MISCELLANEOUS PROVISIONS.

72. The Telegraph Department of the Nation shall forward over its lines the service telegrams sent by the Heads of the Inspection of Communications of the Ministries of War and Marine and by superintendents of the radiotelegraph stations of the State which are opened to public service, providing that necessity calls for such action.

73. The Ministry of Marine may authorise the coast stations to give maritime information agencies data and details respecting maritime disasters and wrecks or other information which may be of general interest to navigators.

74. The respective offices of the Ministries of War and Marine, in agreement with the Directorate-General of Posts and Telegraphs, shall determine the character of the radiotelegraph stations to be opened to service.

75. The offices dependent on the Ministries of War and Marine shall advise the Directorate-General of Posts and Telegraphs, when called upon to do so, for the purpose of carrying out these Regulations.

76. Coast and ships' stations are bound to re-transmit radiotelegrams when communication cannot be established directly between the stations of origin and destination.

In such circumstances they must not make more than two re-transmissions.

In the case of radiotelegrams intended for *terra firma* use may only be made of re-transmission to reach the nearest coast station.

This re-transmission shall be made when the intermediate station which receives it in transit is in a position to send it on.

77. Coast radiotelegraph stations must always accept with absolute priority calls for assistance from vessels in distress, and shall reply in the same way to those calls and communicate them with the indication "urgent" to the lines of the National Telegraph System or to addressees.

78. The provisions of the International Telegraph Regulations are applicable by analogy to the radiotelegraph correspondence in so far as they are not contrary to those of the International Radiotelegraph Regulations.

A LAW has been issued in accordance with which all ships entering or leaving Argentina ports with 50 or more persons on board must possess a wireless telegraph installation, under the charge of a competent operator. For use on river steamers the wireless must have a range of not less than 200 kilos. (about 125 miles) and for sea-going vessels a range of at least 500 kilos. (about 310 miles). Vessels not complying with the regulations will not be cleared.

AUSTRALIA

THE Postmaster-General's Department controls commercial wireless telegraphy in the Commonwealth. The first Act was passed in 1905, and is as follows :—

No. 8 of 1905.

1. *Short Title.*—This Act may be cited as the Wireless Telegraphy Act, 1905.

2. *Interpretation.*—In this Act—

"Australia" includes the territorial waters of the Commonwealth and any territory of the Commonwealth;

"Wireless Telegraphy" includes all systems of transmitting and receiving telegraphic messages by means of electricity without a continuous metallic connection between the transmitter and the receiver.

3. *Exemption of Ships of War.*—This Act shall not apply to ships belonging to the King's Navy.

4. *Exclusive Privileges of Postmaster-General.*—The Postmaster-General shall have the exclusive privilege of establishing, erecting, maintaining, and using stations and appliances for the purpose of—

(*a*) transmitting messages by wireless telegraphy within Australia, and receiving messages so transmitted, and

(*b*) transmitting messages by wireless telegraphy from Australia to any place or ship outside Australia, and

(*c*) receiving in Australia messages transmitted by wireless telegraphy from any place or ship outside Australia.

5. *Licences.*—Licences to establish, erect, maintain, or use stations and appliances for the purpose of transmitting or receiving messages by means of wireless telegraphy may be granted by the Postmaster-General for such terms and on such conditions and on payment of such fees as are prescribed.

6. *Penalty for Breach of Act.*—(1) Except as authorised by or under this Act, no person shall—

(*a*) establish, erect, maintain, or use any station or appliance for the purpose of transmitting or receiving messages by means of wireless telegraphy; or

(*b*) transmit or receive messages by wireless telegraphy.

Penalty : Five hundred pounds, or imprisonment with or without hard labour for a term not exceeding Five years.

Ships Fitted with Apparatus for Wireless Telegraphy.—(2) Subsection (1) of this section shall not, except as prescribed, extend to appliances maintained on any ship, arriving from any place beyond Australia, for the purpose of enabling messages to be transmitted from

or received on that ship by means of wireless telegraphy, but all such appliances shall, while the ship is within Australia—

(*a*) be subject to the control of the Postmaster-General; and

(*b*) only be used by his authority or as authorised by the regulations.

Penalty: Five hundred pounds.

7. *Forfeiture of Appliances Unlawfully Erected.*—All appliances erected, maintained, or used in contravention of this Act or the regulations, for the purpose of transmitting or receiving messages by means of wireless telegraphy, shall be forfeited to the King for the use of the Commonwealth.

8. *Search Warrants for Appliances Unlawfully Erected.*—(1) If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that any appliance is established, erected, maintained, or used in contravention of this Act or the regulations, for the purpose of transmitting or receiving messages by means of wireless telegraphy, he may grant a search warrant to any person.

(2) A search warrant under this section shall authorise the person to whom it is addressed to break and enter any place or ship, where the appliance is or is supposed to be, either by day or by night, and to seize all appliances which appear to him to be used or intended to be used for transmitting or receiving messages by means of wireless telegraphy.

9. *Proceedings in Respect of Offences.*—(1) Proceedings for any offence against this Act may be instituted in any Court of Summary Jurisdiction, and any person proceeded against under this section may be dealt with summarily or may be committed for trial.

(2) The Court in dealing summarily with any accused person under this section may, if he is found guilty of any offence against this Act, punish him by imprisonment with or without hard labour for any period not exceeding six months, or by a penalty not exceeding Fifty pounds.

10. *Regulations.*—The Governor-General may make regulations, not inconsistent with this Act, prescribing all matters which by this Act are required or permitted to be prescribed or which are necessary or convenient to be prescribed for carrying out or giving effect to this Act.

Wireless Telegraphy Regulations.

1. These Regulations may be cited as the Wireless Telegraphy Regulations, 1913.

2. In these Regulations, unless the contrary intention appears:—

"Australian ship" means a ship registered in Australia;

"British ship" means a British ship other than an Australian ship;

"Foreign ship" means a ship other than an Australian ship or a British ship;

"Harbour" includes any harbour properly so called, whether natural or artificial, or any estuary, navigable river, pier, jetty, or other work in or at which a ship can obtain shelter, or ship or unship goods or passengers;

"Land Station" means a station, not being a ship station, for the transmission and receipt of messages by means of wireless telegraphy;

"Ship Station" means a ship (not permanently moored) having installed thereon appliances for the transmission and receipt of messages by means of wireless telegraphy;

"Territorial Waters" means the territorial waters of the Commonwealth and those of any territory of the Commonwealth, and includes harbours;

"The Act" means the *Wireless Telegraphy Act*, 1905.

KINDS OF LICENCES.

3. Licences under Section 5 of the Act may be (*a*) General Licences, or (*b*) Supplementary Licences.

4. *General Licences.*—(1) A General Licence shall be granted only in respect of ship stations on Australian ships.

(2) Any number of ships belonging to the same company or person may be included in a General Licence.

(3) A General Licence may be in accordance with the form in the Schedule, and shall include the terms and conditions set out in that form.

(4) A General Licence shall be for a period of one year from the date thereof, but may be renewed from time to time.

5. *Supplementary Licence.*—(1) The Postmaster-General may grant to the holder of a General Licence a Supplementary Licence in respect of any ship belonging to him and not included in the General Licence.

(2) A Supplementary Licence shall be in such form as the Postmaster-General thinks fit, and shall be deemed to be incorporated with the General Licence, and the General Licence shall apply to each ship included in the Supplementary Licence to the same extent as if the ship had been included in the General Licence.

6. *Fees for Licences.*—The fees for licences shall be as follows:—

For a General Licence for ship stations or for any renewal thereof—Five shillings for each ship included in the licence.

For a Supplementary Licence for ship stations or for any renewal thereof—Five shillings for each ship included in the licence.

The fees prescribed by this Regulation shall be payable in advance.

7. *Application for a General Licence.*—(1) An application for a General Licence must be in writing, and must set out the following particulars: (*a*) the names of the different ships to be included therein; (*b*) the ports in Australia at which the ships are registered; and (*c*) the system of wireless telegraphy to be used on the ships.

(2) Before granting the licence the Postmaster-General may require the applicant to furnish such additional particulars as he thinks necessary.

8. *Condition as to Syntony, etc.*—Before any General Licence is granted, the applicant must satisfy the Postmaster-General that the wireless telegraphy apparatus or appliances to be worked in pursuance of the licence complies with the regulations for the time being in force governing syntony and wave length.

9. *Licences to be in Duplicate.*—(1) Every licence shall be made out in duplicate, and one part shall be issued to the Licensee and the other retained in the Department of the Postmaster-General.

(2) Before the licence is issued to the applicant he shall execute the part of the licence to be retained in the Department.

10. *Renewal of a Licence.*—(1) A General Licence or Supplementary Licence may be renewed by writing thereon a memorandum stating the period for which it is renewed.

(2) The memorandum of renewal must be signed by the Postmaster-General or by some officer authorized by him.

(3) The renewal may be made at any time within one month before or one month after the expiry of the licence.

(4) The memorandum is to be written on both parts of the licence.

11. *Revocation of Licence.*—The Postmaster-General may, by notice in writing, revoke and determine any licence, as to all or any of the ship stations included therein, on the ground of the licensee having failed to comply with any regulation for the time being in force under the *Wireless Telegraphy Act* 1905, or on any other ground specified in the licence.

12. *Powers of Inspection.*—The Postmaster-General or any Deputy Postmaster-General or any person thereto authorised in writing by the Postmaster-General or by a Deputy Postmaster-General may at all reasonable times enter upon any ship station or land station on which wireless telegraphy appliances are installed, or are in course of being installed, in pursuance of a licence, and may inspect such appliances and the working and user thereof.

13. *Communications between Ship and Land Stations.*—When communications are made by means of wireless telegraphy between a ship (whether British, Foreign, or Australian) in territorial waters and a wireless telegraph station on land, the rules in force for the working of wireless telegraphy at that station shall be observed.

14. *Application of the Radiotelegraphic Convention and Regulations.*—The provisions of the Radiotelegraphic Convention and the Service Regulations for the time being in force thereunder, so far as such Convention and Regulations are applicable, shall apply to all wireless telegraphy installations available for the transmission or receipt of private messages, whether installed by the Commonwealth or under Licence, and whether at ship stations or land stations, and every Licensee shall comply therewith.

15. *Appliances to be Worked so as to Avoid Interference with other Appliances.*—(1) The wireless telegraphy appliances on board any ship (whether an Australian ship, a British ship, or a foreign ship) in territorial waters shall be worked in such a way as not to interrupt or interfere with—

(*a*) Naval or Military signalling; or

(*b*) the transmission of messages between other wireless telegraph stations.

(2) In this regulation Naval or Military signalling includes signalling or communicating, by means of any system of wireless telegraphy, by the King's Imperial or Colonial Naval or Military Forces.

16. *Appliances not to be Worked while Ship in Harbour.*—Except by permission of the Postmaster-General, the wireless telegraphy appliances on board any Australian ship, British ship, or foreign ship (other than a ship of war) shall not be worked or used whilst the ship is in any harbour in Australia or any territory of the Commonwealth.

17. *Application of Defence Regulations to Foreign Ships of War in Harbours.*—The use of wireless telegraphy appliances on board any foreign ship of war while in any harbour in Australia or any territory of the Commonwealth shall be subject to such rules (whether prohibitive or regulative) as the Governor-General may think fit to make.

18. *Powers of Governor-General in Emergencies.*—If at any time, in the opinion of the Governor-General, an emergency has arisen in which it is expedient that the Commonwealth Government should have control over the transmission of all messages by wireless telegraphy, he may by notice in the *Gazette* prohibit for such period as he thinks necessary the use of wireless telegraphy on board foreign ships in territorial waters.

19. *Control of Appliances in Emergencies.*—(1) In case of emergency, any officer in command of any ship of war of His Majesty's Navy (whether Imperial or Colonial), or any officer in command of any part of the Defence Force, may—

(*a*) take possession of any wireless telegraphy appliances installed on any ship in pursuance of a licence and use such appliances for the King's service; or

(*b*) place any person in control of any such appliances; or

(*c*) direct the licensee or person in charge of such appliances to submit to him all or any messages tendered for transmission or received by means of such appliances; or

(*d*) stop or delay or direct the licensee or person in charge of such appliances to stop or delay the transmission or delivery of any such messages or to deliver them to him; or

(*e*) direct the licensee or person in charge of such appliances to comply with all such directions as he thinks fit to give with reference to the transmission or receipt of messages by means of such appliances.

(2) Every licensee and every person in charge of any wireless telegraphy appliances installed in pursuance of a licence shall comply with this regulation, and all directions issued in pursuance thereof.

(3) Reasonable compensation shall be payable to the licensee for any damage to the appliances arising in consequence of the exercise of the powers conferred by this regulation.

20. *Use of Wireless Telegraphy for Naval or Military Purposes.*—These regulations shall not prevent the use, without licence, by the naval or military authorities of wireless telegraphy for naval or military purposes: Provided that in time of peace each wireless telegraphy installation (other than a mere temporary installation) to be used shall be authorised in writing by the Minister of Defence and notice in writing of the installation shall be sent to the Postmaster-General.

The form of licence set out in the schedule to the above regulations is similar to that employed by the British Post Office. It is laid down in Rule I. that the

"Apparatus shall be deemed to be 'syntonised' when the transmitting apparatus is so adjusted as to communicate with a receiver which has a corresponding adjustment, and to produce as little effect as possible on a receiver not having a corresponding adjustment. The aerial antenna must be continuous and without a break when in the transmitting condition. If two waves are emitted, neither may differ from the normal wave of the station by more than 3 per cent., provided that in the case of stations using 5 kilowatts or over this variation shall not exceed 2 per cent."

THE following Regulation, dated the 28th October, 1914, was made under the Wireless Telegraphy Act, 1905, and the Telegraph Act, 1909:—

Control of Radiotelegraphic Communication in Emergencies.

(1) The Postmaster-General may, notwithstanding anything contained in a licence issued to a licensee under the Wireless Telegraphy Regulations 1913, by order published in the *Gazette*, prohibit for such time as he directs any licensee (whether licensed in respect of a land station or a ship station) from communicating with any radiotelegraph

station licensed by, or belonging to, or in any country which is at war with His Majesty the King, or the possessions thereof.

(2) Any order under this Regulation may prohibit all communications whatever, or may permit communications to particular stations, or under special circumstances.

Navigation Act

THE Commonwealth Parliament have passed a new Navigation Act which contains a clause making it compulsory for ships trading in Australian waters to be equipped with apparatus for wireless telegraphy. This matter is dealt with in Section 236 of the Act, and the text of the section given below is as under :—

EXTRACT FROM NEW NAVIGATION ACT, 1912.

DIVISION VI.—SIGNALS OF DISTRESS.

233 ... ...
234 ... ...
235 ... ...

236 (1) Except as prescribed, every foreign-going ship, Australian trade ship, or ship engaged in the coasting trade, carrying fifty or more persons, including passengers and crew, shall before going to sea from any port in Australia be equipped with an efficient apparatus for wireless communication in good working order in charge of one or more persons holding prescribed certificates of skill in the use of such apparatus.

(2) For the purposes of this section apparatus for wireless communication shall not be deemed to be efficient unless :—

(*a*) It is capable of transmitting and receiving messages over a distance of at least one hundred miles, day and night.

(*b*) The person controlling the operator undertakes in writing to the Minister to exchange, and does, in fact, exchange, as far as may be physically practicable (of which the master shall be the judge) messages with shore or ship stations using similar or other systems of wireless communication; and

(*c*) There is provided, in connection with the apparatus, and ready for use whenever from any cause the ordinary supply of electrical power is not available, a battery of accumulators of such capacity as to insure for a period of at least six hours communication of the efficiency prescribed in paragraph (*a*) of this sub-section.

(2a) The equipment shall, if so prescribed, include a silent chamber for the receipt of messages.

(3) The master of a ship required by this section or the regulations to be equipped with wireless telegraphy apparatus shall not

take her to sea, and the owner of a ship required to be so equipped shall not permit her to go to sea, unless the requirements of this section have been complied with.

PENALTY: One Thousand Pounds.

(4) The regulations may prescribe the times and hours during which an operator shall be in attendance on the apparatus, ready to receive or transmit messages.

(5) Except as otherwise prescribed, the provisions of this section shall not apply to ships plying exclusively between ports in Australia less than two hundred miles apart.

In addition to the clauses quoted above, the following new sub-clause was to be proposed by the Minister for Defence in the Senate :—

"The Governor-General may make regulations in accordance with the provisions of any International Convention to which the United Kingdom is a party relating to the use of Wireless Telegraphy on ships, and such regulations may be in addition to or in substitution either wholly or in part for the provisions of this section."

AUSTRIA

THE following Decree of the Ministry of Commerce, dated 7th January, 1910, is concerned with wireless telegraph stations in the Austrian Empire, on board Austrian ships, and on ships of foreign nationality in Austrian territorial waters :—

(1) In accordance with a High Decree of Parliament of January 16th, 1847, and the Decree of the Ministry of Commerce, dated April 28th, 1905, the erection and working of Wireless Telegraph stations in the Austrian Empire and on Austrian ships is a State concession, to acquire which a written application (liable to Stamp Duty), containing a description of the station and a diagram of connections, must be submitted.

(2) The choice of system, apparatus, and fixtures, as well as the establishment of coast and land rates within the limits of the Wireless Telegraph agreement of 1909, and the supplemental regulations are the prerogative of the Ministry of Commerce.

(3) The general regulations for Wireless Telegraph stations on board ships are shown below.

(4) Wireless Telegraph stations on board ships must fulfil the following conditions :—

(*a*) They must be of equal technical efficiency to systems other than that adopted in the stations, and they must be able to inter-communicate with other systems.

(*b*) The system adopted must be one of "syntonisation."

(*c*) The speed of transmission and reception must not, under normal circumstances, be less than twelve words (each of five letters) per minute.

(*d*) The power possessed by the apparatus must not exceed, in normal conditions, 1 kilowatt. A greater power can be used when the ship is under an obligation to exchange messages at a longer distance than 300 kilometres from the nearest coast station, or when the transmission can only be effected by means of a higher power than specified.

(5) The working of Wireless Telegraph stations on board foreign ships in Austrian territorial waters is dependent upon the previous grant of a State concession. This regulation does not apply to war-ships or ships in distress. If a foreign vessel employs its Wireless Telegraph station without authorisation, the State authorities may take steps to prevent the working of the station in Austrian territorial waters.

Document of Concession.

THE Ministry of Commerce hereby grants to .... the concession for the installation and working of a wireless telegraph ship station on board the s.s. ..... and reserves to itself the right to cancel same at any time. The concession is granted on the following conditions :—

(1) The Wireless Telegraph station must be erected according to the description in the application and according to the diagram of connections.

Supplemental changes in the technical installation which would have an effect upon the transmitting and receiving speed of the station cannot be undertaken without the consent of the Ministry of Commerce.

(2) The concessionnaire must pay an annual recognition fee of 20 Kronen for the station.

(3) The Telegraph Directorate is entitled to empower their officials to examine the station and to control the working of the same.

Opportunity must be given to officials of the Austrian Navy, on their request, to make themselves acquainted with the working of the station apparatus.

Collusion in order to keep back details of the condition of the station from the official authorities is inadmissible.

(4) The Telegraph Directorate reserves to itself the right of using the station at any time, completely and absolutely, or for a definite kind of correspondence, and this they may do without giving their reasons, or without the concessionnaire being able to claim any indemnity.

(5) In case of war and mobilisation the station must be closed.

The commander of the ship must superintend the closing and make himself responsible for it.

The control over the supervision of this measure is confined to the military authorities.

(6) Only Austrian subjects can be employed as telegraph operators, and they must be able to show a testimonial to the effect that they have successfully passed the special examination of the Telegraph Directorate.

Wireless telegraph operators on board ship must be provided with a sea service book, they must be enrolled in the muster, and must be subject to the ship's discipline.

In case of the cancelling of the above-mentioned testimonial by the State Telegraph Directorate, a telegraph operator must be dismissed immediately.

Every change of operator must without delay be notified to the marine authorities in Trieste.

(7) The concessionnaire must allow to third persons the services of the station on payment by them of the normal charges.

(8) The station charge amounts to . . . a word. The lowest telegram amounts to . . . Kronen. The charge belongs to the underwriter.

(9) The station must exchange news with all coast stations, and with all other ship stations without prejudice as to the system of wireless telegraphy used by these stations.

(10) As regards the working of the station and the scale of the tariff, the regulations of the International Radio Telegraph Convention and its supplemental regulations must be observed, in the same manner as all measures published by the Telegraph Directorate.

The call signal of the station is established as . . . . . .

THE following is a copy of the Decree of the Minister of Commerce of November 8th, 1910, concerning the installation of wireless stations on passenger ships engaged in the carrying service abroad :—

Austrian vessels of the merchant service making voyages from Austrian ports and carrying passengers beyond Gibraltar or Aden must be fitted with wireless telegraph apparatus.

With regard to the fitting, working, and staff of such wireless stations, the conditions of the Decree of the Ministry of Commerce dated January 7th, 1910, must be complied with. Such stations must be capable of exchanging telegrams at a distance of 100 nautical miles, and above all must be of use, at the request of the Captain, for rescue purposes and for the safety of the vessel by communication with coast stations or with the stations of other ships without distinction of system.

The Royal Imperial Masters of Ports as well as Consuls are

S. L. H. Rydin

Director of Telegraphs,
Sweden.

[*To face page* 114

authorised to forbid the carrying of passengers on any ships passing beyond Gibraltar and (or) Aden not so fitted.

This decree will come into force one year after notice of same has been published.

THE following Regulation of the Ministry of Commerce, dated March 1st, 1912, concerns the erection of a wireless telegraphy inspectorate in Trieste, and the erection and regulation of wireless telegraphy offices on Austrian vessels.

(1) In accordance with the High Decree of 15th February, 1912, a Royal Wireless Telegraphy Inspectorate has been created, which is immediately subordinate to the Ministry of Commerce. On and after April, 1912, this department shall control the Wireless Telegraph offices on board Austrian ships, private Wireless Telegraph offices on Austrian ships and foreign ships in Austrian territorial waters.

REGULATIONS.

The following normal Regulations governing the installation and working of wireless telegraph offices on board Austrian ships came into force on April 1st, 1912 :—

(1) Wireless Telegraph offices on board ships under the State direction shall carry the sign "Kk Bordtelegraphamt" (Royal Telegraphy Office on Board Ship), together with the name of the vessel.

(2) The owner of a vessel who requires a Wireless Telegraph office must apply to the Ministry of Commerce, and must give the following particulars :—

(*a*) The name of the ship and the time and date when the installation is required to be erected.

(*b*) The routes on which the ship will be principally engaged.

(*c*) The accommodation for first and second-class passengers on board.

(3) The Ministry of Commerce must, within a period of two months, inform any applicant for a Wireless Telegraph installation on board ship whether such an installation will be granted, and, if so, upon what terms.

Provided the vessel on which it is proposed to instal a Wireless Telegraph office comes within the scope of the Decree of the Ministry of Commerce, dated November, 1910 (concerning the equipment for Wireless Telegraphy of long-voyage passenger ships) the Ministry of Commerce must grant any application made in accordance with these regulations.

In cases where the Ministry declines to grant an installation, it is not called upon to state any reasons for its refusal. A written agreement is in all cases drawn up between the State Department and the owner of the vessel when an installation is granted.

In the event of any change in the regulations, a new agreement must be made.

(4) The Wireless Telegraph office shall be installed as near as possible to the date required by the shipowner, provided the application sent has duly satisfied the conditions laid down in Regulation 2. The period during which the installation is granted is usually six months.

The State department shall bear the entire cost of the fitting and furnishing of the Wireless Telegraph office, which is to remain the property of the State. The department shall undertake to maintain the office in a state of efficiency and to supervise the working of the installation through its own servants.

(5) The shipowner shall be responsible for the cost of all arrangements on board, services of the ship's *personnel,* materials and plant necessary for the proper installation and working of the Wireless Telegraph office, as well as the necessary electric power.

The shipowner's obligations with regard to these arrangements are set forth in detail in the written agreement referred to in Regulation 3.

The shipowner shall be required to provide adequate facilities for the telegraphists on board, to enable them to carry out their duties in an efficient manner; and the telegraphists must be made acquainted with the course and speed of the ship, soundings, and distances from foreign stations, as well as meteorological data.

6. The shipowner must pay the salaries due to the telegraphists for each voyage, which amounts thus paid will be refunded by the State, who will inform the owner, before the departure of the vessel, the amount of salary due to the telegraphists and the dates when the salaries become due.

The owner of the ship must make suitable provision for the safety of the telegraphists on board.

The owner must, at his own cost, carry out the following duties :—

(*a*) Carry telegraphists of the Royal Austrian Navy between Pola and Trieste when ordered to transfer them to or from the Wireless Telegraph Inspectorate at Trieste.

(*b*) Transfer the ship's telegraphists between the port and the ship which is being equipped with a Wireless Telegraph office, or between two ships, and provide for the maintenance of the telegraphists during the transfer.

(*c*) First-class travelling expenses and maintenance of the chief officials of the Royal Telegraph Department shall be provided when the officers are proceeding to take up their duties. Second-class travelling expenses shall be provided for officers of lower rank.

(7) The shipowner must contribute to the State Department an annual sum for the cost of the Wireless Telegraph office on board.

In the case of ships which come under the decree of the Ministry of Commerce dated November, 1910, the amount which the shipowner must contribute is from Kr. 2,200 to 2,500 (£1,100 to £1,250)—the amount depending upon whether the apparatus is of the first or second-class type. The Ministry of Commerce will decide under which class the apparatus comes. The annual amount is payable in advance, in instalments, which become due on the first day of the months January, April, July, and October. The liability of the owner of the vessel becomes due on the date when the Wireless Telegraph office on board commences operations, and ceases on the date of the closing of the office; but in any case not before the expiration of the term of notice.

If the ship should be lost, the obligation to contribute ceases on the date of the loss, and when this is not known, the obligation is dated from the last date on which the ship was heard.

When a vessel has received through its Wireless Telegraph office distress messages from other ships, and has thus saved or helped to save another ship, the owner must pay to the State Department 3 per cent. of the net sum received by him for salvage.

(8) Service messages to and from the owner of the ship are dealt with at ordinary rates; "shipowner telegrams" which are wireless telegrams transmitted by the captain of the ship to the owner, or to the managing officials or agents, and which deal with the crew, passengers, cargo condition, voyage, conduct, or damage of the ship, are not transmitted in the interests of a third person.

"Ship Service Telegrams" are wireless telegrams exchanged by the captains of ships under the same ownership. Both classes of telegrams must be composed by the senders, and code words must be used as far as possible. A copy of the code must be deposited on board ships that have to transmit shipowner and ship service telegrams, and likewise in the office of the department. Such telegrams must be written by the sender on a form having a detachable receipt coupon provided for the purpose. They are only transmitted when the receipt coupon has been impressed with the ship's stamp, and this stamp must agree with the stamp which is deposited by the commander of the vessel in the wireless telegraph office on board.

(9) The coast and land charges for shipowner telegrams are deferred and are fixed on the basis of the receipt coupon in the wireless office on board. These charges must be checked immediately after the arrival of the ship in her own port against the amount of the receipt in the wireless telegraph office on board.

The charges for private telegrams may be collected in cash by the officer in charge of the wireless telegraph office, at the time of the despatch of the telegram, or they may be placed to credit.

(10) Telegraph operators on board are subject to the general disci-

pline of the ship, and to the instructions of the captain or his representatives. They must not, however, be called upon to participate in any of the ordinary business of the ship.

Free access to the premises of the telegraph office is allowed to the captain or to his representatives. Other members of the crew may have access to these premises only for the purpose of executing the duties mentioned in Regulation 5.

A member of the crew must be sufficiently competent to take the place of the operator in case of necessity, and before the beginning of the voyage the person so appointed must be sworn to secrecy in the usual way.

(11) The State shall provide a Wireless Telegraph office on board ship when it deems it necessary for a definite or indefinite period, and in this case the owner has no claim to indemnity.

In the case of mobilisation or war the embargo on the Wireless Telegraph office of a ship can be ordered by the Royal Austrian Navy or by a Royal Austrian Consulate.

The captain of a ship is responsible for the closing of a telegraph office when such an order proceeds from the authorities mentioned.

(12) The State may at any time create a Wireless Telegraph office on a ship not limited to the decree referred to in Regulation 3. The owner of the ship must receive not less than six months' notice of the intention to create such an office; but, where circumstances warrant it, this period of notice shall not be observed.

The owner must give six months' notice in writing of his intention to terminate the agreement referred to in Regulation 3, and in the case of the sale of the ship three months' notice.

After the expiration of the notice the Wireless Telegraph office will be dismantled (except in the case of the ship sold abroad), but the dismantling shall take place only when the ship is in an Austrian port.

In the event of the dismantling of the office taking place in a port other than that of Trieste, the shipowner must pay for the technical dismantling and material belonging to the State, and he must despatch the apparatus to Trieste at his own cost, and pay the fares of the telegraph operators to the last-named port.

Temporary Service Regulations for Wireless Telegraphists.

A.—General.

1. In the Wireless Telegraph service of the Government Post and Telegraph Organisation, and, outside the Royal Naval Reserve, State employees under the title of "Funkentelegraphisten" (wireless telegraphists) will be employed.

The appointment of wireless operators will only take place in case of a lack of Royal Naval Reserves.

The conditions of service of wireless operators is subject to the

following regulations, which, however, do not in any way affect discipline on board ship either of Captains, Port Officials, or Consuls.

B.—Appointment.

The conditions for the appointment of wireless operators are as under :—

1. Proof of Austrian citizenship.

2. Freedom from any conviction in a criminal court.

3. Age limit, between 18 and 40 years.

4. Proof of bodily fitness and general capability for the service.

5. Proofs of the necessary knowledge of languages for the special conditions of service.

6. Proof of capability to obtain a ship's telegraphist's certificate in case one year has expired since the issue of the certificate held by the applicant or since the last practical work done by him. The applicant has to prove that he has sufficient practice to enable him to carry on the service in an appropriate manner.

7. Applicants under age must present proof of permission to enter the service from parents or those responsible for them.

The following are excluded from appointment :—

1. Those who, through conviction in a criminal court have lost the right to enter the State service providing they have not regained same.

2. Those who have been bankrupts or who are trustees or guardians.

3. Those who have been employed by the State, and through some fault of their own have been dismissed therefrom.

Should a person who according to these regulations is excluded from appointment by any chance be appointed without the approval of the Minister of Commerce, he shall be considered as no longer belonging to the Service from the time that his undesirability for the Service is proved, and at once be dismissed therefrom without further ado.

4. Appointment is made by the Wireless Telegraph Department in Trieste by means of Service contract and either :—

(*a*) by notice, or

(*b*) for a certain voyage.

For appointment for a voyage only temporary use of the services of an operator as far as can be foreseen would be made, and State officials do not undertake any responsibility for the disadvantages which may be caused to an operator through the prolongation of the duration of a voyage of any ship where he may be engaged.

When appointments are being considered, those persons who have requested the Inspectors' Department of the Service to put them in special or certain positions will first be taken into account.

The Service contract will be made in duplicate, one copy being handed to the employee against receipt for same, the other one being kept by the officials of the Department.

5. Wireless operators will be sworn in by the officials of the Wireless Department. The form of oath will be the one prescribed for other State officials.

C.—Rights and Duties.

6. For appointments subject to notice salary will be paid monthly. The monthly salary is due from the first to the last day of service inclusive.

Whether the salary commences or ends during the course of a calendar month, only the aliquote part will be paid, and 30 days will be reckoned as being one month.

7. For appointments for voyages salary will be paid by the day. The daily salary is due from the first to the last day of service inclusive.

In case a telegraphist who was appointed for a voyage should enter upon duty where he is subject to notice, he is entitled to any money outstanding under the conditions of the previous terms of appointment.

8. The payment of salary as mentioned in Par. 6 and 7 will take place on the last day of each month, but should an operator leave the service on a day other than the last of the month, he will be paid when he leaves. During a voyage the payment of salary will be made by the paymaster of the shipowners.

For voyages beyond the Mediterranean and Black Seas only one-half of the salary will be paid during the voyage, the other half being paid by the Wireless Telegraph Dept. at the end of the voyage.

9. Beside the regulation pay as per Par. 6 and 7, the wireless operator has a right to the following :—

(1) The benefits conferred by the Regulations of the Board of Trade of March 1st, 1912, R.G.Bl. No. 43 from the shipowners, and especially for sustenance and attention on board.

(2) A share in the profits of telegrams transmitted as per the special rules.

Telegraphists appointed subject to notice are further allowed : —

(*a*) For the period when not on board they receive an extra allowance of kronen 2 per day.

(*b*) For proofs of a mastery of a foreign language or languages, kronen 5 per month for each foreign language.

10. Operators may wear uniform whether on or off duty, but the wearing of any other uniform than that described in Supplement 5 is not permitted. Operators must use or allow to be used the wireless installations under their care *only* for the benefit of the State, and are moreover to continually bear in mind the safety of the ship.

Before going aboard, wireless operators must see that they have a sea Service Book in their possession.

E.—CANCELLATION OF THE SERVICE CONTRACT.

19. The Service Contract of operators appointed on notice may be cancelled :—

(1) By a six months' notice from either party.

(2) By the obligation to enter the military service as prescribed by the law for the duration of the said military service.

(3) By dismissal.

20. The Service Contract of operators appointed for voyages may be cancelled :—

(1) After the expiry of three days from the date of return from a voyage.

(2) By dismissal.

21. Except when a telegraphist has been dismissed from the Service, he has the right to a reference covering the period of his service.

F.—STAFF RECORDS.

22. At the Inspectors' Office of the Wireless Telegraph Department complete data regarding each wireless operator will be kept. The operator is bound to give any particulars by document or otherwise, and also to report any changes necessary in the said data.

BAHAMAS

AN Act to restrict the use of wireless telegraphy except under certain conditions (1902) :—

1. This Act may be cited for all purposes as "The Wireless Telegraphy Restriction Act, 1902."

2. From and after the passing of this Act it shall be unlawful for any person in these islands to transmit or receive messages across the seas by means of any wireless telegraphy whatsoever ("*or to erect, construct, establish, or maintain any instrument or apparatus for the purpose of transmitting or receiving such messages*"—added by an Act of 1903), unless such person shall have previously received the consent in writing, under the hand of the Colonial Secretary of the Governor in Council, authorising the same.

3. Any person violating the provisions of this Act shall be liable, on summary conviction, to a penalty not exceeding £200, anything in the Magistrates' Act, 1896, to the contrary notwithstanding.

BARBADOS

WIRELESS ACT, 1905.

THIS Act may be cited as the Wireless and Submarine Telegraph Act, 1905.

2. (1) The West India and Panama Telegraph Company shall not

lay down or maintain a new telegraph cable nor shall any other company or person lay down or maintain any telegraph cable upon the foreshore and bed of the sea except under and in accordance with an Act of the Legislature.

(2) A person shall not establish any wireless telegraph station, or instal or work any apparatus for wireless telegraphy in any place in this island except under and in accordance with an Act of the Legislature.

(3) If the West India and Panama Telegraph Company lays down or maintains a new telegraph cable or if any other company or person lays down or maintains any telegraph cable upon the foreshore or bed of the sea without the authority of an Act of the Legislature in that behalf, the company or person shall be liable, on conviction before a Police Magistrate, to a penalty not exceeding £100 and shall forthwith remove the telegraph cable, and if the telegraph cable be not removed within one day after such conviction the company or person shall be liable to a penalty not exceeding £50 for each day thereafter during which the company or person shall fail to remove the telegraph cable. Provided, that the Governor-in-Executive Committee may at any time after the expiration of one day from the date of the conviction cause the same to be removed and destroyed.

(4) If any person establishes a wireless telegraph station without the authority of an Act of the Legislature in that behalf, or instals or works any apparatus on any place in this island for wireless telegraphy without such authority in that behalf he shall be liable, on conviction before a Police Magistrate, to a penalty not exceeding £100, and further be liable to forfeit any apparatus for wireless telegraphy installed or worked without such authority.

(5) If a Police Magistrate is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without legal authority in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place within his jurisdiction without such authority in that behalf, he may grant a search warrant to any police officer named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station or place and to seize any apparatus which appears to him to have been used, or intended to be used, for wireless telegraphy therein.

(6) No proceedings shall be taken under any of the provisions of this section except by order of the Governor.

3. This Act shall continue in force until the 31st day of March, 1907. (*By an amending Act of* 1908, *this Act continues in force until repealed by the Legislature.*)

BELGIUM

THE following Decree came into force on November 3rd, 1913 :—

In virtue of the law of March 6th, 1818, relating to the penalties to be imposed for contraventions of the administrative regulations in the interior, as also to those which might be called into force by the by-laws of provincial and communal authorities, on the suggestion of our Minister of Marine, Posts, and Telegraphs, we do and hereby decree :—

1. On Belgian territory and on Belgian ships every kind of electrical radiating apparatus or installation capable of being used for or interfering with either the transmission or the reception of radio-telegraphic or radio-telephonic signals, as well as every projected removal of or modification to, or in the arrangement of an authorised installation, must be submitted to the Marine Department previous to any steps being taken which may be considered as a commencement of such a project.

The applicant for a licence must indicate the nature of the installation, the object of its exploitation as regards ship stations, the tariff of taxes which it is intended to charge, the details of the apparatus and methods to be employed, the wave length, the hours of working, and generally all information of such a nature as will permit of a complete study of the project; it must further state what measures are proposed in order to prevent disturbance in the service of other stations, either official or authorised.

2. The granting of a licence is subject to the reserve and conditions which are considered necessary in the interest of the public safety and convenience, this also including the safeguard of the public and service correspondence.

3. A new licence becomes necessary :—

(*a*) If the station has not been installed or modified and put into service within the time specified in the licence.

(*b*) If the station has been put into action or exploited in conditions other than those stipulated therein.

4. This regulation applies to all installations which were in existence prior to the Act being put into force, and the owners of such installations must forthwith apply for a licence, as prescribed in Article 1 of this Act, and in the meantime they must suspend the operation of such stations until the granting of a licence.

5. Vessels registered in foreign nations, fitted with wireless telegraph apparatus previous to their entry into Belgian waters, shall not be subjected to the previous dispositions, but they must procure a permit from the Belgian Minister to enable them to operate. Neither do the foregoing dispositions prevent distress signals being sent or received from other ships.

Foreign vessels are required, on entering Belgian waters, to cease

all operations which might interfere with radio-telegraphic or radio-telephonic stations in Belgium.

6. On Belgian territory and in Belgian waters, as well as on board Belgian vessels to be found in foreign waters or harbours, the duly sworn delegates of the Government (according to Article 8 of the law of July 10th, 1908) have, at all times of the day or night, free access to the lands, buildings, ships or other craft, where licensed installations are working or for which a regular certificate of authorisation has been granted. The proprietors, exploiters, owners, commanders, directors, managers, chiefs, or employees of any description are bound to facilitate by all means in their power to help such delegates in the carrying out of their duties of examining such stations.

7. Proprietors, exploiters, and owners are responsible under civil law for the fines imposed on their commanders, directors, managers, chiefs, or employees.

8. The Minister of Marine, Posts, and Telegraphs is charged with the execution of the present law.

9. The present law will come into force the day following the date of publication (November 4th, 1913).

BERMUDA

The Wireless Telegraph Act, 1903.

FROM and after the passing of this Act it shall not be lawful for any person in these islands to transmit or receive messages across the seas (*by an Act of* 1910 *this was amended by the addition of the words "or between places in these islands"*) by means of any wireless telegraphy, or to instal, erect, construct, establish, or maintain in these islands any instrument, apparatus, or other thing for the purpose of transmitting or receiving such messages, unless such person shall hold a written licence from the Governor authorising the same, and such licence shall be in force and unrevoked; and any person who shall offend against the provisions of this enactment shall be liable, on summary conviction before any two justices, for a first offence to a penalty not exceeding £25, and for a second or subsequent offence to a penalty not exceeding £100.

2. Any licence issued by the Governor under this Act may at any time be revoked by him by a written notice given to the person to whom such licence was issued, or by the publication of such revocation in the *Gazette*, and after such revocation such person shall not be entitled to any privilege or protection by virtue of such licence.

3. Any licence under this Act may be issued subject to such conditions and restrictions as the Governor may from time to time consider desirable in the public interest.

4. If any Justice of the Peace shall be satisfied from the information on oath of any credible person that there is good reason to believe that any of the provisions of the first section of this Act have been or are being violated, he may issue a search warrant to any constable or constables authorising and requiring him or them, with or without assistants, at any hour of the day or night, to enter into, and go through and search, inspect and examine any premises where such violation is suspected to have been or to be committed for the purpose of ascertaining whether such violation has been or is being committed; and if, upon such search, any instrument, apparatus, or other thing apparently used, or capable of being used, for the purpose of transmitting or receiving messages across the sea by wireless telegraphy shall be found, it shall be lawful for such constable or constables to seize and carry away, or otherwise to secure the same; and if, upon a hearing before any two Justices of the Peace, they shall adjudge and determine that any such instrument, apparatus, or other thing, has been used, or is capable of being used, for either of the purposes aforesaid, they may adjudge the same to be forfeited, and such forfeiture may be in addition to any penalty which may be imposed on any person under this Act in respect of such instrument, apparatus, or other thing.

5. Any instrument, apparatus, or other thing which shall be adjudged to be forfeited under the provisions of this Act shall be sold or otherwise disposed of in such manner as the Governor shall direct, and if sold the net proceeds of such sale shall be paid into the public treasury, after payment thereout of such reward, if any, as the Governor shall award to the informer, or to any constable or constables executing the search warrant under which such articles were seized.

6. This Act shall continue in force until and throughout the last day of December, 1907. (*By the Wireless Telegraphy Act Continuing Act, 1907, the Act of 1903 is continued in force indefinitely.*)

1909.

The Governor having informed the Legislature that a despatch has been received from the Secretary of State for the Colonies drawing attention to the desirability of making Regulations as to the use of Wireless Telegraphy apparatus on merchant ships, whether British or foreign, while in the territorial waters in these islands, and it was deemed expedient to confer on the Governor in Council the power to make such Regulations as may be necessary for the purpose aforesaid, and the following Act came into force in March, 1909:—

1. It shall be lawful for the Governor in Council to make regulations as to the use of wireless telegraph apparatus on merchant ships, whether British or foreign, while in the territorial waters of

these islands, for preventing such apparatus being worked so as to interfere with naval signalling, or with the working of any wireless telegraph station lawfully established or worked in these islands, or with the transmission of messages between any such station and ships at sea.

2. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whilst in the territorial waters of these islands shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases, or in such cases as may be deemed desirable.

3. Any regulations made under this Act may Impose fines for any breach thereof not exceeding £20 for a single offence, and not exceeding £5 a day for a continuing offence, and such fines shall be recoverable with costs in any Court of Summary Jurisdiction consisting of any two Justices of the Peace.

4. All regulations made under this Act shall become operative on the date of their publication in the *Gazette,* or on such later date as shall be fixed by the regulations for the purpose.

BRAZIL

THE following is an extract from an Act relating to the Merchant Service :—

Article 159.—Those boats must without exception be provided with radio-telegraphic apparatus, approved by the General Direction of Telegraphs, with the necessary power to allow of communication with the wireless stations in the zones in which they trade, when :—

(*a*) they carry passengers and are employed in the coastal trade, of any description whatsoever, and having a registered tonnage of over 300 tons, and for those boats employed in river trade having a registered tonnage of over 500 tons.

(*b*) they are only employed in the coastal trade as cargo boats but carry over 30 (thirty) souls all told.

Article 160.—After the promulgation of this regulation, no ship shall be registered by any Port Authority if it has not complied with the regulations of the preceding Article, the licence to navigate being refused to any ship which, within one year from the date of the promulgation of this regulation, shall not have fulfilled the dispositions set forth herein.

Law No. 2,719 of December 31st, 1912, fixes the wireless rates at 6 francs for a telegram up to 10 words, and 60 centimes

for each word extra; included in the rate is the transmission between a coast station and the telegraph stations to which the wireless station is directly joined up.

There is also a tax of 25 centimes a word for every State that the telegram passes through. The ship tax, as fixed by the Telegraph Department, is 240 reis a word, and the coast station and forwarding charge is 360 reis, equalling together one franc; 10 words are charged for, and the extra tax of 25 centimes is collected when necessary.

A new wireless district was created by Law No. 2,738 of January 4th, 1913, with a credit of 732 contos, to include the Acre, Amazonas and Para wireless stations, and these stations have since been taken over by the Telegraph Department and opened to public traffic.

BRITISH GUIANA

THIS Ordinance may be cited as "The Telegraph Ordinance, 1903."

2. In this Ordinance "Telegraph" means an electric, galvanic, or magnetic telegraph, and includes appliances and apparatus for transmitting or making telegraphic, telephonic or other communication by means of electricity, galvanism or magnetism, whether the same be transmitted by means of wires or cables or without wires or cables.

3. The Governor-in-Council shall have the exclusive privilege of establishing, maintaining and working telegraphs between the Colony and places outside of the Colony.

Provided that the Governor-in-Council may grant a licence on such conditions and in consideration of such payments as he thinks fit, to any person, company or body corporate, to establish, maintain, or work a telegraph between the Colony and any place or places outside the Colony; and

Provided that nothing in this Ordinance shall apply to or in any way affect the rights already granted to the West India and Panama Telegraph Company, Limited, under any Ordinance or Ordinances passed before the commencement of this Ordinance.

Ordinance No. 7 of 1910.

1. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place

or on board any British ship registered in the Colony, except under and in accordance with a licence granted in that behalf by the Governor-in-Council.

(2) A person shall not work any apparatus for wireless telegraphy installed on any merchant ship (whether British or foreign) whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made in that behalf by the Governor-in-Council, and the Governor-in-Council may, by any such regulations, impose penalties recoverable summarily for the breach of any such regulations, not exceeding fifty dollars for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour and be liable on summary conviction thereof to a penalty not exceeding fifty dollars, and, on conviction on indictment, to a fine not exceeding five hundred dollars, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence.

(4) If a Justice of the Peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship within his jurisdiction without a licence in that behalf or contrary to the provisions of the regulations made under sub-section two of this section he may grant a search warrant to any police officer or any officer appointed in that behalf by the Governor or the Postmaster-General and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

(5) The expression "wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: *Provided,* That nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

2. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1910.

BRITISH HONDURAS

ORDINANCE NO. 13.—1903.

IT shall not be lawful for any person to use or establish any apparatus or installation for the purpose of operating a wireless electric telegraph without a licence from the Governor on such terms and conditions as the Governor may from time to time prescribe.

2. Any person who commits any offence against the provisions of this Ordinance is guilty of a misdemeanour within the meaning of the Criminal Code.

BRITISH NORTH BORNEO

BRITISH NORTH BORNEO has been included as a party in the International Radiotelegraphic Convention.

The following proclamation controls the use of wireless telegraphy :—

1. This proclamation may be cited as "The Wireless Telegraphy Proclamation, 1914," and shall come into force upon the publication thereof in the *Gazette*.

2. (i.) In this proclamation the expression "wireless telegraphy" means any system of communication by telegraph as defined by "The Telegraph Proclamation, 1901," without the aid of any wire connecting the points from and at which the messages or other communications are sent and received;

The expression "locally owned ship" means a ship owned wholly by the Government or by bodies corporate established under and subject to the laws of this State, and having their principal place of business within this State.

(ii.) Nothing in this proclamation shall prevent any person from making or using apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may, whenever he shall deem it expedient to do so, license the establishment of any wireless telegraph station, or the installation or working of any apparatus for wireless telegraphy, in any place in this State or on board any locally owned ship.

4. (i.) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in this State or on board any locally owned ship except under and in accordance with a licence granted in that behalf by the Governor.

(ii.) Every such licence shall be in such form and for such periods as the Governor may determine, and shall contain such terms, conditions, and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (i.) Any person establishing a wireless telegraph station without a licence in that behalf, or installing or working any apparatus for wireless telegraphy without a licence in that behalf, shall be liable to a fine not exceding one thousand dollars or to imprisonment of either description for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, provided that no proceedings shall be taken against any person under the proclamation except with the previous sanction of the Governor.

(ii.) On being satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf, a magistrate may grant a search warrant to any police officer to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (i.) The Governor may make and, when made, vary or cancel rules more particularly for all or any of the following matters:—

(*a*) For prescribing the form and manner in which applications for licences under this proclamation are to be made;

(*b*) For prescribing the fees payable on the grant of any licence;

(*c*) For regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship or a British or a foreign ship, in the waters of this State shall be worked so as to prevent the interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in this State or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*d*) For prohibiting, except with the special or general permission of the Superintendent of Telegraphs, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship or a British or a foreign ship, whilst such ship is in any of the harbours of this State;

(*e*) For prohibiting or regulating, in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that the Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether locally owned ships or British or foreign ships, in the waters of this State, the use of wireless telegraphy on board such ships while in such waters

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Postmaster-General
Dominion of Canada.

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by such further rules as the Governor may see fit to make from time to time, and either in all cases or in such cases as may be deemed desirable;

(*f*) And generally for the more effectual carrying out of the provisions of this proclamation.

(ii.) No rules made in respect of the matters described in paragraphs (*c*), (*d*), and (*e*) of sub-section (i.) shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. On an application for a licence proving to the satisfaction of the Governor that the whole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted to such applicant, subject to such special terms, conditions, and restrictions as the Governor may think proper that such licence shall not be subject to any rent or royalty.

8. (i.) Every omission or neglect to comply with, and every act done or attempted to be done contrary to, the provisions of the proclamation, or of any rule made thereunder, or in breach of the conditions and restrictions subject to or upon which any licence has been issued, shall be deemed to be an offence against, not otherwise specially provided for, the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine not exceeding five hundred dollars.

(ii.) All convictions, forfeitures, and fines under this proclamation, or any rules made thereunder, may be had and recovered before the Court of a Magistrate of the First Class.

CANADA

WIRELESS Telegraphy in the Dominion was until 1913 regulated by Part IV. of the Telegraphs Act. (See YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913. Pp. 111 and 112.) This is now replaced by the Act which was assented to on June 6th, 1913, and reads as follows:

1. This Act may be cited as *The Radiotelegraph Act.*

2. In this Act, unless the context otherwise requires—

(*a*) "Minister" means the Minister of the Naval Service;

(*b*) "radiotelegraph" includes any wireless system for conveying electric signals or messages including radiotelephones;

(*c*) "coast station" means any radiotelegraph station which is established on land or on board a ship permanently moored and which is used for the exchange of messages and electric signals with ships at sea;

(*d*) "land station" means any radiotelegraph station or installation of radiotelegraphic apparatus which is not a coast station or a ship station;

(*e*) "ship station" means any radiotelegraph station established on board a ship which is not permanently moored.

3. No person shall establish any radiotelegraph station or instal or work any radiotelegraph apparatus in any place in Canada or on board any ship registered in Canada except under and in accordance with a licence granted in that behalf by the Minister.

4. From and after the first day of January, nineteen hundred and fourteen, no passenger steamer, whether registered in Canada or not—

(*a*) licensed to carry 50 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 200 nautical miles from one port or place to another port or place; or,

(*b*) licensed to carry 250 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 90 nautical miles from one port or place to another port or place; or,

(*c*) licensed to carry 500 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 20 nautical miles from one port or place to another port or place

shall leave or attempt to leave any Canadian port unless such steamer is equipped with an efficient radiotelegraph apparatus, in good working order, capable of transmitting and receiving messages over a distance of at least one hundred nautical miles by night and by day, and in charge of a person fully qualified to take charge of and operate such apparatus.

(2) The owner, master or other person in charge of any passenger steamer which leaves or attempts to leave any Canadian port contrary to the provisions of this section shall, on summary conviction, be liable to a fine not exceeding $1,000 and costs, and such fine and costs shall constitute a lien upon such passenger steamer.

(3) This section shall not apply to passenger steamers plying on the rivers of Canada, including the River St. Lawrence as far seaward as a line drawn from Father Point to Point Orient, or on the Northumberland Straits, or on the Georgian Bay, or on the lakes of Canada other than Lakes Ontario, Erie, Huron and Superior, and the provisions of paragraph (*c*) of subsection 1 of this section shall not apply to steamers making voyages on Lakes Ontario, Erie, Huron and Superior, the regular route for which is not at any point more than seven miles from the shore.

(4) This section shall not apply to steamers calling at Canadian ports solely for the purpose of obtaining bunker coal or provisions for the use of such steamer, or through stress of weather, or for repairs.

5. All persons operating land or cable telegraph lines shall transmit all messages destined to or coming from ship stations via coast stations

under such rules as may be made by the Board of Railway Commissioners for Canada.

6. No one shall be employed as a radiotelepraph operator at any coast or land station unless he is a British subject, and all radiotelegraph operators at shore or land stations, or on ship stations on board any vessel registered in Canada, shall take and subscribe a Declaration of Secrecy in the form set forth in the Schedule to this Act, before a judge of any court, a notary public, a justice of the peace or a commissioner for taking affidavits, having authority or jurisdiction within the place where the oath is administered.

(2) Every person who has made the Declaration of Secrecy and who, either directly or indirectly, divulges to any person, except when lawfully authorised or directed so to do, any information which he acquired by virtue of his employment, is guilty of an offence and shall be liable on summary conviction to a penalty not exceeding $100 and to imprisonment for a term not exceeding six months.

7. Any person who sends or transmits or causes to be sent or transmitted any false or fraudulent distress signal, message, call or radiogram of any kind, or who without lawful excuse interferes with or obstructs any radio-communication, shall be guilty of an offence and shall be liable on summary conviction to a penalty not exceeding $500 and costs or six months' imprisonment.

8. If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that a radiotelegraph station has been established without licence in that behalf, or that any apparatus for radiotelegraphy has been installed or worked in any place or on board any ship registered in Canada within his jurisdiction without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Minister and named in the warrant.

(2) A warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship and to seize any radiotelegraph apparatus which appears to him to be there used or intended to be there used for radiotelegraphy.

9. Everyone who establishes a radiotelegraph station or instals or works any radiotelegraph apparatus in violation of the provisions of this Act, or of any regulation made hereunder, shall be liable on summary conviction to a penalty not exceeding $50, and on conviction on indictment to a fine not exceeding $500 and to imprisonment for a term not exceeding twelve months, and in either case shall be liable to forfeit to His Majesty any radiotelegraph apparatus installed or worked without a licence.

(2) No proceedings shall be taken against any person under this section, except by order of the Minister.

10. The Governor in Council may—

(*a*) prescribe the tariff of fees to be paid for licences and for

examination for certificates of proficiency held and issued under the provisions of this Act;

(*b*) accede to any international convention in connection with radiotelegraphy, and make such regulations as may be necessary to carry out and make effective the terms of such convention and prescribe penalties recoverable on summary conviction for the violation of such regulations; provided that such penalties shall not exceed $500 and costs;

(*c*) make regulations for the censorship and controlling of radiotelegraph signals and messages in case of actual or apprehended war, rebellion, riot or other emergency.

11. The Minister may make regulations—

(*a*) prescribing the form and manner in which applications for licences under this Act are to be made;

(*b*) classifying ship, coast and land stations and prescribing the type and range of the regular equipment and the emergency equipment to be installed in the several classes of stations;

(*c*) defining the different kinds of licences that may be issued, their respective forms and the several periods for which they shall continue in force;

(*d*) prescribing the conditions and restrictions to which the several licences shall respectively be subject;

(*e*) prescribing the different classes of certificate of proficiency and the class of certificate necessary to qualify persons as operators for the several classes of ship, coast and land stations;

(*f*) for the examination of persons desiring to obtain certificates of proficiency as radiotelegraph operators and to determine the qualifications in respect of age, term of service, skill, character and otherwise to be required for such certificates;

(*g*) prescribing the watches to be kept by operators and the number of operators to be maintained and kept at the different classes of ship, coast and land stations;

(*h*) for the inspection of radiotelegraph stations;

(*i*) to provide how radiotelegraph apparatus installed upon any foreign or British ship (whether such British ship is registered in Canada or elsewhere) shall be operated while such ship is within the territorial waters of Canada;

(*j*) to compel all radiotelegraph stations to receive, accept, exchange and transmit signals and messages with such other radiotelegraph stations and in such manner as he may prescribe;

(*k*) for the effective carrying out of the provisions of this Act.

(2) The Minister may, by regulation, authorise the imposition of penalty not exceeding fifty dollars and costs or three months' imprison-

ment for the violation of any regulation made under this section, and any such penalty may be recovered upon summary conviction.

12. All regulations made under the provisions of the two sections immediately preceding shall be published in *The Canada Gazette*, and shall be laid before both Houses of Parliament within ten days after the publication thereof if Parliament is then sitting, and if Parliament is not then sitting, then within ten days after the next meeting thereof.

13. His Majesty may, at any time, assume, and for any length of time retain, possession of any radiograph station and of all things necessary to the sufficient working thereof, and may, for the same time, require the exclusive service of the operators and other persons employed in working the same; and the person owning or controlling the station shall give up possession thereof, and the operators and other persons so employed shall, during the time of such possession, diligently and faithfully obey such orders, and transmit and receive such signals, calls and radiograms as they are required to receive and transmit by any duly authorised officer of the Government of Canada.

(2) If the Minister and the person owning or controlling any radiotelegraph station taken possession of by the Crown under the provisions of this section cannot agree as to the compensation to be paid by the Crown for such taking possession, the Minister shall refer the matter to the Exchequer Court of Canada for adjudication.

14. Part IV. of *The Telegraphs Act* is repealed.

SCHEDULE.

DECLARATION OF SECRECY.

I, A. B., solemnly and sincerely promise and declare that I will faithfully and honestly fulfil the duties which devolve upon me as radiotelegraphic operator, and that I will not, either directly or indirectly, divulge to any person, except when lawfully authorised or directed so to do, any information which I acquire by virtue of my employment as such operator, or which may come to my knowledge through the operation of any radiotelegraphic installation.

Declared before me at .....
this ..... day of ....., 19....

[*Signature of declarant.*]

SHIP LICENCE.

THE herein named ....., resident of ....., is hereby licensed to establish and operate a wireless telegraph station on board the ship ..... for the term or period commencing ....., and terminating on ....., and to instal and operate at such station the apparatus mentioned in the schedule hereto, on payment of the sum of one dollar, being the licence fee for the privilege above named.

This licence is subject to the following terms, conditions and restrictions :—

1. In this licence the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something, either in the subject or context, repugnant to such construction, that is to say :

The expression " marine signalling " means signalling by means of any system of wireless telegraphy between two or more ships, between ships and shore stations and any other wireless telegraph station, or between shore stations and ships; and the term " Minister " means the Minister or the Deputy Minister of the Naval Service for the time being.

2. (1) The licensee shall not establish, instal or operate any apparatus for wireless telegraphy, except the apparatus hereinafter called the " licensed apparatus " specified in the said schedule hereto.

(2) No tolls, fees or other consideration shall be received, levied or collected by the licensee until the same have been approved of by the Board of Railway Commissioners.

3. (1) The licensee shall so operate the licensed apparatus as not to interfere with the working of any wireless telegraph station established in Canada, or with marine signalling on the waters or territory of Canada or neighbouring waters or territory.

(2) With a view to preventing such interference as aforesaid, the licensee shall comply with all directions which shall be given to the licensee by the Minister and with all rules prescribed by the Minister for observance by his licensees :—

(*a*) With respect to all arrangements to be adopted for the purposes of syntony or enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station;

(*b*) With respect to any alteration of messages which the Minister may think necessary; and

(*c*) Generally with respect to avoiding interference between one wireless telegraph station and another.

(3) The licensed apparatus shall not, without the consent of the Minister, be altered or modified in respect of any of the particulars mentioned in the schedule hereto.

4. (1) The licensee shall, if so required in writing by the Minister, cease to operate the licensed apparatus for such period (not exceeding ..... hours in any one day) as may be specified by the Minister.

5. Subject to the provisions of the licence, and in accordance with the regulations issued from time to time by the Minister, the licensee shall transmit and receive messages by means of the licensed apparatus to and from any coast station or to and from any other ship without

regard to the particular system of wireless telegraphy installed at such coast station or such other ship, on equal terms without favour or preference, whether as regards rates of charge, order of transmission or otherwise.

6. The licensee shall not be obliged to transmit and receive commercial messages by means of the licensed apparatus to and from a ship station on a ship registered in a country which does not adhere to the International Radiotelegraphic Convention, unless instructed so to do by the Minister in his regulations.

7. (1) If and whenever any department of the Government shall require the licensee, his servants or agents to transmit by means of the licensed apparatus any messages on His Majesty's service (including messages to and from ships of His Majesty's Royal Navy or Canadian Government vessels), such messages shall have priority over all other messages, and the licensee, his servants and agents shall, as soon as reasonably may be, transmit the same, and shall, until transmission thereof, suspend transmission of all other messages; and the rates to be charged on such messages shall not exceed half the rates charged the ordinary public.

(2) The licensee shall not be entitled to claim any compensation in respect of the suspension of the transmission of messages as aforesaid.

8. The licensee shall, so far as possible, receive from all other stations all requests for assistance and all signals of distress, and retransmit them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in his power.

9. The licensee shall not divulge to any person (other than properly authorised officials of the Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the licensee and transmitted by marine signalling or by any system of wireless telegraphy.

10. All messages transmitted by means of the licensed apparatus shall be copied in full in registers to be kept by the licensee for that purpose, and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its places of origin and ultimate destination and such further particulars as the Minister shall from time to time reasonably require to be shown, messages on His Majesty's service being in such registers distinguished from other messages. The licensee shall preserve all used message forms, written and printed, and transcripts of messages and all other papers for such periods as is from time to time prescribed by the regulations of the International Radiotelegraphic Convention, and such registers and message papers shall be open to the inspection of the Minister or his officers thereto authorised at the head office of the licensee, in Montreal, between the hours of 10 a.m. and 5 p.m., on every day except Sunday or a public holiday.

11. The Minister or his officers may from time to time and at all reasonable times enter upon the herein licensed station for the purpose of inspection, and may inspect any apparatus fixed or in use in such station for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such stations, and the working and user of such apparatus and telegraphic instruments.

12. The licensee shall prepare a detailed return of the messages handled by the licensed station during each month on the forms provided for that purpose by the Minister, and shall forward the same to the Minister at the end of each month.

13. (1) The licensee shall observe at the said station the provisions of the International Radiotelegraphic Convention as adhered to by His Majesty in respect of the Dominion of Canada and the detailed regulations from time to time made thereunder for carrying such provisions into effect.

(2) The licensee shall operate the licensed apparatus in accordance with any regulations which may be issued from time to time by the Minister.

14. Except with the consent in writing of the Minister, the licensee shall not assign or sublet the licence.

15. The licensed apparatus at the said ship station shall be worked only by a person or persons holding a certificate or certificates issued by the Minister.

Certificates shall be granted to persons of such technical proficiency, and shall be in such form and subject to such conditions as the Minister may from time to time prescribe.

16. The licensee shall carry this licence on the ship on which the ship station is established under this licence, and also such documents as may be prescribed by the Minister, for the purpose of enabling the licensee to communicate with coast stations in accordance with the rules and regulations of the International Radiotelegraphic Convention of Berlin, 1906.

17. If, and whenever, in the opinion of the Minister or any officer in command of one of His Majesty's ships of war, an emergency shall have arisen in which it is expedient for the public service that the Government shall have control over the transmission of messages by the licensed apparatus, it shall be lawful for the said Minister or officer, by warrant under his hand, to direct and cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's service and, subject, thereto, for such ordinary service as to the said Minister or officer may seem fit, and in that event, any person authorised by the said Minister or officer may enter upon the stations of the licensee and take possession thereof and use the same as aforesaid.

(2) The Minister or any officer in command of one of His Majesty's ships of war may when he considers such an emergency as aforesaid to have risen, instead of taking possession of the stations of the licensee, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus, either wholly or partly and in such manner as he may direct, and such persons may enter upon the licensee's premises accordingly, or the said Minister or officer may direct the licensee to submit to him or any person authorised by him all messages tendered for transmission or arriving by the licensed apparatus or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of messages as the said Minister or officer may prescribe, and the licensee shall obey and conform to all such directions.

(3) In any case such as aforesaid, if the licensee shows that during the exercise of any of the powers aforesaid, his receipts for the licensed apparatus with respect to which the said powers have been exercised have been less than his receipts from the same source during a corresponding period, the Government shall pay to the licensee, as compensation for any loss of profit sustained by the licensee by reason of the exercise by the Minister of any of the powers hereby reserved, such sum as may be settled between the Minister and the licensee by agreement or as in case of difference may be determined by arbitration. Provided always that no such compensation as aforesaid shall be paid if not so far as the powers hereby reserved to the Minister are exercised for the purpose of preventing direct communication with any of His Majesty's enemies, and, save with the consent of the Minister no such compensation shall be paid if not so far as the powers aforesaid are exercised for the purpose of preventing direct or suspected communication with any of His Majesty's enemies or of protecting the interests of His Majesty under the apprehension of impending war.

18. In case of any breach, non-observance or non-performance by or on the part of the licensee of any of the terms or conditions herein contained and on the part of the licensee to be observed and performed, then and in any such case the Minister may, by writing, revoke and determine these presents and the licences, powers and authorities hereinbefore granted, and thereupon these presents, and the said licences, powers and authorities and each and every of them shall absolutely cease, determine and become void.

19. Nothing in these presents contained shall prejudice or affect the right of the Minister, from time to time, to establish, extend, maintain and work any system or systems of wireless telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit, neither shall anything herein contained prejudice or affect the right of the Minister, from time to time, to enter into agreements for or to grant licences relative to the

working and user of wireless telegraphs (whether of a like nature to those hereby licensed or otherwise), or the transmission of messages in any part of Canada, by means of wireless telegraphy, with or to any person or persons whomsoever upon such terms as he shall, in his discretion, think fit.

20. Any notice, request or consent (whether expressed to be in writing or not) to be given by the Minister under these presents may be under the hand of any authorised officer for the time being of the Department of the Naval Service, and may be served by sending the same by registered letter to the licensee, and any notice to be given by the licensee, under these presents, may be served by sending the same by registered letter addressed to the Deputy Minister of the Naval Service, Ottawa, Ontario.

SPECIAL REGULATIONS FOR AMATEUR EXPERIMENTAL STATIONS.

1. At amateur experimental stations the power used measured at the terminals of the transformer must not exceed ½ kw.

2. The wave lengths which may be used vary with the distance between the licensed station and any commercial coast or land station or a route of navigation as follows:—

For transmission—

Class 1.—Stations located within 5 miles of a commercial coast or land station or a route of navigation shall not use a transmitting wave length greater than 50 metres;

Class 2.—Stations located more than 5 but less than 25 miles from a commercial coast or land station or a route of navigation shall not use a transmitting wave length greater than 100 metres;

Class 3.—Stations located more than 25 but less than 75 miles from a commercial coast or land station or route of navigation shall not use a transmitting wave length greater than 150 metres;

Class 4.—Stations located more than 75 miles from a commercial coast or land station or route of navigation shall not use a transmitting wave length greater than 200 metres.

3. In cases where transmitting apparatus is installed the natural wave length of the aerial and the length of the emitted waves must be as specified in the licence; in general this wave length will be the maximum allowable under Regulation No. 20.

4. In cases where no transmitting apparatus is installed on the station, no limit is placed on the length of the aerial which may be used provided it is employed for the purpose of reception only.

5. The station must be worked by a person holding an amateur experimental certificate of proficiency (see Regulation No. 97).

6. The waves emitted must be as little damped as possible, and in no case shall the logarithmic decrement of a complete oscillation exceed two-tenths. The coupling between the primary and secondary of the

oscillation transformer shall not be closer than that which gives a difference of five per cent. between the mean wave length and either of the two waves emitted by the coupled circuits.

7. A distinctive call signal will be allotted to each station commencing with the letter "X," *e.g.*, XAA, XAB, which signal must be sent not less than three times at the termination of every transmission.

8. The regulations of the International Radiotelegraph Convention must, where applicable, be observed by the station.

9. The station must take every precaution to prevent interference with the working of other stations.

10. The station, when operating, must listen for the signal "STP," which will indicate that an amateur experimental station is interfering with commercial business.

11. The latter signal will only be made use of by certain authorised Government stations and will not be used unless absolutely necessary. The signal "STP" will, whenever possible, be preceded by the call signal allotted to the amateur experimental station to which the interference is attributed and will be followed by the call signal of the Government station. On receipt of the "STP" signal all amateur experimental stations will cease to operate until the Government station gives the signal "Cancel STP."

12. The aerial must be connected to the transmitting apparatus only when actual communication is in progress or when measurements are being taken. At all other times, such as when the spark is being tested or sending is being practised, the aerial must be disconnected.

13. When the licensed station is in the vicinity of a commercial station it should be connected with the local telephone exchange so that instant communication may be established in case of interference.

CEYLON.

THE following rules, made under "The Ceylon Telegraph (Amendment) Ordinance No. 15 of 1914," regulate the use of wireless telegraphy in Ceylon and its territorial waters:—

DECEMBER 3, 1914.

1. Any person desirous of obtaining a licence for the establishment of a wireless telegraph station, or the installation or working of any apparatus for wireless telegraphy, in any place in the Colony, or on board any British ship registered in the Colony, must apply in writing to the Colonial Secretary. Such application must contain full particulars—

(*a*) Of the place or ship in respect of which a licence is sought;

(*b*) Of the nature of the apparatus which it is desired and proposed to instal and work; and

(*c*) Of the purposes for which the installation is intended to be utilised.

2. The following shall be the fees payable on the grant of licences :—

	Rs.
(*a*) For a licence for a land station	5
(*b*) For a licence for a ship station	5
(*c*) For an experimental licence	Free

3. All apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony, shall be worked in such a way as not to interfere with—

(*a*) Naval signalling; or

(*b*) The working of any wireless telegraph station lawfully established, installed, or worked in the Colony or in waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

4. In these regulations "naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station, whether on shore or on any ship.

5. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour, port, or bay of the Colony, except with the special or general permission of the Postmaster-General.

6. (i.) If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, and notice to that effect is published by the Postmaster-General, after the publication of such notice and until further notice the use of wireless telegraphy on board merchant ships, whether British or foreign, whilst in the waters of the Colony, shall be subject to such rules as may be made by the Governor, and such rules may prohibit or regulate such use in all cases, or in such cases as may be deemed desirable.

(ii.) Such notice as aforesaid shall be published in the *Ceylon Government Gazette*, and in such other manner, if any, as to the Postmaster-General may seem fit.

7. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use of working of any apparatus on board such ship.

8. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

9. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

CHINA

Hongkong

THE following Ordinance (No. 20 of 1913) to provide for the regulation of Wireless Telegraphy was passed on July 24th, 1913, and repeals all previous Ordinances :—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. "Telegraph" means an electric, galvanic or magnetic telegraph and includes appliances and apparatus for transmitting or making telegraphic, telephonic or other communications by means of electricity, galvanism or magnetism.

The expression "Wireless Telegraphy" means any system of communication by "telegraph" (as defined in this Ordinance) without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: provided that nothing in this Ordinance shall prevent any person from making or using an electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may whenever he shall deem it expedient to do so license the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony.

4.—(1.) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2.) Every such licence shall be in such form and for such period as the Governor-in-Council may determine and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5.—(1.) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand dollars or to imprisonment for a term not exceeding twelve months, and in either case be liable to forfeit any

apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Attorney-General.

(2.) If a Magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6.—(1.) The Governor-in-Council may make regulations for all or any of the following matters:—

(*a*) For prescribing the form and manner in which applications for licences under this Ordinance are to be made;

(*b*) For prescribing the fees payable on the grant of any licence;

(*c*) For regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*d*) For prohibiting, except with the special or general permission of the Colonial Secretary, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British of foreign, whilst such ship is in any of the harbours of the Colony;

(*e*) For prohibiting or regulating, in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that his Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Colony, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2.) Provided that no regulations made in respect of the matters described in paragraphs (*c*), (*d*) and (*e*) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms, conditions, and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

8.—(1.) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any Regulation made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Ordinance, and for every such offence not otherwise specially provided for the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine of five hundred dollars.

(2.) All convictions, forfeitures, and fines under this Ordinance or any Regulations made thereunder may be had and recovered before a Magistrate.

9. The Wireless Telegraphy Ordinance, 1903, the Wireless Telegraphy Ordinance, 1909, and the Wireless Telegraphy Amendment Ordinance, 1909, are hereby repealed.

THE following Regulations were made by the Officer Administering the Government-in-Council under the provisions of Section 6 of the Wireless Telegraphy Ordinance, 1913 (Ordinance No. 20 of 1913), on November 20th, 1913:—

1. Any person desirous of obtaining a licence for the establishment of a wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony, or on board any British ship registered in the Colony, must apply in writing to the Colonial Secretary. Such application must contain full particulars—

(*a*) of the place or ship in respect of which a licence is sought,

(*b*) of the nature of the apparatus which it is desired and proposed to instal and work, and

(*c*) of the purposes for which the installation is intended to be utilised.

2. The following shall be the fees payable on the grant of licences:

(*a*) for a licence under Section 3 for a land station $2.50

(*b*) for a licence under Section 3 for a ship station $2.50

(*c*) for an experimental licence under Section 7 ..... *Nil.*

3. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with—

(*a*) Naval signaling, or

(*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial

waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

4. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the Colony except with the special or general permission in writing of the Colonial Secretary of the Colony.

5. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that his Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whilst in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. No proceedings shall be taken against any person under these Regulations except with the previous sanction of the Attorney-General.

Weihaiwei

No. 1 of 1904.

1. It shall not be lawful for any person to use or establish any apparatus or installation for the purpose of operating a wireless electric telegraph without a licence from the Commissioner on such terms and conditions as the Commissioner may from time to time prescribe.

2. Any person who commits any offence against the provisions of this Ordinance shall be liable to a fine not exceeding $500 or in default of payment thereof to imprisonment for a term not exceeding six months, with or without hard labour.

DENMARK

THE following regulations became effective on February 1st, 1909:—

In accordance with law No. 99 of 19th April, 1907, concerning wireless telegraphs (radiotelegraphs) and with the, in Berlin, the 3rd November, 1906, drawn up International Convention concerning radiotelegraphs, supplemented by appendix decisions, finishing protocol and service regulations, the following decisions will have to be observed in founding and working of radiotelegraph stations and in handling of radiotelegrams:

I.—Establishing of Radiotelegraph Stations.

1. On Danish soil and on board ships permanently anchored, such as lightships, etc., radiotelegraph stations (shore stations) can only be established by the Government.

2. On board ships under Danish flag, not owned by the Government itself, radiotelegraph stations (ship stations) may only be established and operated after permission has been obtained from the Department of Public Works.

The licence or a confirmed duplicate of it must always be carried on board the ship.

The licence may be withdrawn if the conditions for the fitting and operation of the station, set out therein, are not complied with; in such cases the entire apparatus belonging to the station must be removed.

3. Applications for licences to establish and operate radiotelegraph stations on board ships sailing under the Danish flag must be on forms approved by the Department of Public Works, and must be accompanied by notification that the station will fulfil the following conditions:

(*a*) The system employed must be a syntonised system.

(*b*) The speed of transmission and reception must, under normal conditions, be not less than 12 words a minute, the word to consist of five letters.

(*c*) The radiotelegraph transmitter must in normal circumstances not work with a larger energy than 1 kw. Larger energy may, however, be utilised if the ship is obliged to interchange telegrams over a distance of more than 300 kw. with the nearest coast station, or if communication, due to interference, is not obtainable unless by an increase of energy.

(*d*) The station must be operated by one or more operators who have obtained certificates as specified below in section 7.

The station must not be opened for communication until the Telegraph Department has issued a certificate, which will only be granted after the Department, by inspection, is satisfied that the conditions set out in the licence granted by the Department for Public Works are fulfilled.

II.—Installation, Service and Operation of Private Ships' Stations.

4. The apparatus of ship stations must be in strict accordance with the conditions set out in the licence for their establishment.

5. The hours of service of each coast station are decided by the Government Department.

The hours of service for ship stations are decided by the ship stations themselves. Any alteration in hours of service must be reported to the Department of Telegraphs.

6. The normal wave length for ship stations is 300 m. Any ship

station must be fitted to utilise this wave length, unless special permission is otherwise given. In addition to the above, wave lengths up to 600 m. may be employed.

7. The service of the ship station must be maintained by operators who are in possession of certificates granted by the Department for Public Works, which certificates specify the ability of the operator—

(*a*) In the maintenance of the apparatus;

(*b*) in the sending and receiving (by sound) of telegrams with a speed not less than 20 words a minute.

(*c*) and in knowledge of the regulations utilised, governing radiotelegraph service.

The operator is pledged to secrecy, and he is subject to the penalty, etc., for a breach of this condition as are the State telegraph operators.

In the event of a contravention of the regulations governing the operation of the radiotelegraph service, the certificate may be cancelled by the Department of Public Works.

8. The ship stations may be licensed for ordinary public telegraph communication, limited public telegraph communication (with specified ships, with specified shipping lines, with ships fitted with specified kind of apparatus, etc.), public telegraph communication over long distances, private telegraph communication, special telegraph communication (exclusively for public use, etc.).

The traffic of the ship station must be confined to that for which it is licensed, as specified in section 2; all stations are, however, bound to receive, to answer, and eventually further to communicate messages from ships in distress and give these absolute priority.

Ship stations have no responsibility whatever regarding the radiotelegraph communication.

Ship stations intended for public telegraph service must be provided with such printed forms, service journals, tariff lists, etc., as are necessary for this service; these forms are obtained from the Telegraph Department. Stations must furthermore be governed by all the instructions regarding the installation and operation of the station and the handling of the traffic issued by the Department of Telegraphs.

No unauthorised person must be allowed to enter the wireless cabin.

9. If technically possible, ship stations must interchange telegrams with other stations (coast or ship stations), without regard to the system of radiotelegraphy employed at the corresponding station. The interchange of telegrams with other ship stations must, however, be so arranged that the working of coast stations is not interfered with, these as a rule having the priority in public telegraph service.

The operation of a station must as far as possible be arranged so that it does not disturb other stations.

Exchange of superfluous signals and words is prohibited. Trials

and practice are only permitted in so far as the service of other stations is not interfered with.

When a ship is in a Danish harbour the station must only be utilised for communication with ships in distress.

10. According to the International Convention, the Telegraph Department must notify the Berne Bureau of the ship installation, and the Telegraph Department can demand to be furnished with any information regarding the installation, service and apparatus of the ship station, both for this and for other purposes.

11. The Telegraph Department will see that all conditions for fitting and operation of ship stations are complied with. The inspectors for this purpose, who are selected by the Director of Telegraphs, must at any time on showing their authority be admitted to inspect and test the station, provided that the ship is within Danish waters. All information required by the said inspectors must be immediately given, and their directions must be complied with, pending the decision of the Director of Telegraphs, or eventually of the Department for Public Works.

For the inspection daily maintenance and travelling expenses are allowed to the inspectors; these are paid by the Department of Telegraphs, but the amount will have to be refunded (on demand) by the shipping company.

12. All pecuniary liability in respect of the service of the ship station is payable entirely by the shipping company, without regard to whether the liability in any case may have been due to fault or negligence on the part of the operators.

13. The original radiotelegrams with appendices handed in at the ship stations must if possible be sent once a month by the ship station to the Department of Telegraphs.

III.—Handling of Radiotelegrams.

14. Radiotelegraph stations open for public service for the transmission and reception of telegrams may be used by any person, unless the service at the station is limited to a certain special kind of telegrams (see section 8).

The telegrams are divided into three classes:—

(1) State telegrams.
(2) Service telegrams.
(3) Private telegrams.

The right to transmit State telegrams and service telegrams, and the right to priority for such messages, is at any time governed by the conditions laid down in the International Telegraph Regulation and the Inland Telegraph Regulation governing transmission of such telegrams over ordinary telegraph systems.

15. Regarding the radiotelegraph traffic, the handling of telegrams

is governed by the International Radiotélegraph Service Regulation, Articles IX., XI., XIV., XXXIV., XXXIX., XL., XLI. The traffic of telegrams to and from coast stations and over the ordinary telegraph and telephone system is at any time governed by the Inland and International regulations for such traffic.

16. State and service telegrams may under all conditions be written in code or cypher. Private telegrams in code or cypher may be interchanged only with coast stations of such countries where this method of communication is allowed.

17. The undermentioned terms or the appended abbreviations may be utilised; they are written between two double hyphens before the address, and are charged as one word:—

To addressee only delivered: Egenhaendigt, or MP.
Delivered open . . . : Aabent, or RO.
Private express telegram . : Urgent, or D.
Telegram restante . . : TR.
X Addresses . . . : TMX.

18. The entire charge for the handling of a radiotelegram from the sender to the addressee is to be collected from the sender by the station where it originates. The station must not collect a larger amount than allowed in the tariffs.

19. The entire charge for radiotelegrams includes—

1. Charge for the radiotelegraphic handling, namely (*a*) "coast tax," which is allotted to the coast stations; (*b*) "ship tax," which is allotted to the ship station.

2. Charge for handling over the ordinary telegraph and telephone system paid according to the general regulations.

The coast tax for Danish coast stations is 15 ctm. per word.

The ship tax is decided by the owner of the ship station, subject to the approval of the Department for Public Works. It must not exceed 40 ctm. per word; a minimum charge per telegram may, however, be adopted, not exceeding the charge for 10 words. Service telegrams concerning the radiotelegraph service are handled without any charge. Press telegrams at reduced rates are not accepted.

20. Reimbursement of charges paid, and accounts with the Telegraph Department, are governed by International Radiotelegraph Service Regulations, Articles XXXV. and XXXVI. (compare Article XLI.).

IV.—Other Regulations.

21. Stations on board ships under foreign flags must not be operated during the time such ships are in a Danish harbour, except to answer and to forward messages from ships in distress.

22. When the interests of the State requires it, the Government may reserve to itself the right to prohibit all radiotelegraphic communications from ships, Danish or foreign, in Danish waters, and to make the necessary regulations to carry out such prohibition.

23. The maximum penalty payable to the State for contravening the foregoing regulations is 400 kroner (£22), and all unlawfully fitted or utilised apparatus may be confiscated. Such contraventions are adjudicated in the public police court, and proceedings may only be taken by direction of the Minister for Public Works.

24. These regulations are effective as from the 1st of February, 1909.

EAST AFRICA PROTECTORATE

THIS Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. The expression "wireless telegraphy" means any system of communication by telegraph as defined by the Indian Telegraph Act, 1883, without the aid of any wire connecting the points from and at which the messages or other communications are sent and received.

Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may, whenever he shall deem it expedient to do so, licence the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Protectorate or on board any British ship registered in the Protectorate.

4. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Protectorate or on board any British ship registered in the Protectorate except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (1) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand and five hundred rupees or to imprisonment of either description for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Attorney-General.

(2) If a Magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on

board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (1) The Governor may make regulations for all or any of the following matters:—

(*i.*) for prescribing the form and manner in which applications for licences under this Ordnance are to be made;

(*ii.*) for prescribing the fees payable on the grant of any licence;

(*iii.*) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Protectorate shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed or worked in the Protectorate or the waters thereof and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*iv.*) for prohibiting, except with the special or general permission of the Postmaster-General of the Protectorate, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, whilst such ship is in any of the harbours of the Protectorate;

(*v.*) for prohibiting or regulating in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Protectorate, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraphs (*iii.*) (*iv.*) and (*v.*) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms, conditions and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

C. A. A. Alting von Geusau

Director-General of Posts and Telegraphs, Holland.

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8. (1) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any Regulation made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Ordinance and for every such offence not otherwise specially provided for the offender shall in addition to the forfeiture of any articles seized be liable to a fine of seven hundred and fifty rupees.

(2) All convictions, forfeitures and fines under this Ordinance or any Regulations thereunder may be had and recovered before a Magistrate of the first class, and every such Magistrate shall have jurisdiction to pass any sentence authorised by this Ordinance on any European or other Non-Native convicted of an offence against this Ordinance notwithstanding anything in any Ordinance or law limiting the jurisdiction of such Magistrate over Europeans and Non-Natives.

9. The Wireless Telegraphy Ordinance, 1908, is hereby repealed Provided however—

(1) Every licence granted under the said Ordinance and in force at the commencement of this Ordinance shall be deemed to have been granted under this Ordinance.

(2) All Regulations made under the said Ordinance and in force at the commencement of this Ordinance shall be deemed to have been made under this Ordinance and shall continue in force until other provision is made.

EGYPT

WIRELESS Telegraphy is a State monopoly in Egypt in accordance with the following Khedivial Decree dated May 12th, 1906 :—

1. Wireless Telegraphy shall be a State monopoly and no installation shall be established or used except by the Government or with the sanction of the Government.

2. The Minister of Public Works shall be responsible for administration of this law.

FALKLAND ISLANDS

THE following Ordinance relating to wireless telegraphy came into force on March 15, 1912 :—

1. No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor in Council.

2. No person shall work any apparatus for wireless telegraphy

installed on any merchant ship (whether British or foreign) whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made in that behalf by the Governor in Council, and the Governor in Council may, by any such regulations, impose penalties, recoverable before a Stipendiary magistrate or any two Justices of the Peace in a summary manner, for the breach of any such regulations, not exceeding twenty pounds for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship.

3. If any person establishes a wireless telegraph station without a licence in that behalf or installs or works any apparatus for wireless telegraphy without a licence in that behalf he shall be guilty of a misdemeanour and be liable on summary conviction thereof to a penalty not exceeding twenty pounds or to imprisonment not exceeding three months, and, on conviction in the Supreme Court, to a fine not exceeding one hundred pounds, or to imprisonment for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence.

4. If a Justice of the Peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship within his jurisdiction without a licence in that behalf or contrary to the provisions of the regulations made under this Ordinance, he may grant a search warrant to any constable or to any officer appointed in that behalf by the Governor and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

5. The expression "wireless telegraphy" means any communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

6. The Wireless Telegraphy Ordinance, 1903, is hereby repealed.

7. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1912.

FRANCE AND ALGERIA

THE commercial use of Wireless Telegraphy in France and Algeria is under the control of the Minister of Commerce, Industry and Posts and Telegraphs, M. Alfred Massé. The Department of Telegraphs deals with all matters relating to the

Administration of Commercial Wireless Telegraphy, and this Department also controls inland and foreign telegraphs. The Ministry of War and the Ministry of Marine control the use of wireless telegraphy in the Army and Navy.

There have been no recent changes in the Laws and Regulations relating to wireless telegraphy, with the exception of the special regulations made in consequence of war. These regulations, however, have not been published.

Shortly before the outbreak of hostilities a Bill was passed authorising the installation of telegraphic communications in French Equatorial Africa, a total sum of 760,000 francs being allotted for the construction of wireless stations at Oubangui, Alima, and Brassaville, as well as a telegraph line from Alima to Haut-Ogovué, at a cost of 105,000 francs. However, we understand that the work of constructing these stations has been temporarily suspended owing to present circumstances.

The following are the principal clauses of the Decree dated March 5th, 1907 (modified by the following decrees: April 26th, 1910; February 5th, 1911; May 27th, 1911; November 20th, 1911), which superseded the decrees of February, 1903, and February 27th, 1904:—

1. Radiotelegraphic stations established or about to be established in France, Algeria and Tunis shall be classified as follows:—

(*a*) Coast or internal land station for carrying on commercial service

(*b*) Naval coast stations.

(*c*) Military coast stations.

(*d*) Lighthouse or lightship stations.

In addition, private stations may be established temporarily when the necessary licences have been obtained.

2. The President of the Council, the Ministries of the Interior, of Public Works, Posts and Telegraphs, of War, Marine, Colonies, Foreign Affairs, Commerce and Industry, Public Instruction and Fine Arts are charged, in so far as concerns their respective departments, with the carrying out of this Decree.

In case of mobilisation the Ministries of Marine and War shall automatically assume control of all stations, without exception.

3. The choice of sites for the proposed range of a station and all technical conditions applicable to each projected station shall be submitted for the consideration of an Inter-ministerial Commission formed in accordance with Article 4 of this Decree. The function of this Commission is to study the various aspects of the services to be carried on

and to indicate to the Administrative Departments affected the conditions that are necessary to reconcile their respective interests.

4. The Inter-ministerial Technical Commission shall be appointed by the Minister of Public Works, Posts and Telegraphs, and shall comprise the following members :—

One President and one Vice-President appointed by Presidential decree from the Departments interested.

Three representatives from the Ministry of Marine.

Three representatives from the Ministry of War.

Two representatives from the Colonial Office.

Two representatives from the Foreign Office.

Two representatives from the Ministry of Commerce and Industry.

Two representatives from the Ministry of Public Instruction and Fine Arts.

One representative from the Ministry of the Interior.

Four representatives from the Ministry of Public Works, Posts and Telegraphs, one representing the Department of Public Works and three the Post and Telegraph Administration.

A secretary who shall belong to the Post and Telegraph Administration. He shall have no voting powers.

5. The Commission shall examine the title to sites and technical conditions appertaining to all stations which shall constitute the French radiotelegraphic network ; examine complaints regarding French stations ; consider such administrative problems concerning the radiotelegraphic service as the Ministry of Public Works, Posts and Telegraphs deems fit to submit to it ; institute experiments of general interest. The Commission shall be informed through the departments represented thereon of results obtained by various types of apparatus employed at stations in operation.

6. Except during periods of mobilisation all radiotelegraphic coast stations and stations carrying on commercial services, other than those which exist solely for experimental purposes, shall be open for the transmission of private telegrams.

7. The Post and Telegraph Administration shall be responsible for all matters concerning the collection of taxes, foreign stations, and the International Bureau at Berne. It shall supervise the administration of international regulations in so far as they concern commercial traffic passing through coast stations in France, Algeria and Tunis, as well as through stations on vessels of the mercantile marine.

8. Licences to establish private stations shall be granted by the Post and Telegraph Administration upon the recommendation of the Commission referred to in Article 4. Such licences shall only be of a temporary character, and the stations are strictly forbidden to interfere with the working of other stations.

GAMBIA

12th February, 1903.

AN Ordinance to secure the control of all telegraphic establishments within the Colony and Protectorate in so far as may be necessary for the public safety :—

1. No company, corporation, persons, or person whatsoever shall within the limits to which this Ordinance applies establish, maintain or use any telegraphic apparatus, mechanism or contrivance, of what nature or kind soever the same may be, without due permission and licence under the hand of the Governor previously obtained for that purpose.

It is hereby expressly declared that what is commonly known as "wireless telegraphy," including the Marconi apparatus and any similar or other mechanism or contrivance whatsoever for the transmission of telegraphic messages without the employment of wires or cables, is a telegraphic apparatus, mechanism, or contrivance within the meaning of this section.

2. It shall be lawful for the Governor-in-Council from time to time to make, and as he shall see fit repeal, alter or vary rules and regulations for all or any of the following purposes, viz. :—

Licensing companies, corporations, or individuals to establish, maintain, or use any telegraphic apparatus, mechanism or contrivance, whether for the service of the public or for any private purpose.

Attaching conditions, restrictions, and limitations to the exercise of the privilege by such licence conferred.

Attaching suitable penalties and forfeitures to the contravention of the prohibition above contained in section 1 of this Ordinance, and to the breach of any rule or regulation made thereunder, and providing for the recovery thereof, summarily or otherwise. Provided that the penalty (over and above forfeiture) to be imposed for any one offence shall in no case exceed a fine of £200, or in default of payment thereof imprisonment with or without hard labour for a period not exceeding twelve months.

The exercise of all such powers and control over telegraphic establishments (by temporarily entering into possession thereof or otherwise) as may be necessary for the public safety, whether at all times or in any case of emergency which may arise.

And generally for the better carrying out of the purposes of this Ordinance.

Such rules and regulations shall come into force as from the date of publication thereof, subject to disallowance by His Majesty.

3. Nothing in this Ordinance contained shall invalidate or impair any agreement now in force entered into between the Governor of

this Colony, or the Imperial Government on behalf of the Government of this Colony, and any telegraph company, relative to the laying down or landing of any telegraphic cable, the removal, renewal, maintenance and use thereof, or to the payment of any subsidy to such company by the Government of this Colony or any other the like matter.

4. This Ordinance may be cited for all purposes as "The Telegraphic Establishments (Maintenance of Control) Ordinance, 1903," and shall apply to the whole Colony and Protectorate and to the territorial waters thereof.

GERMANY

Sole Article:—The Act of April 6th, 1892, relating to telegraphs in the German Empire is modified as follows:—

1. Article 3 is completed by the following Paragraph 2:

Installations of electric telegraphs for transmission of messages without the aid of metallic wires of junction, shall not be established and worked, except with the authorisation of the State.

2. The following provisions are inserted after Article 3:

(3 *a*) Telegraphic installations which are not exclusively designed for the internal service of a ship, cannot be established and worked on German vessels, unless authorised by the State.

(3 *b*) The Imperial Chancellor shall decree the regulations concerning the working of telegraphic stations on board foreign vessels in German territorial waters.

3. Article 7 is completed by the following paragraph (2):

The provision of Paragraph 1, Phrase 1, does not apply till July 1st, 1913, to installations of the nature defined in Article 3, Paragraph 2.

The following regulations are decreed for the working of telegraphic installations on board foreign ships in German territorial waters, and are founded on Article 3 (*c*) of the "Telegraph Law of the German Empire" of April 6th, 1892, and March 7th, 1908, and under the reservation of Article 15 of this law:—

1. Ships of war are authorised, in a general manner,

(*a*) To exchange messages, signals, by means of optic and acoustic signals, submarine acoustic signalling excepted.

(*b*) To use wireless telegraphy, on condition that they do not disturb the radiotelegraphic service of the public coast stations, or the service of the coast or ship stations of the Imperial Navy.

In exchanging messages with German or foreign radiotelegraphic stations, foreign vessels must conform to the regulations of

the "Decree for the Regulation of the Radiotelegraphic Service" and to the Decrees which may ultimately be promulgated.

2. Foreign vessels other than ships of war are authorised—till otherwise decreed—

(*a*) To exchange messages by means of optic and acoustic signals, submarine acoustic signalling excepted, and under the reservation that within the illumination zone of the navigable waters of the German coasts and islands the lights of the signal projectors or lanterns must not exceed that prescribed for fixed lights.

(*b*) To use wireless telegraphy in conformity with the provisions of the "Decree Regulating the Radiotelegraphic Service" and the decrees which may ultimately be promulgated; nevertheless, in the ports, roadsteads, and estuaries, and in the navigable waterways of the interior, wireless telegraphy can only be used on an authorisation being granted in writing by the Ministry of Posts and Telegraphs of the German Empire.

3. In the public interest the Articles 1 and 2 may be temporarily restricted or suspended.

4. Whosoever works telegraphic installations in a way not authorised by the preceding provisions is liable to fines determined in Article 9 of the "Law of Telegraphs," and in virtue of Article 40 of the Penal Code of the German Empire, all the apparatus designed for the transmission of wireless messages can be confiscated. Moreover, installations which have been worked without a licence can be, in conformity with Article 11 of the "Telegraph Law," removed or rendered unserviceable.

THE following are some of the principal conditions on which the concession for the installation and working of a radiotelegraph station on board ship is granted:—

1. The concession for the installation and working of the ship station may be withdrawn at any time.

2. The station must fulfil the following requirements:—

(*a*) The construction of the station must be in accordance with modern developments of science and technology.

(*b*) The ship station must be equipped in such a way as to be able to use the two wave-lengths of 600 and 300 metres.

(*c*) The waves must be as pure and little damped as possible. The use of sending arrangements, with which the production of the emitted waves takes place by direct sparking discharges of the antenna, is not permitted, except in cases of distress. However, it may be allowed for certain special stations (*e.g.*, for such on small ships) the primary energy of which does not exceed 50 watts.

(*d*) The power transmitted at the radiotelegraphic apparatus, measured at the terminals of the generator, must not under normal conditions exceed one kilowatt.

(*e*) With the reservation of the special provisions concerning the application of the 1,800 m. wave, a power of more than one kilowatt may be used if the ship must maintain communication over a distance exceeding 200 nautical miles from the nearest coast station, or if, in consequence of exceptional circumstances, communication cannot be maintained except by means of an increase of power.

(*f*) The apparatus must be suitable for transmitting and receiving at a speed of at least 20 words per minute, five letters being counted as one word. Installations working with more than 50 watts must be equipped so as to be able to cover several distances within the normal range of transmission, the shortest of which shall be about 15 nautical miles.

(*g*) The receiving apparatus must be capable of reception up to 600 miles with the greatest possible protection against disturbances.

3. Ships belonging to the two first categories stated under Article 8, in addition to the ordinary apparatus, must be equipped with emergency gear having an independent source of power and capable of working for at least six hours, with a minimum range of 80 nautical miles in the case of ships in the first category, and of 50 nautical miles of those of the second category. The emergency gear is not necessary in the case of ships whose ordinary plant fulfils the conditions for emergency sets.

The emergency gear, as well as the ship stations themselves, must be placed as high as possible above the deck—viz., according to the structure of the ship and the available space, either equal to the height of the bridge or of the large boat's deck, so that in case of accident they shall be able to remain longest above the water. When using batteries for the emergency plants accumulators may be arranged in the station room itself, whilst acid accumulators, on account of the vapours which they develop, must be placed outside the station room, but in its immediate vicinity, and so that they are protected against outside influences.

4. The contractor must submit to the Imperial Telegraph Administration a description of the ship station, together with a plan of the circuits. Subsequent alterations of the technical equipment affecting transmission or reception must not be made without the consent of the Imperial Telegraph Administration.

5. In order to examine the prescribed arrangement of the ship's station, and the carrying out of the service, the officers of the Imperial Telegraph Adn.inistration are permitted at any time to enter the rooms

where the apparatus are installed, and to inspect the working equipments.

6. The radiotelegraph service on the ship must be operated only by German subjects.

7. The service of the ship station must be carried out by an operator holding a certificate issued by the Imperial Telegraph Administration, or in an emergency, and for one journey only, by another Government which is a party to the International Radiotelegraphic Convention.

There are two classes of certificates.

The first-class certificate for the capability of the operator, with regard to :—

(*a*) The adjustment of the apparatus and knowledge of the methods of working.

(*b*) Transmitting of telegrams and receiving by sound at a speed of at least 20 words per minute.

(*c*) Knowledge of the regulations applying to the exchange of radiotelegraphic communication.

The second-class certificate may be issued to an operator who attains in transmitting and receiving a speed of 12 to 19 words per minute, but who fulfils the other conditions mentioned above. Operators holding a second-class certificate may be admitted :—

(*a*) On ships which use radiotelegraphy for their own service only and for the exchange of messages of the crew, in particular on fishing vessels.

(*b*) On all ships as junior operators, provided that such ships have on board at least one operator holding the first-class certificate. Nevertheless on ships placed in the first category mentioned in Article 8 the service must be carried on by at least two operators holding the first-class certificate.

Transmission may be made only by an operator holding either the first or second-class certificate, except in cases of emergency.

8. Ship stations are placed in three categories :—

1. Stations always open.
2. Stations having limited working hours.
3. Stations having no fixed working hours.

During navigation the following must remain permanently on watch :—

1. The stations of the first category.
2. Those of the second category during the hours that they are open for service, out of these hours these stations must remain on the watch for the first ten minutes of each hour.

The stations of the third category are not bound to perform any regular "listening" service.

9. The ship station operator is under the supreme authority of the captain or of the captain's representative, who, in his capacity as superintendent of the ship station, is entitled to note the contents of all telegrams provided he has been placed by the Imperial Telegraph Administration, or, in the case of ships that are permanently abroad, by a German Consulate (General or Vice-consulate), under the obligation of preserving the secrecy of correspondence.

10. The certificate may be withdrawn if, in case of any offences against the "Regulations for the Radiotelegraph Service," the operator has been found guilty after an inquiry.

11. If it is shown that the offence is due to the condition of the apparatus or to instructions given to the operator, the same procedure will be followed in respect of the licence issued to the ship.

12. The certificate may also be withdrawn if it is stated by an officer of the Imperial Telegraph Administration that the operator is no more in possession of the prescribed knowledge and skill. In the latter case a certificate will be granted to the operator after he has successfully passed a further examination.

13. Every change in the staff of the ship station must be reported immediately to the local post office of the home port.

14. The ship station is bound to interchange radiotelegrams with every coast station and with every other ship station, without regard to the particular system of radiotelegraphy employed.

15. The Radiotelegraph Service is regulated in accordance with the rules in the "Instructions for the Radiotelegraph Service." In addition, special instructions which may be issued by the Imperial Telegraph Administration must be observed also.

. . . . . .

22. The ship station must be in possession of the certificate from the Imperial Telegraph Administration, stating that the installation and the working of the station have been licensed by the authority named and the category in which the station is placed. This certificate must be kept in the station and presented upon the request of the authorities of the countries at the ports at which the ship calls.

Regulations have been adopted concerning the installation and working of wireless telegraph receiving stations. The licence, which may be revoked at any time, applies only to the use of stations for receiving time signals from Norddeich, which uses a wave of 1,650 m.

The installation must fulfil the following technical requirements :—

(*a*) The receiving apparatus shall be adjusted so that the owner of the station may alter the syntonisation only within the immediate vicinity of the prescribed wave-length. The adjustable

wave-lengths shall not differ by more than 5 per cent. above or below the prescribed wave-length.

(*b*) The antenna shall not be larger than is necessary for the intended reception.

(*c*) The single parts of the oscillatory circuits, also of the antenna circuit, shall be connected firmly and permanently with each other by being soldered together; exceptions are only admissible at the connecting terminals of the detectors and of the telephone receivers.

(*d*) The soldered joints shall be enclosed in casing containing all the parts of the apparatus, and this must be sealed, so that only the handle of the tuning device and the connecting terminals of the detectors and of the telephones are accessible to the owner. For the connection of the antenna wire a sound insulating wrapper shall be used.

(*e*) No later connection of circuits or tuning devices shall be permitted.

The controlling officials of the Imperial Telegraph Administration, of the Imperial Naval Administraton, and of the Administration of the Army are permitted at any time to enter the premises where the apparatus is situated and to inspect the station and everything appertaining thereto. The licensee is pledged to secrecy in respect of any messages that he may intercept. He must suspend working temporarily when requested to do so by the Imperial Telegraph Administration of the naval or military authorities.

THE German Official Journal No. 73 of 1913 published a Decree of the Chancellor of the 14th October, 1913, referring to the modification of regulations for the working of telegraph stations on foreign ships in German waters. According to these regulations, wireless telegraphic traffic of foreign ships in German waters and in German rivers is subject to the following:—

(*a*) Foreign men of war may use their apparatus on condition that the public coast stations and coast and ship stations of the German marine are not hindered. In exchanging traffic with German or foreign wireless stations the rules laid down in the "Anweisung fuer den Funkentelegraphendienst" (Regulations for the Wireless Telegraph service) must be followed.

(*b*) Other foreign craft are only permitted to use their wireless apparatus in accordance with the above-mentioned regulations, but within German ports, roadsteads, river mouths, as well as within inner waterways, wireless apparatus may only be used with the written permission of the German Postal Authorities.

GIBRALTAR

THERE are no commercial wireless telegraph stations in Gibraltar, and the right to use wireless telegraphy is reserved to the Government.

The following Ordinance to prohibit the importation, keeping, use or establishment of any apparatus or installation for transmission of messages by wireless telegraphy by unauthorised persons in Gibraltar came into force on October 20th, 1903. This Ordinance has been amended by the Wireless Telegraph Apparatus Amendment Ordinance, 1909 (February 3rd), and in the text below the amending words are shown in brackets:

1. This Ordinance may be cited as "The Wireless Telegraph Apparatus Ordinance, Gibraltar, 1903."

2. No person shall import, keep, use or establish in Gibraltar [*or on board any British ship registered in Gibraltar*] any apparatus or installation for the receipt or transmission of messages by wireless telegraphy without the licence in writing of the Governor, and under such terms and conditions as may be prescribed in such licence, which licence the Governor may in his discretion at any time cancel and revoke.

3. It shall be lawful for the Governor by order in writing to authorise the Chief of Police or any other person named by him in such order to enter at any time by day or night and by force, if necessary, any premises or place [*or any ship*] in Gibraltar, and to search for any such apparatus or installation as described in this Ordinance, and to seize and remove the same to be dealt with in such manner as the Governor may direct.

4. Any person offending against this Ordinance, or resisting or in any way interfering with any person charged with the execution of an order issued by the Governor under the preceding section, may be arrested without warrant and shall be liable on conviction by a Court of Summary Jurisdiction to a penalty not exceeding £50, or to imprisonment with or without hard labour for any term not exceeding three months.

5. All penalties under this Ordinance shall be recoverable summarily in manner directed by "The Justices Ordinance, Gibraltar, 1890."

THE "Wireless Telegraph Apparatus Further Amendment Ordinance, Gibraltar, 1909" (April 30th), contains the following clause:

2. A person shall not work any apparatus for wireless telegraphy installed on merchant ships, whether British or foreign, while in

Gibraltar, otherwise than in accordance with rules made in that behalf by the Governor, and the Governor may, by any such rules, impose penalties recoverable summarily for the breach of any such rules, not exceeding ten pounds for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ships. All such rules shall be published in the Official Gazette and after such publication shall have the same force and effect as if enacted in this Ordinance.

THE following Rules as to the use of wireless telegraph apparatus on merchant ships, whether British or foreign, while in Gibraltar, were made on May 3rd, 1909, under "The Wireless Telegraph Apparatus Further Amendment Ordinance, Gibraltar, 1909":

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of Gibraltar shall be worked in such a way as not to interfere with (*a*) Naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed or worked in Gibraltar or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of Gibraltar, except with the special or general permission in writing of the Governor.

3. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy the use of wireless telegraphy on board merchant ships whilst in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

4. These rules shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

5. Any person offending against any of these rules shall be liable to a penalty not exceeding ten pounds for each offence recoverable summarily under "The Justices Ordinance, Gibraltar, 1890" and any apparatus for wireless telegraphy installed or worked on such ship may be forfeited to His Majesty.

GOLD COAST COLONY

AN Ordinance to regulate communication by Wireless Telegraphy was issued on September 22nd, 1913 :—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1903."

2. No person shall establish or use any apparatus or installation for the purpose of communication by wireless telegraphy without a licence from the Governor. Any such licence may be granted on such terms and conditions as the Governor may prescribe.

3. Any person who shall contravene the provisions of the preceding section or any of the terms or conditions of any licence granted hereunder shall be guilty of an offence and shall on conviction before a District Commissioner be liable to a penalty not exceeding £100 or to imprisonment with or without hard labour for a period not exceeding six months or to both, and the apparatus or installation in respect of which the offence is committed shall be forfeited to His Majesty.

4. The Governor in Council may from time to time make, revoke or alter rules for further or better carrying into effect any of the purposes of this Ordinance, and such rules shall on publication in the "Gazette" have the same effect as if enacted in this Ordinance.

The following Bill, which has been read a first time at a meeting of the Legislative Council held at the Public Offices, Victoriaborg, Accra, on Wednesday, August 6th, 1913, is published for general information :—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. In this Ordinance "wireless telegraphy" means any system of communication by telegraphy without the aid of any wire connecting the points from and at which the messages or other communications are sent or received : Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) A person shall not establish any wireless telegraph station or install or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the Colonial waters otherwise than in accordance with regulations under this Ordinance.

5. (1) The Governor may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the " Gazette " have the same effect as if enacted in this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the Colonial waters shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate or District Commissioner is satisfied by information on oath that there is reasonable ground for suspecting THAT A WIRELESS telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any Police Officer or any person appointed in that behalf by the Commissioner of Police and named in the warrant, and a warrant so granted shall authorise the Police Officer or person named therein to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (1) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(2) Proceedings shall be taken before a District Commissioner's Court on the complaint of a Commissioner of Police or of any person thereto authorised by him in writing, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. The Wireless Telegraphy Ordinance, 1903, and the Wireless Telegraphy (Amendment) Ordinance, 1913, are hereby repealed.

SCHEDULE—SECTION 5 (2).

REGULATIONS.

(i.) All apparatus for wireless telegraphy on board a merchant ship

in the Colonial waters shall be worked in such a way as not to interfere with

(*a*) Naval signalling; or

(*b*) The working of any wireless telegraph station lawfully established, installed, or worked in the Colony or Colonial waters, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(ii.) In these Regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station, and any other wireless telegraph station, whether on shore or on any ship.

(iii.) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour, port, or bay of the Colony except with the special or general permission of the Governor.

(iv.) For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

(v.) Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

(vi.) These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

GREAT BRITAIN

THE Postmaster General is responsible for the administration of wireless telegraphy in Great Britain and Ireland.

The following are the officers who form the Department of Wireless Telegraphs at the General Post Office, London, E.C.: —Postmaster General, Rt. Hon. C. E. H. Hobhouse; Assistant Secretary, E. W. Farnall, C.B.; Principal Clerk, F. J. Brown; First Class Clerk, J. I. DeWardt.

Department of the Inspector of Wireless Telegraphy:— Inspector of Wireless Telegraphy, Commander F. G. Loring, R.N., M.I.E.E.; Deputy Inspector of Wireless Telegraphy, Major C. G. C. Crawley, R.M.A., A.M.I.E.E.; Assistant Inspectors, F. Addey, B.Sc. Lond., A.M.I.E.E., and O. F. Brown,

M.A., B.Sc. Oxon., B.Sc. Lond.; Consulting Engineer for Wireless Telegraphy (temporary), W. Duddell.

Early in 1914 a Bill was presented to the House of Commons by the President of the Board of Trade to amend the laws relating to merchant shipping so as to give effect to the International Convention for the Safety of Life at Sea, signed at London on January 20th, 1914. Under the title "Merchant Shipping (Convention) Act, 1914," this Bill was passed in August last and is due to come into force on July 1st, 1915. Part III. of the Act refers to wireless telegraphy and is to be found on page 189.

At the outbreak of war all wireless stations in the British Empire were brought under the control of the Government, and in the following pages we have included the notices which were published in the *London Gazette* of August 2nd and 3rd, and also an extract from the Defence of the Realm (Consolidation) Regulations, 1914, which relates to the prohibition of the possession of wireless telegraphic apparatus, unless with the official permission of the Postmaster General. All amateur and experimental stations have been closed, and there is no probability of their being re-opened until the end of the war, when it is anticipated that the provisions of the licenses will be considerably revised. For this reason we have not included the particulars of these licenses in the following pages, but they are to be found in the YEAR BOOK for 1914 (pp. 183-188).

Wireless Telegraphy Act, 1904.

Following the termination of the meeting of the delegates at the International Conference in Berlin in 1903, the British Government drafted a Wireless Telegraphy Act to define the official position of the Postal and Telegraph Department in the United Kingdom in regard to the new development. The Act received Royal assent on August 15th, 1904, and the text is as follows:—

1.—(1) A person shall not establish any wireless telegraph station, or instal or work any apparatus for wireless telegraphy, in any place or on board any British ship except under and in accordance with a licence granted in that behalf by the Postmaster-General.

(2) Every such licence shall be in such form and for such period as the Postmaster-General may determine, and shall contain the terms, conditions, and restrictions on and subject to which the licence is granted, and any such licence may include two or more stations, places, or ships.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless

telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour, and be liable, on conviction under the Summary Jurisdiction Acts, to a penalty not exceeding ten pounds, and on conviction on indictment to a fine not exceeding one hundred pounds, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Act except by order of the Postmaster-General, the Admiralty, the Army Council, or the Board of Trade.

(4) If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within his jurisdiction without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Postmaster-General, the Admiralty, the Army Council, or the Board of Trade, and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used, or intended to be used, for wireless telegraphy therein.

(5) Sections 684, 685, and 686 of the Merchant Shipping Act, 1894 (which relate to the jurisdiction of courts and justices), and section 693 of the same Act (which relates to distress for sums ordered to be paid by masters and owners of ships), shall apply to the jurisdiction of courts and justices in respect of ships, and to distress under this Act.

(6) The Postmaster-General may make regulations for prescribing the form and manner in which applications for licences under this Act are to be made, and, with the consent of the Treasury, the fees payable on the grant of any such licence.

(7) The expression "wireless telegraphy" means any system of communication by telegraph as defined in the Telegraph Acts, 1863 to 1904, without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: Provided that nothing in this Act shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

2.—(1) Where the applicant for a licence proves to the satisfaction of the Postmaster-General that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted, subject to such special terms, conditions, and restrictions as the Postmaster-General may think proper, but shall not be subject to any rent or royalty.

H. J. Nierstrasz

Chief of Technical Staff:
Department of Wireless Telegraphs, Holland.

[*To face page 170*

(2) Where an applicant for a licence satisfies the Postmaster-General that a wireless telegraph station is to be used solely for the transmission of telegrams which are within the first or second exception from the exclusive privilege of transmitting telegrams conferred upon the Postmaster-General by the Telegraph Act, 1869, a licence for that purpose, if granted, shall not be subject to any rent or royalty.

(3) It shall be lawful for the Postmaster-General, due regard being had to the maintenance and exercise of effective control over wireless telegraphy, to grant special licences at reduced terms for the establishment and working of wireless telegraph stations to be used exclusively for the transmission within the United Kingdom of news to public registered newspapers. A schedule of all reduced rents or royalties imposed by any special licences shall be laid before both Houses of Parliament within fourteen days of the commencement of the session next succeeding the grant of any such licences.

3.—(1) This Act may be cited as the Wireless Telegraphy Act, 1904, and may be cited with the Telegraph Acts, 1863 to 1904.

(2) This Act shall extend to the whole of the British Islands and to all British ships in the territorial waters abutting on the coast of the British Islands, and the Royal Courts of the Channel Islands shall register this Act accordingly.

(3) His Majesty in Council may order that this Act shall, subject to any conditions, exceptions, and qualifications contained in the order, apply during the continuance of the order to British ships whilst on the high seas.

(4) A person shall not work any apparatus for wireless telegraphy installed on a foreign ship whilst that ship is in territorial waters otherwise than in accordance with regulations made in that behalf by the Postmaster-General, and the Postmaster-General may, by any such regulations, impose penalties recoverable summarily for the breach of any such regulations not exceeding ten pounds for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship. Save as aforesaid, nothing in this Act shall apply to the working of apparatus for wireless telegraphy installed on any foreign ship.

4.—In the application of this Act to Scotland the expression "Misdemeanour" means crime and offence.

5.—In the application of this Act to the Channel Islands and the Isle of Man—

(1) The Lieutenant-Governor of the Island of Jersey or the Island of Guernsey, and the Governor, Lieutenant-Governor, or Deputy Governor of the Isle of Man, as the case may require, shall be substituted for the Board of Trade.

(2) Offences may be prosecuted, fines recovered, proceedings taken, and search warrants issued in such courts and in such manner as

may for the time being be provided in the Channel Islands and the Isle of Man by law, or if no express provision is made then in and before the courts and in the manner in which the like offences, fines, proceedings, and warrants may be prosecuted, recovered, taken, or issued therein by law, or as near thereto as circumstances admit, and the bailiff or his lieutenant, or any jurat of the Royal Court in the Island of Jersey or the Island of Guernsey, and the judge or any jurat of the Court of Alderney, and the high bailiff or two justices of the peace in the Isle of Man, shall respectively be substituted for a justice of the peace.

6. This Act shall continue in force until the thirty-first day of July, nineteen hundred and six, and no longer, unless Parliament otherwise determines. (It was renewed until 31st December, 1909, and has since been extended from year to year by the Expiring Laws Continuance Act. It is now in force until 31st December, 1915.)

THE following Order in Council is dated 29th February, 1908:—

(1) The Wireless Telegraphy Act, 1904, shall apply to British ships whilst on the high seas, provided that a person on board a British ship which is registered in any British possession (other than the Channel Islands and the Isle of Man), or in any British Protectorate shall not be deemed to commit an offence against the Wireless Telegraphy Act, 1904, by reason of the installation or working of wireless telegraphy on such ship if the authority in such Possession or Protectorate, having power by law so to do, shall have granted a licence for the installation and working of apparatus for wireless telegraphy on that ship, and if such person is acting in accordance with the provisions of such licence.

(2) The Interpretation Act, 1889, shall apply for the purpose of the interpretation of this Order as it applies for the purpose of the interpretation of an Act of Parliament.

(3) This Order shall be published in the *London Gazette*, and shall come into operation immediately from and after the expiration of three months after this Order is so published.

(4) This Order may be cited as "The Wireless Telegraphy Order, 1908."

AN Order was issued in 1908 (No. 496) containing regulations relating to foreign ships:—

1. In these Regulations unless the context otherwise requires—

"Wireless Telegraphy" has the same meaning as in the Wireless Telegraphy Act, 1904.

"Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy,

between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

" Territorial Waters " means such part of the sea adjacent to the coast of the British Islands as is deemed by international law to be within the territorial sovereignty of His Majesty, and includes harbours.

" Harbour " includes harbours properly so called, whether natural or artificial estuaries, navigable rivers, piers, jetties, and other works in or at which ships can obtain shelter, or ship and unship goods or passengers.

2. When communications are made by means of wireless telegraphy between a foreign ship in territorial waters and a wireless telegraph station in the British Islands, the rules in force for the working of wireless telegraphy at that station shall be observed.

3. All apparatus for wireless telegraphy on board a foreign ship in territorial waters shall be worked in such a way as not to interrupt or interfere with—

(*a*) Naval Signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the British Islands or the territorial waters abutting on the coast of the British Islands, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

4. (1) Except with the special permission in writing of the Postmaster-General no apparatus for wireless telegraphy on board a foreign ship (other than a ship of war) shall be worked or used whilst such ship is in any harbour in the British Islands.

(2) Without prejudice to the operation of the general provisions of these Regulations, the use of wireless telegraphy on board a foreign ship of war while in a harbour in the British Islands shall be subject to such rules (whether prohibitive or regulative) as may be made by the Admiralty from time to time.

5. (1) If at any time in the opinion of one of His Majesty's Principal Secretaries of State an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, and notice to that effect is published by the Postmaster-General, after the publication of such notice and until further notice the use of wireless telegraphy on board foreign ships whilst in territorial waters shall be subject to such rules as may be made by the Admiralty from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

(2) Such notice as aforesaid shall be published in the *London*

Gazette, the *Edinburgh Gazette*, and the *Dublin Gazette*, and in such other manner, if any, as to the Postmaster-General may seem fit.

6. (1) Any person who shall offend against any provision of these Regulations or of any Rules made by the Admiralty thereunder shall be liable on conviction under the Summary Jurisdiction Acts for every such offence to a penalty not exceeding ten pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy installed or worked on board the ship on which the offence was committed shall be seized and forfeited.

(2) For the purposes of any proceedings under these Regulations the master or person being or appearing to be in command or charge of any Foreign ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

(3) Any summons or other document in any proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

7. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

8. These Regulations shall come into operation on the first day of July, 1908.

9. These Regulations may be cited as "The Wireless Telegraphy (Foreign Ships) Regulations, 1908."

THE following is a copy of the form of Licence granted by the Postmaster-General to establish Wireless Telegraph Ship Stations :—

LICENCE TO ESTABLISH WIRELESS TELEGRAPH SHIP STATIONS.

Whereas —— —— of —— —— in the County of —— —— (hereinafter called "the Licensee") is desirous of establishing installing working and using on a ship or ships belonging to the Licensee wireless telegraphy as defined in section 1 (7) of the Wireless Telegraphy Act 1904:

And whereas by reason of the provisions of the Telegraph Acts 1863 to 1913 and the Wireless Telegraphy Order 1908 it is unlawful to establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any British ship (whether in the territorial waters of the British Islands or on the high seas) except under and in accordance with a licence granted in that behalf by the Postmaster-General:

And whereas at the request of the Licensee I have agreed to grant to the Licensee the licences powers and authorities hereinafter expressed and contained for the period upon the terms and subject to the stipulations and conditions hereinafter appearing:

Now I the above-named —— —— His Majesty's Postmaster-General in exercise of all powers and authorities enabling me in this behalf do

hereby grant to the Licensee during the term or period commencing on the day of the date hereof and terminating on the 31st day of December 1915 and thereafter so long as the Wireless Telegraphy Act 1904 shall continue in force unless and until these presents and the licence or permission hereby given shall be determined as hereinafter provided license and permission—

(i) To establish instal and work for the purposes hereinafter mentioned at the ship station or stations specified in the Schedule hereto apparatus for wireless telegraphy of the kind specified in the Schedule hereto (which apparatus is hereinafter referred to as " the licensed apparatus ") :

Provided that—

(*a*) Each ship station shall be of such class mentioned in Articles XIII. of the Service Regulations annexed to the Radiotelegraph Convention 1912 as is specified in the said Schedule opposite to the name of such station;

(*b*) The apparatus installed at each ship station shall be of the character specified in the said Schedule opposite to the name of such station;

(*c*) The transmitting apparatus used at each ship station shall be of such a character that the waves emitted are as pure and as little damped as possible and the receiving apparatus used at the said station or stations shall be of such a character as to afford the greatest possible protection from disturbance during the reception of signals;

(*d*) The apparatus shall include such emergency installation as may be required according to the class of the ship station under the provisions of Article XI. of the Service Regulations annexed to the Radiotelegraph Convention 1912;

(*e*) The licensed apparatus shall be so constructed as to be capable of using wave-lengths of 600 and 300 metres in length as measured by the standard of measurement in use by the Post Office for the time being and such other wave-lengths not exceeding 600 metres in length as shall be authorised in writing from time to time by the Postmaster-General. Provided always that the wave-length of 600 metres shall normally be used for communication and further that the wave-length of 1,800 metres may be used for transmission in the exceptional case contemplated by Article XXXV. (2) (*a*) of the Service Regulations annexed to the Radiotelegraph Convention 1912:

Provided further that only the wave-length of 600 metres shall be used by the Licensee during the period of any war in which the United Kingdom is engaged;

(f) The apparatus shall admit of the transmission and reception of messages at the rate of not less than 20 words a minute five letters being counted as one word;

(ii) To send and receive messages by means of the licensed apparatus between the said ship stations and also between the said ship stations and coast stations and other ship stations. Provided that the Licensee shall not except with the consent in writing of the Postmaster-General send or receive messages from and at the said ship stations when in any harbour in the British Islands; and

(iii) To receive money or other valuable consideration for or in respect of the use of the licensed apparatus or for or in respect of the transmission or receipt of messages by means of the said apparatus.

And I do hereby declare that the said licence and permission is granted on and subject to the following conditions and provisions:

1. In these presents (and in the Schedule hereto) the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something either in the subject or context repugnant to such construction (that is to say):—

The expression "the Postmaster-General" means the Postmaster-General for the time being.

The expression "wireless telegraphy" has the same meaning as in the Wireless Telegraphy Act, 1904.

The term "telegraph" has the same meaning as in the Telegraph Act, 1869.

The expression "Naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy between ships of His Majesty's Navy and Naval Stations or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether a coast station or a ship station.

The expression "the Admiralty" means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

The expressions "the International Telegraph Convention" and "the International Telegraph Regulations" mean respectively the International Convention of St. Petersburg dated the 10th-22nd July, 1875, and the Service Regulations made thereunder and include respectively any modifications of the Convention or Regulations made from time to time.

The expression "the Radiotelegraph Convention, 1912," means the Convention signed at London on the 5th day of July, 1912, and the Service Regulations made thereunder and includes any modification of the Convention or Regulations made from time to time.

The expression "coast station" means a wireless telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between the land and ships at sea.

The term "ship station" means a wireless telegraph station established on board a ship which is not permanently moored.

2. The licensed apparatus shall not be used by the Licensee or by any other person either on behalf or by permission of the Licensee for the despatch or receipt of messages except messages authorised by this licence.

3. (1) The Licensee shall not by the transmission of any message by means of the licensed apparatus or otherwise by the use of the licensed apparatus interfere with Naval signalling.

(2) If the Admiralty are of opinion that the working of the licensed apparatus at any ship station specified in the Schedule hereto is inconsistent with the free use of Naval signalling the Licensee shall when required in writing by the Postmaster-General so to do close the said station.

(3) These provisions for the protection of naval signalling shall be construed to be without prejudice to the generality of any other provisions of this licence.

4. For the purpose of this licence the Licensee shall observe the International Telegraph Convention and the International Telegraph Regulations so far as the said Convention and Regulations are capable of being applied to wireless telegraphy in common with ordinary land and submarine telegraphy.

5. The Licensee shall observe the provisions of any Regulations from time to time made under the provisions of the Telegraph Acts, 1863 to 1913, by the Postmaster-General with the consent of the Treasury in relation to the conduct of wireless telegraph business so far as the same are applicable to the Licensee.

6. The Licensee shall observe the provisions of the Radiotelegraph Convention, 1912.

7. The Licensee shall comply with all such directions and observe all such rules as may be given or made by the Postmaster-General from time to time for the purpose of preventing interference with the working of any other wireless telegraph station and for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station.

8. The licensed apparatus shall not without the consent of the Postmaster-General be altered or modified in respect of any of the particulars mentioned in the Schedule hereto.

9. The Licensee shall at all times indemnify the Postmaster-General against all actions claims and demands which may be brought or made by any corporation company or person in respect of any injury arising from any act licensed or permitted by these presents.

10. (1) Subject to the provisions of this licence the Licensee shall transmit messages by means of the licensed apparatus on equal terms without favour or preference whether as regards rates of charge order of transmission or otherwise. Provided always that signals of distress and messages in connection therewith shall receive priority over all other messages and that the order of transmission of such other messages shall be governed by the International Telegraph Regulations.

(2) In respect of messages transmitted on behalf of His Majesty's Government or the Government of any British Possession or Protectorate the Licensee shall charge rates not in excess of half of the rates charged to the ordinary public.

11. The Licensee shall so far as possible receive from ships and light stations all requests for assistance and all signals of distress and shall answer such requests and signals and send them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in the power of the Licensee.

12. (1) The licensed apparatus at each of the ship stations mentioned in the Schedule hereto shall be worked only by operators holding certificates issued by the Postmaster-General and the Licensee shall provide for the working of each station such operators as are required by the provisions of Article X. of the Service Regulations annexed to the Radiotelegraph Convention 1912 according to the class of the ship station and shall observe the regulations as to the working of the ship station laid down according to its class by Article XIII. of the said Regulations.

(2) A certificate shall not be recognised as authorising the holder to work a ship station under the terms of this licence unless it bears a statement that it is issued by the Postmaster-General in accordance with the Radiotelegraph Convention 1912. Such certificates will be valid only during the operation of the said Convention. They will be granted to persons of such technical proficiency and will be in such form and will be subject to such conditions as the Postmaster-General shall from time to time prescribe and they may be endorsed or withdrawn at the discretion of the Postmaster-General in case of misconduct or breach on the part of the holder of the regulations prescribed for the working of ship stations.

13. The Licensee shall not divulge to any person (other than properly authorised officials of His Majesty's Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the Licensee and not intended for receipt by means of the licensed apparatus. The Licensee shall exhibit at each of the ship stations specified in the Schedule hereto a copy of Section 11 of the Post Office (Protection) Act 1884 and any contravention of that section by any person in the employment of the Licensee shall be deemed to be a breach of the provisions of this licence entitling the Postmaster-General under Clause 22 hereof to revoke and determine this Licence.

14. The Licensee shall keep full accounts records and registers of all messages transmitted by means of the licensed apparatus and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its place of origin and of ultimate destination and such further particulars as the Postmaster-General shall from time to time reasonably require to be shown messages on His Majesty's service being in such registers distinguished from other messages. The Licensee shall preserve all used message forms written and printed and transcripts of messages and all other papers for a period of at least fifteen months counting from the month following that in which the radiotelegrams were handed in as prescribed by the Radiotelegraph Convention, 1912, and such registers and message papers shall be open to the inspection of the Postmaster-General or his officers thereto authorised at the —— —— —— Office of the Licensee for the time being or at such other place as may be agreed between the hours of 10 a.m. and 5 p.m. on every day except Sunday or a statute or general holiday.

15. The Licensee shall render to the Postmaster-General such accounts as the Postmaster-General shall direct in respect of all charges due or payable under the Radiotelegraph Convention 1912 in respect of messages exchanged between the ship stations hereby licensed and coast stations and shall pay to the Postmaster-General at such times and in such manner as the Postmaster-General shall direct all sums which shall be due from the Licensee under such accounts.

16. The Postmaster-General and any agent authorised in that behalf in writing by him may at all reasonable times enter upon all or any of the ship stations hereby licensed for the purpose of inspecting and may inspect any apparatus fixed or being in such stations respectively for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such stations respectively and the working and user of such apparatus and telegraphic instruments respectively.

17. The Licensee shall carry on every ship on which a ship station is established under this Licence a print or copy of the Licence certified under the hand of an appropriate officer of the Postmaster-General to be a true copy and shall produce such print or copy for inspection if required to do so by the competent authorities of the countries where the ship calls. The Licensee shall also carry on every such ship such documents as may be prescribed by the Postmaster-General for the purpose of enabling the Licensee to communicate with coast stations and ship stations in accordance with the Radiotelegraph Convention, 1912.

18. The Licensee shall pay to the Postmaster-General for and in respect of the licence hereby granted a royalty of five shillings per annum in respect of each ship station at which the licensed apparatus is installed.

(1) The Licensee shall pay to the Postmaster-General for and in respect of the Licence hereby granted a royalty of five shillings per annum in respect of each ship station in which the licensed apparatus is installed.

(2) The said royalty shall be payable on the 1st of December in each year during which the licence remains valid.

19. Except with the consent in writing of the Postmaster-General the Licensee shall not assign, underlet, or otherwise dispose of or admit any other person or body to participate in the benefit of the licences powers or authorities hereby granted or any of such licenses powers or authorities.

20. (1) If and whenever an emergency shall have arisen in which it is expedient for the public service that His Majesty's Government shall have control over the transmission of messages by the licensed apparatus it shall be lawful for any naval, military customs or police officer or any other person authorised by the Admiralty to take possession of the licensed apparatus or any part thereof in the name and on behalf of His Majesty and to use the same for His Majesty's service and in that event any such officer or person so authorised may enter upon any ship on which any such apparatus is installed and take possession of the said apparatus and use the same as aforesaid, and subject to such use may use the same or allow it to be used for such ordinary services as may in his discretion seem fit to him or may prohibit and take steps to prevent the use of the same and issue directions which shall be obeyed by the Licensee to prevent such use.

(2) Any such officer or person so authorised as aforesaid may in such event as aforesaid instead of taking possession of the licensed apparatus as aforesaid direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus either wholly or partly and in such manner as he may direct and such persons may enter upon any ship on which any apparatus is installed accordingly or the said officer or person so authorised as aforesaid may direct the Licensee to submit to him or any person authorised by him all messages tendered for transmission or arriving by the licensed apparatus or any class or classes of such messages to stop or delay the transmission of any messages or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of messages as the said officer or person so authorised as aforesaid may prescribe and the Licensee shall obey and conform to all such directions.

(3) The Licensee shall be entitled to reasonable compensation for any damage to the licensed apparatus arising in consequence of the exercise of the powers conferred by this Clause.

21. At any time after the 31st day of December 1915 the Postmaster-General may in his absolute discretion give notice in writing to determine

these presents and the licence or permission hereby granted at the end of one calendar month from the date of such notice and at the expiration of that period the licence or permission hereby granted shall cease and determine accordingly but without prejudice to any remedy of the Postmaster-General under any condition or provision herein contained.

22. In any of the following cases (that is to say) :—

(*a*) In case any sum of money which ought to be paid by the Licensee to the Postmaster-General under or by virtue of these presents shall be in arrear and unpaid for one calendar month after the time at which the same ought to be paid under or by virtue of the provisions herein contained; or

(*b*) In case of any breach non-observance or non-performance by or on the part of the Licensee of any of the provisions (other than a provision for the payment of money) or conditions herein contained

then and in any such case the Postmaster-General may by notice in writing under his seal revoke and determine these presents and the licences powers and authorities hereinbefore granted and each and every of them as to all or any of the ship stations hereby licensed and thereupon these presents and the said licences powers and authorities and each and every of them shall absolutely cease determine and become void as to all or any of the said ship stations (as the case may be) but without prejudice to any right of action or remedy which shall have accrued or shall thereafter accrue to the Postmaster-General under any condition or provision herein contained.

23. Nothing in these presents contained shall prejudice or affect the right of the Postmaster-General from time to time to establish extend maintain and work any system or systems of telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit neither shall anything herein contained prejudice or affect the right of the Postmaster-General from time to time to enter into agreements for or to grant licences relative to the working and user of telegraphs (whether of a like nature to those hereby licensed or otherwise) or the transmission of messages in any part of the United Kingdom by means of wireless telegraphy or by any other means with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit. And (save as in this licence expressly provided) nothing herein contained shall be deemed to authorise the Licensee to exercise any of the powers or authorities conferred on or acquired by the Postmaster-General by or under the Telegraph Acts or any of them.

24. Any notice, request, or consent (whether expressed to be in writing or not) to be given by the Postmaster-General under these presents may be under the hand of any one of the secretaries or assistant secretaries for the time being of the Post Office and may be served by sending the same in a registered letter addressed to the

Licensee at the —— —— office for the time being of the Licensee or if such notice request or consent relates to any particular ship station by delivery to the master of the ship upon which such station is installed and any notice to be given by the Licensee under these presents may be served by sending the same in a registered letter addressed to the Secretary of the Post Office at the General Post Office, London.

The Schedule of Ship Stations before referred to.

1. Name of Ship on which Station established.	2. Class of Ship Station under the Radiotelegraph Convention 1912.	3. Nature of Services performed.	4. Hours of Service.	Normal Range of Signalling in Nautical Miles.		Character of Apparatus.		9. Power.		10. If Alternator is used, Number of Cycles per Second.
				5. By Night.	6. By Day.	7. System of Radiotelegraphy with the Characteristics of the System of Emission.	8. Wave lengths (in Metres).	Source and Maximum Output.	Maximum to be taken by Transmitting Instruments.	

LICENSE TO USE WIRELESS TELEGRAPHY FOR PRIVATE BUSINESS.

WHEREAS of in the county of (hereinafter called "the Licensee") is desirous of establishing installing working and using a system of wireless telegraphy as defined in section 1 (7) of the Wireless Telegraphy Act 1904:

AND WHEREAS by reason of the provisions of the Telegraph Acts 1863 to 19 it is unlawful to establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place except under and in accordance with a license granted in that behalf by the Postmaster General and it is also unlawful save as in the said Acts provided to transmit telegrams within the United Kingdom:

AND WHEREAS at the request of the Licensee I have agreed to grant to the Licensee the licenses powers and authorities herinafter expressed and contained for the period upon the terms and subject to the stipulations and conditions hereinafter appearing:

NOW I the above-named His Majesty's Postmaster General in exercise of all powers and authorities enabling me in this behalf do hereby grant to the Licensee during the term or period commencing on the day of the date hereof and terminating on the 31st day of December 191 license and permission—

(i) to establish instal and work at the stations specified in the Schedule hereto apparatus for wireless telegraphy (hereinafter

called " the licensed apparatus ") provided that the apparatus installed at each station shall be of the character specified in the said Schedule opposite to the name of such station; and

(ii) to transmit and receive messages on the private business of the Licensee by means of the licensed apparatus between the said stations.

AND I do hereby declare that the said license and permission is granted on and subject to the following conditions and provisions:—

1. In these presents (and in the Schedule hereto) the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something either in the subject or context repugnant to such construction (that is to say):—

The expression " the Postmaster General " means the Postmaster General for the time being.

The expression " wireless telegraphy " has the same meaning as in the Wireless Telegraphy Act 1904.

The term " telegraph " has the same meaning as in the Telegraph Act 1869.

The expression " naval signalling " means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy between ships of His Majesty's Navy and Naval Stations or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

The expression " the Admiralty " means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

Apparatus shall be deemed to be " syntonised " when the transmitting apparatus is so adjusted as to communicate with a receiver which has a corresponding adjustment and to produce as little effect as possible on a receiver not having a corresponding adjustment.

2.—(1) The licensed apparatus shall not be used by the Licensee or by any person either on behalf or by permission of the Licensee for any purpose except for the transmission and receipt of such messages as aforesaid between and at the stations specified in the Schedule hereto.

(2) No money or other valuable consideration shall be received by the Licensee or by any other person with the authority or by the permission of the Licensee in respect of the transmission or receipt of any messages by means of the licensed apparatus or any part thereof.

3.—(1) The Licensee shall not by the transmission of any message by means of the licensed apparatus or otherwise by the use of the licensed apparatus interfere with naval signalling.

(2) Whenever the operators at any signal station of the Licensee perceive through the medium of the instruments used by them that naval signalling is proceeding they shall refrain from using the licensed apparatus until all indication that naval signalling is proceeding shall have ceased.

(3) The Licensee shall if so required in writing by the Admiralty cease to use the licensed apparatus for such period (not exceeding two hours in any one day) as may be specified by the Admiralty.

(4) If the Admiralty are of opinion that the working of the licensed apparatus at any station specified in the Schedule hereto is inconsistent with the free use of naval signalling the Licensee shall when required in writing by the Postmaster General close the said station.

(5) These provisions for the protection of naval signalling shall be construed to be without prejudice to the generality of any other provisions of this license.

4. The Licensee shall observe the provisions of any Regulations from time to time made under the provisions of the Telegraph Acts 1863 to 19 by the Postmaster General with the consent of the Treasury in relation to the conduct of wireless telegraph business.

5.—(1) The Licensee shall so work the licensed apparatus as not to interfere with the working of any wireless telegraph station established in the British Islands or the territorial waters abutting on the coasts of the British Islands (whether on shore or on any ship) by or for the purposes of the Postmaster General or any department of His Majesty's Government or for commercial purposes and in particular with the transmission or receipt of any messages between or at wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(2) With a view to preventing such interference as aforesaid the Licensee shall comply with all directions which shall be given to the Licensee by the Postmaster General and with all rules prescribed by the Postmaster General for observance by his Licensees—

(*a*) With respect to all arrangements to be adopted for the purpose of securing syntonised apparatus or for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station;

(*b*) With respect to any alternation of messages which the Postmaster General may think necessary; and

(*c*) Generally with respect to avoiding interference between one wireless telegraph station and another.

6. The licensed apparatus shall not without the consent in writing of the Postmaster General be altered or modified in respect of any of the particulars mentioned in the Schedule hereto.

7. The Licensee shall at all times indemnify the Postmaster General against all actions claims and demands which may be brought or made by any corporation company or person in respect of any injury arising from any act licensed or permitted by these presents.

8. The Licensee shall so far as possible receive from ships and light stations all requests for assistance and all signals of distress and retransmit them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in the power of the Licensee.

9. Subject to the provisions of this license the Licensee shall not divulge to any person (other than properly authorised officials of His Majesty's Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the Licensee and not intended for receipt by means of the licensed apparatus.

10. The Postmaster General and any agent authorised in that behalf in writing by him may at all reasonable times enter upon all or any of the stations or other premises in the possession or occupation of the Licensee either solely or jointly with any other person or persons for the purpose of inspecting and may inspect any apparatus fixed or being in such places respectively for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such places respectively, and the working and user of such apparatus and telegraphic instruments respectively.

11.—(1) All apparatus used or intended to be used by the Licensee shall be so erected fixed placed and used as not either directly or by reason of the working or user thereof to interfere with the efficient or convenient maintenance working or user of any telegraphic line of the Postmaster General which may from time to time exist or which it is probable that the Postmaster General may have occasion to erect place fix or use or to expose any such line to risk of damage or to risk of interference with the efficient or convenient working or user thereof.

(2) In case any telegraphic line of the Postmaster General shall be damaged or the efficient working or user thereof shall be wholly or partially interrupted or otherwise interfered with and the Engineer-in-Chief for the time being of the Post Office shall certify in writing under his hand that such damage interruption or interference has been caused directly or indirectly by any apparatus used or intended to be used by the Licensee or by anything done by or on behalf of the Licensee in relation thereto the Licensee shall on demand pay to the Postmaster General all costs that shall be reasonably incurred by him in repairing such damage and in removing or altering such telegraphic line so as to restore the same to efficient working order and in adding thereto or substituting therefor either temporarily or permanently any other telegraphic line if the said Engineer-in-Chief shall certify that such addition or substitution is reasonably required.

(3) For the purposes of this Article the expression "telegraphic line" has the same meaning as in the Telegraph Act 1878 and the expression "telegraphic line of the Postmaster General" includes a telegraphic line belonging to or worked by the Postmaster General or constructed or maintained by him for any Department of the Government or other body or person.

12.—(1) The Licensee shall pay to the Postmaster General on the 1st day of December next for and in respect of the licence hereby granted a royalty of £ per annum in respect of each station.

(2) In the event of the renewal of this license the said royalty shall be payable on the same day in each succeeding year.

13. Except with the consent in writing of the Postmaster General the Licensee shall not assign underlet or otherwise dispose of or admit any other person or body to participate in the benefit of the licenses powers or authorities hereby granted or any of such licenses powers or authorities.

14. If and whenever in the opinion of one of His Majesty's Principal Secretaries of State an emergency shall have arisen in which it is expedient for the public service that His Majesty's Government shall have control over the transmission of messages by the licensed apparatus it shall be lawful for the said Secretary of State by warrant under his hand to direct and cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's service and in that event any person authorised by the said Secretary of State may enter upon the stations offices and works of the Licensee or any of them and take possession thereof and use the same as aforesaid.

15. The Postmaster General may at any time in his absolute discretion give notice in writing to determine these presents and the license or permission hereby given at the end of one calendar month from the date of such notice and at the expiration of that period the license or permission hereby granted shall cease and determine accordingly but without prejudice to any remedy of the Postmaster General under any condition or provision herein contained.

16. In any of the following cases (that is to say):—

(*a*) In case any sum of money which ought to be paid by the Licensee to the Postmaster General under or by virtue of these presents shall be in arrear and unpaid for one calendar month after the time at which the same ought to be paid under or by virtue of the provisions herein contained; or

(*b*) In case of any breach non-observance or non-performance by or on the part of the Licensee of any of the provisions (other than a provision for the payment of money) or conditions herein contained;

then and in any such case the Postmaster General may by writing under his seal revoke and determine these presents and the licenses

powers and authorities hereinbefore granted and each and every of them and thereupon these presents and the said licenses powers and authorities and each and every of them shall absolutely cease determine and become void.

Provided always that no such revocation or determination as aforesaid shall prejudice or affect any right of action or remedy which shall have accrued or shall thereafter accrue to the Postmaster General under any condition or provision herein contained.

17. Nothing in these presents contained shall prejudice or affect the right of the Postmaster General from time to time to establish extend maintain and work any system or systems of telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit neither shall anything herein contained prejudice or affect the right of the Postmaster General from time to time to enter into agreements for or to grant licenses relative to the working and user of telegraphs (whether of a like nature to those hereby licensed or otherwise) or the transmission of messages in any part of the United Kingdom by means of wireless telegraphy or by any other means with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit and (save as in this license expressly provided) nothing herein contained shall be deemed to authorise the Licensee to exercise any of the powers or authorities conferred on or acquired by the Postmaster General by or under the Telegraph Acts or any of them.

18. Any notice request or consent (whether expressed to be in writing or not) to be given by the Postmaster General under these presents may be under the hand of any one of the Secretaries or Assistant Secretaries for the time being of the Post Office, and may be served by sending the same in a registered letter addressed to the Licensee at the usual or last known place of residence or business of the Licensee, and any notice to be given by the Licensee under these presents may be served by sending the same in a registered letter addressed to the Secretary of the Post Office at the General Post Office, London.

THE SCHEDULE.

1.	Normal Range of Signalling		Character of Apparatus.		6. Power.		7.
Name of Station.	2. By Night.	3. By Day.	4. Description of Receiving Apparatus.	5. Wave Lengths (in Metres).	Source and Maximum Output.	Maximum to be taken by Transmitting Instruments.	If Alternator is used, No. of Cycles per Second.

IN October, 1912, the Board of Trade, at the request of the Lords Commissioners of the Admiralty, issued a notice directing the attention of Masters and Owners of British Merchant Vessels to the necessity for arranging for periodical practices in Wireless Telegraphy communications between H.M. Ships of War and Ships of the British Mercantile Marine for the purpose of ensuring efficient and reliable communication when required.

The co-operation is invited of all British ship-owners and masters whose ships are fitted with Wireless Telegraphy, in order to give effect to the following proposals.

(1) At 8.30 a.m. and 2.30 p.m. daily any single man of war (destroyers and small craft excluded) or one man of war in a fleet in company, detailed by the Senior Naval Officer present, will adjust her Wireless Telegraphy transmitting and receiving apparatus to the commercial 600 metre wave length and make the call "CCCC," followed by her own commercial call sign, indicating that she is prepared to carry out an exercise with any British merchant ship within range.

On a British merchant ship receiving this call she will answer and say whether or not she is prepared to proceed with the exercise. Should more than one merchant ship answer, the man of war will indicate which is to exercise and which is to wait.

The exercise will then proceed, but no messages are to be exchanged which are not authorised by the respective captains and masters of the ships practising. No message received during such exercises is to be forwarded beyond the ship actually receiving the message and no payment for any message can be made. The exercises are to be considered as strictly on Service and not for any commercial advantage.

(2) In all such exercises the man of war is to be considered the controlling ship.

(3) The exercises will cease at 9.15 a.m. and 3.15 p.m. respectively, or before, at the discretion of the captains concerned.

(4) These exercises are only to be carried out between vessels, neither of which are within 150 miles range of any commercial shore station using the 600 metre wave length, and are to cease at once should one of H.M. ships so direct.

MERCHANT SHIPPING (CONVENTION) ACT, 1914.

An Act to make such amendments of the law relating to Merchant Shipping as are necessary or expedient to give effect to an International Convention for the Safety of Life at Sea, signed in London on January the twentieth, nineteen hundred and fourteen, and for purposes incidental thereto.

(10th August 1914.)

PART III.

(Which deals with Wireless Telegraphy.)

15. (1) Subject to the provisions of this Act, every British ship registered in the United Kingdom which carries 50 or more persons shall be provided with a wireless telegraphy installation, and shall maintain a wireless telegraphy service which shall be at least sufficient to comply with the rules made for the purpose under this Act, and shall be provided with certified operators and watchers at least in accordance with those rules. Provided that the obligations imposed by this section shall not come into operation until such date, not being less than six months after the making of those rules, as may be specified in the rules.

(2) In reckoning the number of persons carried on a ship for the purpose of this section, persons shall not be counted who are exceptionally and temporarily carried on a ship—

(*a*) As the result of *force majeure;* or

(*b*) as the result of the necessity of increasing the number of the crew to fill the places of members of the crew who are ill or disabled; or,

(*c*) as the result of the obligation on the part of the master to carry shipwrecked persons, or persons in like circumstances; or,

(*d*) if so provided by rules of the Board of Trade, as cargo hands for a part of the voyage not being between one continent and another, and not being, during the time the hands are carried, outside the limits of latitude thirty degrees north and thirty degrees south.

(3) If this section is not complied with in the case of any ship, the master or owner of the ship shall be liable in respect of each offence to a fine not exceeding five hundred pounds, and any such offence may be prosecuted summarily, but if the offence is prosecuted summarily the fine shall not exceed one hundred pounds.

16. (1) The Board of Trade, in consultation with the Postmaster General, shall make such rules with respect to wireless telegraphy installations and service on British ships which are registered in the United Kingdom and with respect to the carrying on those ships of operators and watchers for the purposes of wireless telegraphy, as appear to them necessary or expedient to carry into effect the provisions of the Convention mentioned in Part V. of the Third Schedule to this Act.

(2) The Board of Trade may by rules made under this section exempt from the obligations of this Act as to wireless telegraphy—

(*a*) Ships while on voyages the course of which does not take the ship more than a hundred and fifty sea miles from the nearest coast, if the Board are satisfied that the route and the conditions of the voyage are such as to render compliance with those obligations unreasonable or unnecessary; and,

(*b*) sailing ships on which, owing to the peculiar or primitive nature of their build, it is impossible to provide a proper wireless telegraphy installation.

(3) The Board of Trade may by rules made under this section provide that any automatic calling apparatus which is certified by them to be efficient and to have been accepted by the parties to the Convention may be substituted, for the purposes of the provisions of this Act and any rules made thereunder relating to wireless telegraphy, for a certified operator or watcher.

17. The Board of Trade may postpone the operation of the provisions of this Act relating to wireless telegraphy as respects any particular ship for such period as the Board of Trade determine in each case, if it is shown by the owners of the ship that they have taken all reasonable steps to comply with the provisions of this Act as respects the ship, but that they have been unable to do so owing to difficulties in obtaining delivery of any wireless telegraphy apparatus or of obtaining the service of certificated operators or watchers.

The period of postponement under this section shall not exceed one year in the case of ships which are required in pursuance of the Convention to provide a first-class wireless telegraphy service, and two years in the case of ships which are so required to provide a third-cless wireless telegraphy service, and in the case of ships which are so required to provide a second-class wireless telegraphy service, shall not exceed one year as respects the provision of a wireless telegraphy installation and two years as respects the provision of a continuous watch.

(*This Act is due to come into force on July 1st, but it may be necessary to alter this date.*)

SUPPLEMENT TO *THE LONDON GAZETTE* OF FRIDAY, THE 31ST OF JULY, 1914.

Sunday, 2nd August, 1914.

GENERAL POST OFFICE.

In pursuance of Regulation 5 of the Wireless Telegraphy (Foreign Ships) Regulations, 1908, I, the Right Honourable CHARLES EDWARD HENRY HOBHOUSE, His Majesty's Postmaster General, do hereby give notice that in the opinion of the Right Honourable REGINALD MCKENNA, one of His Majesty's Principal Secretaries of State, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, and that the use of wireless telegraphy on board foreign ships whilst in the territorial waters of the British Isles will be subject to such rules as may be made by the Admiralty.

Dated this First day of August, 1914.

Hon. W. G. Spence

Postmaster-General,
Commonwealth of Australia.

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EXTRACT FROM *THE LONDON GAZETTE*, 4TH AUGUST, 1914.

Admiralty, S.W., 3rd August, 1914.

With reference to the notification published by the Postmaster General on the 2nd instant, the following regulations have been made by the Lords Commissioners of the Admiralty prohibiting the use of wireless telegraphy by merchant vessels in the territorial waters of the United Kingdom and Channel Islands:—

1. The use of wireless telegraphy is prohibited in the harbours and territorial waters of the United Kingdom and Channel Islands.

2. On entering any port or harbour or on directions being given to that effect by any naval, military, examination service, Customs or police officer, the aerial wire or antenna is to be at once lowered, disconnected from its halliards, and from the operating room, and is not to be rehoisted while the ship remains in English territorial waters.

3. Any breach of these regulations renders the masters of offending ships liable to penalties and to the confiscation of the wireless apparatus of their ships.

Note.—These regulations do not apply to ships owned (not chartered) by the Admiralty, whether they fly the Blue or the Red Ensign.

By Command of Their Lordships,

W. GRAHAM GREENE.

EXTRACT FROM STATUTORY RULES AND ORDERS, 1914.

No. 1699.

DEFENCE OF THE REALM.

The Defence of the Realm (Consolidation) Regulations, 1914:

22. No person shall, without the written permission of the Postmaster General, buy, sell, or have in his possession or under his control any apparatus for the sending or receiving of messages by wireless telegraphy, or any apparatus intended to be used as a component part of such apparatus: and no person shall sell any such apparatus to any person who has not obtained such permission as aforesaid; and if any person contravenes the provisions of this regulation he shall be guilty of an offence against these regulations.

If the competent naval or military authority has reason to suspect that any person having in his possession any apparatus for sending or receiving messages by telegraphy, telephony, or other electrical or mechanical means is using or about to use the same for any purpose prejudicial to the public safety or the defence of the realm, he may, by order, prohibit that person from having any such apparatus in his possession, and may take such steps as are necessary for enforcing the order, and if that person subsequently has in his possession any apparatus in contravention of the order he shall be guilty of an offence against these regulations.

For the purposes of this regulation any apparatus ordinarily used as a distinctive component part of apparatus for the sending or receiving of messages by wireless telegraphy shall be deemed to be intended to be so used unless the contrary is proved.

GRENADA

The Wireless Telegraph Ordinance, 1903.

IN this Ordinance the term "Wireless Telegraphy" means any system or installation designed or constructed for the transmission or receipt of any messages or communications to or from a distant place by means of electric currents and signals generated by any apparatus or instrument which system, installation or instrument is unconnected by wire or other tangible attachment with such distant place. The term "Wireless Telegram" means any message or communication transmitted, or intended for transmission, by Wireless Telegraphy.

2. The Governor in Council and the servants of the Government of the Colony shall have the exclusive privilege of installing, erecting, maintaining, and using in this Colony apparatus intended for Wireless Telegraphy, and also the incidental services of transmitting, receiving, collecting or delivering Wireless Telegrams.

3. It shall not be lawful for any person to instal, erect, maintain or use in this Colony any apparatus or instrument for the purpose of Wireless Telegraphy without having previously obtained from the Governor a licence in that behalf to be granted on such terms and conditions as the Governor may prescribe.

4. Any person contravening the provisions of this Ordinance shall be liable on conviction to a fine not exceeding Fifty Pounds, and the apparatus and installation in respect of which a conviction is obtained may by order of the Magistrate before whom such conviction is obtained be forfeited to the use of His Majesty the King.

5. All proceedings under this Ordinance may be taken before the Magistrate of the Southern District or any other person appointed by the Governor for the purpose of hearing and deciding the case; and the mode of procedure shall be according to the law in force for the time being in respect of other offences punishable on summary conviction.

6. This Ordinance may be cited as "The Wireless Telegraph Ordinance."

HOLLAND.

ARTICLE I. of the Royal Decree of March 6th, 1905, supplemented and amended under the Decree of July 11th, 1914, bears reference to wireless telegraphy :—

ARTICLE I.

Unless provided with a permit from the Minister of Waterways, Commerce and Industries, and subject to observance of the conditions and stipulations therein contained for the purpose of preventing interference with the exploitation of telegraphs and telephones intended for public traffic, it is forbidden to lay down or to use the following :—

1. (*a*) Any electric conductors above ground for lighting purposes or for the transmission of power at a distance of less than 6 metres measured in horizontal projection from any overground conductor belonging to the telegraphs and telephones intended for public traffic.

(*b*) Any other electric conductor above the ground at a distance of less than 2 metres measured in horizontal projection from any conductor above ground belonging to the telegraphs and telephones intended for public traffic.

2. Any underground electric conductors at a distance of less than 0·50 metre from any underground conductor belonging to telegraphs and telephones intended for public traffic.

Among the installations referred to under 3 shall not be included plants the appartus of which are only suitable for the reception of radiotelegraphic signals, unless the plants are provided with an antenna placed within 1,500 metres of a Government station for radiotelegraphy, and more than 30 metres high above the ground.

3. Any electric installation intended for non-public telegraphic and telephonic intercourse by means of apparatus which are not connected with one another at the terminal points by wires or conductors.

Among the conductors referred to under 1 and 2, electric conductors within buildings are not included.

The permit referred to under 1, 2, and 3 above, is not required for electric conductors and installations which are already in use when this general working regulation comes into force.

Decree of May 10th, 1906, relating to the fixing of a provisional tariff for telegraphic communications for reports and distress signals received by radiotelegraphic means from ships at sea.

ARTICLE 1.

The Government Office with radiotelegraphic service at Scheveningen Harbour shall report by telegraph, to those who have notified themselves for the purpose, the communications from ships and distress signals received by way of radiotelegraphy.

ARTICLE 2.

The reports referred to in Article 1 shall be supplied within the Netherlands subject to the payment by the addressee of a coast charge of 1 florin for the present for each communication, increased by an amount of 50 cents if the telegram to be drawn up does not contain more than 10 words, and of 25 cents above this for each successive 10 words or fraction thereof.

Nevertheless, the reports herein mentioned may also be supplied against such a fixed price per year as shall be fixed by our Minister of Waterways, Commerce and Industry for each interested party, taking into consideration both the number and the extent of the required information and also the above-named tariff.

In supplying the reports referred to in this Article to interested parties outside the Netherlands, the above-mentioned costs will be increased by the foreign telegraphic tariff applying thereto.

ARTICLE 3.

This Decree shall come into operation on the second day after the date of the *Staatsblad* and the *Staatscourant* in which it is published.

Our Minister of Waterways, Commerce and Industry is entrusted with the execution of this Decree, which shall be published simultaneously in the *Staatsblad* and in the *Staatscourant*, and a copy whereof shall be sent to the State Council.

HUNGARY

THE following is a copy of an Order issued by the Royal Hungarian President of the Board of Trade in 1912 in respect of wireless telegraphic equipments on Hungarian Ocean-going Passenger Ships.

In accordance with Sections 24 and 27 of the appendix to my Order No. 60805, dated August 21st, 1912, concerning measures of safety for and equipment of sea-going merchant ships before they are allowed to be on active service: all passenger vessels which are already in active service, liners running to time-table from Hungarian ports further than Gibraltar or Aden carrying passengers, at latest by February 1st, 1915, and all new ships before they go into active service must be fitted with such radio-telegraphic apparatus as is able to give and receive messages under normal conditions at a distance of 100 nautical miles at least.

That this Order may be carried out, I issue the following instructions:

(1) The shipowner must apply for the permission of the Royal Hungarian President of the Board of Trade to provide a wireless station

on board. The application must be accompanied by a technical description of the apparatus and four drawings. The previous permission of the Royal Hungarian President of the Board of Trade must be applied for and received in case of any change of system or of any other alteration which affects the ability of the apparatus to receive and send messages.

(2) The equipment of the station must be such that it shall conform to section 3 of the London Radio-Telegraphic Convention, and it must be able to work in conjunction with other radio-telegraphic stations of a different system—*i.e.*, it shall be able to send and receive messages from them and it must be abreast of the latest developments of technical progress. The previous approval of the Royal Hungarian President of the Board of Trade is necessary for the choice of the system to be applied.

The apparatus must be such that it shall be possible to tune to 300 meters as well as 600 meters wave-length and with these it shall be possible to send and receive at least 20 words per minute, counting the words at 5 letters each. The station, in accordance with the London International Radio-Telegraph Service Rules XXXV. s. 2 a-d, may also use a wave length of 1,800 metres.

(3) The necessary machines and materials for the equipment of the station, if possible, must be acquired in Hungary. Such materials and machines brought from foreign countries can only be used by special permission of the Royal Hungarian President of the Board of Trade. The auxiliary books and similar official equipment will be supplied at cost price by the General Manager of the Royal Hungarian Post and Telegraph Offices.

(4) All vessels which have a permanent Radio-Telegraphic Station, also those which have limited service in accordance with the London Radio-Telegraph Service Rules s. XI. must have an auxiliary radio-telegraphic equipment fitted in the manner determined by the Royal Hungarian President of the Board of Trade.

This auxiliary equipment must be provided with its own special power supply, which must be absolutely independent of all the other (not radio-telegraphic) power supply equipments of the ship and it must be such that it shall be possible to put it into active service quickly; it shall work for at least six hours and it must be suitable for a range of 80 nautical miles in case of a station in permanent service and 50 nautical miles in case of a station with a limited service.

This special auxiliary equipment can be dispensed with on ships where the regular radiotelegraphic equipment satisfies all requirements.

(5) The speed of transmission and reception will be fixed by the Royal Hungarian President of the Board of Trade in the licence to be issued.

In case of new inventions which promote the reliability and speed of sending and receiving messages to a considerable degree, the Royal Hungarian President of the Board of Trade may compel the shipowner after due and fair consideration of all practical conditions and of cost to apply the new invention on the station within a fixed period.

(6) The electric power used at the radio-telegraphic apparatus must not exceed one kilowatt under normal conditions, and greater power can only be applied in case communications have to be exchanged at a longer distance than 200 nautical miles from the nearest shore station or when by reason of obstacles this greater increase of power is necessary.

(7) The station may be examined and its working controlled by the employees of the General Manager of the Royal Hungarian Post and Telegraph Offices at any time. The shipowner must grant facilities to individuals proposed by the General Manager of the Royal Hungarian Post and Telegraph Offices as well as to the members of the Imperial and Royal Navy through the intermediary of the General Manager of the Royal Hungarian Post or Telegraph Offices to become acquainted with the working of the station, this extending to all particulars, and that they shall acquire the necessary experience.

The shipowner may not agree to any such conditions which the supplier of the equipment might make as that the equipment or any part of it must be kept secret as regards the deputies of the General Manager of the Royal Hungarian Post and Telegraph Offices and of the Imperial and Royal Navy who cannot be excluded.

The shipowner is obliged to carry without charge in classes according to their rank (including the use of sleeping cabins) persons sent for controlling and studying and must provide them with food at his own charge. For each voyage, however, only two such individuals can be sent.

(8) The Royal Hungarian President of the Board of Trade will determine in the licence the character of the service of the deck station (public, special destination, etc.) and duration (continuous, limited service), the number of operators to be employed and also their qualification in classes I. and II.

(9) The Royal Hungarian President of the Board of Trade reserves the right to suspend at any time the use of the deck-station for an indefinite period or for ever, or in respect of certain specified communications, without giving any reason or indemnity.

In case of mobilisation ordered in the Monarchy of Austria-Hungary or of war, if the commander of the vessel does not receive from the General Manager of the Royal Hungarian Post and Telegraph Offices instructions to the contrary, the station must be put absolutely out of use.

The commander of the ship is responsible for carrying out this rule.

In all other respects the shipowner must comply with the special instructions received in case of mobilisation or war.

(10) The radio-telegraph operators must be Hungarian citizens with an unimpeachable record, who are able to speak or write the Hungarian language perfectly and who have received a diploma from the examining commission sent out by the Royal Hungarian President of the Board of Trade that they thoroughly understand how to handle the radio-telegraphic apparatus.

Persons who receive this diploma must take before the examining commission an oath of fidelity to observe their duties and obligations to the service, and amongst these latter they must swear to keep all telegrams secret, which the written certificate will testify.

The employees of the station are subject to the ship's discipline; they must have a "ship service" book and must be included in the list of the crew (or staff).

The shipowner may train for the radio-telegraphic service only such persons whose training has been sanctioned by the General Manager of Post and Telegraph Offices.

Any radio-telegraphic employee whose diploma is cancelled by the General Manager of the Royal Hungarian Post and Telegraph Offices must be dismissed at once.

The shipowner must report to the General Manager of the Royal Hungarian Post and Telegraph Offices and to the Royal Hungarian Naval Authority immediately every change which occurs in the staff of the radio-telegraphic service.

(11) On payment of the regular fees anyone may use such stations for telegraphing as are equipped for public service.

The station fee to be charged must be submitted by the Company to the Royal Hungarian President of the Board of Trade and fixed by him.

The shipowner is entitled to this station fee.

(12) The shipowner is responsible for the telegraphic fees which are due to the Home and Foreign Telegraph Offices from the proceeds of the ship station telegrams. The shipowner—*i.e.*, the deck station—may communicate with foreign Telegraph Authorities and also with the Berne International Telegraph Association Bureau about matters concerning administration only through the General Manager of the Royal Hungarian Post and Telegraph Offices.

(13) The station must enter into communication for exchange of radio-telegrams with all shore and ship stations without regard to the system they use and they must also accept distress signals coming from anywhere and answer them and make the necessary arrangements.

The ship station must have special consideration for the shore station. The ship station must be kept continually in good condition with a view of exact and proper communication with shore stations.

If it is the wish of the shore station, the ship station shall interrupt its communications at once.

(14) With regard to the working of the ship station and the accounting for the fees: the London Radio-Telegraph Agreement and the Service Rules connected herewith, the St. Petersburg Telegraph Agreement and the Service Rules connected with it, as well as the orders of the General Manager of the Royal Hungarian Post and Telegraph Offices whether already issued or still future must be followed.

The ship station—*i.e.*, its owner—must comply with the legislative decisions and regulations concerning telegraph offices, telephones, and electric signals.

In foreign waters they must comply not only with the International Radio-Telegraph Agreement and Service Rules, but also with the special rules (if any) in that particular country. It is the duty of the shipowner to acquaint himself with these.

(15) As an acknowledgment of the right reserved to the State the shipowner must pay at the date mentioned in the licensing document and in cash 20 kronen annually per station and a controlling fee of 30 kronen.

In case an investigation should become necessary in consequence of the negligence or fault of the shipowner or his employee, and the investigation should find the shipowner or his employee guilty, the shipowner shall refund to the Treasury the entire cost of the investigation.

(16) As a penalty for negligence or mistakes committed in connection with the Radio-Telegraph service—in case it is neither transgression nor criminal—the General Manager of the Royal Hungarian Post and Telegraph Offices can fine the shipowner any sum up to K. 100.

(17) If the ship station does not fulfil its obligations, though repeatedly warned, or if the use of the station is directed against public interest, the Royal Hungarian President of the Board of Trade has the right to apply a penalty of K. 100 up to K. 1,000, or give instructions that a deputy sent out by him shall manage the station service at the expense and risk of the shipping company, and the necessary alterations shall be made at the expense of the shipowner, in order to put a stop to the deficiencies in the deck station equipment, or else he may suspend or withdraw the licence for the telegraph outfit.

(18) The licence for the equipment and upkeep of the Radio-Telegraph station cannnot extend to a longer period than twenty years.

After expiry of the period fixed in the licence the equipment, together with the whole appurtenances (furniture, articles of equipment), and together with the auxiliary equipment (if any) shall pass into the ownership of the Royal Hungarian Post in good and serviceable condition, without any charge and free from any liability thereon.

If the Royal Hungarian Post does not desire to take over the station, which thus passes into its ownership, but cedes it for further use to the shipowner, the shipowner must pay 20 kronen, together with and additional to the fees mentioned in section 16, as an acknowledgment of the fact that the ownership of the equipment has been acquired by the State.

Regarding vessels which are withdrawn from service, the licensing document concerning the ship station becomes void, and the shipowner must report this to the General Manager of the Royal Hungarian Post and Telegraph Offices. The transferring of the Radio-Telegraph equipment to another vessel necessitates a new licence.

(19) The Royal Hungarian President of the Board of Trade has the right to take over into State management temporarily or permanently any ship station whenever he chooses without giving a reason, before the licence expires, or to dismantle it.

In case it is temporarily taken over the owner must hand over for use free, and without claim for indemnity, the Radio-Telegraph apparatuses, all necessary articles of outfit for the upkeep and the supplies, as well as the official room and the operators' cabins; he must supply the necessary power for telegraphing, and to the operators services in kind all free of charge (board, medical treatment, service, etc.). On the other hand, the ship fees are due to the shipowner.

The conditions of the definite taking possession will be laid down by an order to be issued and also by the licensing document.

The definite occupation must take place under normal conditions after six months' notice, but the Royal Hungarian President of the Board of Trade reserves the right in the public interest to reduce this period or take over the station at any time without giving notice.

(20) In the public interest, as to which the Royal Hungarian President of the Board of Trade shall be the sole judge, the General Manager of the Royal Hungarian Post and Telegraph Offices—with the exclusion of every claim for indemnity which can be realised by legal means—can take measures for fitting out any kind of vessel with radio-telegraph at the expense of the Treasury, for the upkeep of the same, and, when the public interest does not demand it any more, for the dismantling of the same; and also to make regulations for refunding a certain indemnity to the owner of the vessel which arises out of this.

(21) The Royal Hungarian President of the Board of Trade reserves the right to make exceptions in certain cases under above rules according to practical requirements.

INDIA

THE Administration of Wireless Telegraphy in India is controlled by the Director-General of Posts and Telegraphs, Hon. W. Maxwell, C.I.E., M.V.O., I.C.S., assisted by the Chief Engineer of the Telegraphs Department. Immediately subordinate to these are the Directors of Telegraph Engineering of the Northern, Eastern, and Southern circles, the Postmaster-General and the Director of Telegraph Engineering at Burma. There are, in addition, Superintending Telegraph Engineers in charge of the Telegraph Divisions where Wireless Stations are situated. There are now eighteen wireless telegraph stations in India, of which nine are open to general public correspondence.

The Government of India have decided that the granting of licences to military officers in respect of wireless telegraph apparatus used for experimental purposes shall be regulated by the following general principles :—

(1) When an officer conducts experiments in wireless telegraphy in his official capacity at the expense of Government no licence is required, but only executive permission, which may be given so far as the Telegraph Department is concerned by the Director-General, Posts and Telegraphs.

(2) When an officer carries on experiments as a private individual at his own expense he must obtain a licence. If the approval of the military authorities is required to what he proposes to do he should obtain such approval before the Director-General, Posts and Telegraphs, is approached. The licence will then be submitted by the Director-General, Posts and Telegraphs, for the sanction of the Government of India.

(3) With reference to the above, attention is drawn to the necessity for applying for licences to own and use wireless telegraphy apparatus or installations, experimental or otherwise. Applications for such licences will be submitted through the Chief of the General Staff and will contain particulars regarding the apparatus, showing (*a*) system it is proposed to employ, (*b*) maximum range of signalling with applicants' own receiving apparatus, (*c*) power (current and voltage), (*d*) source of power.

ITALY

WIRELESS Telegraph land stations in Italy belong to and are operated by the Ministry of the Navy, and the department having special charge of the wireless telegraph service is the Department of Artillery and Armaments, at the head of which is Admiral Giulio Bertolini, of the Italian Navy.

In addition to the Ministry of the Navy, the Ministry of War and the Ministry of Posts and Telegraphs also have special departments for Wireless Telegraphy.

The following is known as the Law of 30th June, 1910, No. 395 :—

Art. 1.—The establishment and exploitation of the radiotelegraphic and radiotelephonic installations are reserved to the Government, and in general of all those for which, in the State and in the Colonies, on land and on board ship, energy is employed in order to obtain distance effects without the use of conducting wires.

The Government has the right to grant to any person, public or private scientific or training institution, the authority to establish and to exploit installations of such a nature on land and on the passenger and mercantile vessels, for which previous concession must be obtained.

The licence may be revoked upon the recommendation of the consulting Commission when the installations cause interruption of State stations which were in operation prior to the concession, or when they do not comply with the technical conditions established in the licence.

The exploitation of the installations granted can be revoked, suspended, or taken over by the Government in time of war or during peace whenever the Government may deem it necessary and opportune.

The Government has also the right to inspect, through its officials, those stations which are not the property of the State, in order to ascertain whether the stations are operated in accordance with the regulations.

Art. 2.—The Government administrations concerned in these services are the Ministry of Posts and Telegraphs, of War and the Admiralty; and special regulations determine the share of the respective departments in the execution of the present law.

A permanent consultive commission is constituted to give opinions upon international agreements, questions of a scientific nature, and upon doubtful points relating to the said services.

The commission shall also decide every doubtful case which may arise of a technical character regarding the installation and exploitation of the concessions according to Art. 1.

The commission shall be qualified to determine the power of the radiotelegraphic and radiotelephonic apparatus and technical and economic details for their use on vessels engaged in emigration traffic, when the said apparatus has been installed by the Government according to Art. 11 of the Royal Decree, 14th March, 1909, No. 130.

Questions concerning indemnity on account of the cancellation of a licence, suspension of exploitation, or redemption as per Art. 1, shall be

referred to an arbitration tribunal, which shall decide, without right of appeal. This tribunal shall be composed of three members, one nominated by the Government, one by the licensee, the third by the President of the Tribunal in Rome. The Government can leave to the said Commission the selection of its own arbitrator.

Where several licensees are interested parties to a dispute, and they are unable by mutual agreement to nominate an arbitrator, each shall submit the name of an arbitrator, and the choice will be made by drawing lots in the presence of a judge of the Tribunal of Rome.

The composition of the Commission in the present article and the rules of its working have been determined in the regulations.

Art. 3.—Every infringement of Art. 1 of the present law is punishable by a fine up to £ It. 2,000, and with imprisonment up to one year, which penalties may be imposed separately and together according to the circumstances. It is in the power of the judge to add to the said penalties the confiscation of the apparatus.

During criminal proceedings the Administration can, in virtue of decree by the prefect, and at all times that in the opinion of the prefect would be in the public interest, obtain immediate possession of the installation and provide if necessary for its removal.

Any person will incur the same penalties if he should avail himself of the installation on board commercial or passenger vessels when they are at anchor in the State waters, except in case of danger or other special cases, which will be dealt with in the regulations.

Art. 4.—If any person should cause damage or deterioration to installations, or in any other manner interrupt, or cause interruption of the service, even temporarily, he will be liable to the penalties laid down in Art. 315 of the Penal Code, except in the case of military interference with military stations, for which offence the penalties stated in the Penal Code will be imposed.

If any person should abuse the use of the alarm signal of the vessels in danger, he will be subject to the same penalties.

Art. 5.—The penalties established by the present law are understood to be applicable, without prejudice, to greater offences which may take down in Art. 315 of the Penal Code, except in the case of military Penal Code.

THE following regulations (No. 227) were published in April, 1912, for carrying out the Act of June 30th, 1910 (No. 395) :—

Section I.

1. The Ministry of Posts and Telegraphs shall have under its control :—

(*a*) The installation and exploitation of the stations for public service and constituting the interior net-work of the State and of all those opened for international communication.

(*b*) The verifications, inspection and control of the material and working of the service of all the land installations exploited in virtue of Government licence.

(*c*) The tariff regulation for communication between all land stations and ship and shore stations, also accounting.

The Ministry of War shall have under his control :—

(*a*) The installation and working of stations destined exclusively to the military service, including movable field stations for use in the R. Army. In time of war the management of the service (either a part or all the stations destined to the public service) can be taken over by the military administration.

The Admiralty shall have under its control :—

The installation and exploitation of the ship stations of the Royal Navy, private and mercantile; the verifications, inspections and control of the materials and of the working of the service of the installations made for passenger and mercantile traffic.

Section II.

2. *Permanent Consulting Radiotelegraphic Commission.*—The Permanent Consulting Commission is composed of a President not belonging to the Government Administration, two members selected amongst persons of well-known ability in electric and radiotelegraphic science, a superior officer of the Royal Navy attached to the General Staff, and a superior officer attached to the office of the Chief of the General Staff of the Royal Navy.

The following are members of the Commission by right :—

(1) The Director of Posts and Telegraphs Higher Institution.

(2) The Director in Chief of the Radiotelegraphic Department of the Posts and Telegraphs.

(3) The Officer-Director of the Radiotelegraphic Department in the Army Office of Rome.

(4) The Superior Officer of the General Staff of the Royal Navy, Chief of the Department of the Submarines, Electric material and Radiotelegraphic Service at the Admiralty.

Three members, selected amongst the three mentioned Administrations, will act as Secretaries.

3. The President, members and secretaries will be nominated by Royal Decree, proposed, by common accord, by the Ministers of the Posts and Telegraphs, Admiralty, and War.

By Ministerial decree extraordinary members, without vote, can be added temporarily, these to be selected from persons of well-known skill, proposed by the President of the Commission.

4. The Commission shall have its office at the Admiralty in Rome. The meetings of the Commission are to be convened by the President at the request of the interested Administrations.

5. The opinion of the Consulting Commission can be asked on the following subjects:—

(*a*) On the compilations of arrangements and special rules for the technical organisation of the radiotelegraphic and radiotelephonic service of the State, as well as for practical rules for the constitution and exploitation of the installations.

(*b*) On all questions of a scientific nature, and doubtful cases referring to the radiotelegraphic and radiotelephonic services.

(*c*) On International Conventions.

(*d*) On technical conditions with reference to licences of radiotelegraphic and radiotelephonic stations.

(*e*) The establishment, before granting the licence, of indemnity due in case the installation should be repealed, suspended, or taken over by the State according to paragraph III., Art. I. of the law.

(*f*) Repeal of the licences.

(*g*) On the adoption of new radiotelegraphic and radiotelephonic systems, and on the application of same by the Government service, unless they should deal with interesting systems concerning the defence of the State.

The qualified Administrations may whenever they think it warranted ask the opinion of the Commission on any subject.

The Commission is entitled to avail itself for its own study of the working rooms and of the Government experimental stations, but a previous application must be lodged with the Administrations.

6. The expenses for the working of the Commission are to be divided amongst the three Administrations interested.

Section III.

7. *Licences for the Exploitation of Radiotelegraphy and Radiotelephony.*—Licences to persons, to institutions, and to public and private Administrations for the installation of any radiotelegraphic or radiotelephonic station will be granted in virtue of an agreement containing the conditions to be observed, by a decree issued by the Ministry of the Posts and Telegraphs, acting in harmony with the Ministry of War and the Admiralty.

Such licences cannot last longer than the 16th February, 1917. After this period the licence can be renewed.

8. Licences for radiotelegraphic stations for private use are limited to private correspondence between properties of the same licensee or between properties of two licensees, all correspondence with third persons being absolutely excluded. Such licences are exempted from tax when the stations are constructed on private property and work over all the territory dividing the stations, without interruption by public land.

Licences are also exempted from taxes which are granted for installation of radiotelegraphic and radiotelephonic stations having for object a scientific or educational purpose.

9. All applications for licences for radiotelegraphic and radiotelephonic installations must contain :—

(*a*) The exact indication of the person or institution making the application and their legal residence.

(*b*) The nature and purpose for the licence, the place or places where it is proposed to instal the station or stations, and their presumed zone of service.

(*c*) The detailed plans for the construction and technical quality of the installation, indicating in a detailed manner the nature and power thereof.

(*d*) The period for which the licence is asked.

(*e*) The period required before starting the station.

(*f*) The receipt of the amount to constitute the deposit-guarantee, as per Art. 13 and 14.

Such a deposit must be paid to the cashier of the local Provincial Direction of Posts and Telegraphs by the applicant for the licence.

10. Every contract by the licensee, having for object the hire, amalgamation, partial or complete transference of the licence or licences, cannot take place before obtaining in advance the approval of the Government.

11. The licence is considered as expired should the licensee fail to complete and have ready for service the radiotelegraphic or radiotelephonic installation within the time stipulated as per paragraph (*e*) Art. 9.

The licence is considered as expired on the death of the licensee.

12. The officials of the State Telegraphic Administration shall be responsible for the maintenance of the installation and proper up-keep of the radiotelegraphic and radiotelephonic land stations for which a licence is granted; they shall satisfy themselves that the licensee observes the law and the present regulations and that the licensee fulfils all the obligations imposed upon him by his contract with the Government.

13. Every licensee for radiotelegraphic or radiotelephonic installation for private use, excepting the cases considered in Art. 8, will pay in advance to the State an annual fixed tax of £It.50.

To guarantee the said tax the licensee must make a deposit as guarantee equal to the amount of fixed tax for one year.

14. Every licensee for radiotelegraphic or radiotelephonic installations for public use will pay every year to the State in quarterly instalments a tax corresponding to 10 per cent. of the revenue from radiotelegraphic or radiotelephonic charges on the basis of the common tariff.

To guarantee the said tax the licensee will make a deposit as guarantee of not less than £It.200. If after one year the guarantee shows to be less than the amount due to the State for one year, then the deposit must be brought to the level of such proportion.

15. The period of the licence and the obligation of the tax established by Articles 13 and 14, begin from the month following the decree granting the licence.

16. The deposits as per Articles 13 and 14 will be forfeited to the public exchequer in case of withdrawal or termination of a licence.

Should the licensee fail to provide for the payment of the taxes due as per Articles 13 and 14, the Government will apply the deposit, which should be increased in its integral amount within ten days of the said confiscation.

Section IV.

17. *Qualifications for the Radiotelegraphic and Radiotelephonic Service.*—The staff necessary for the management and working of the radiotelegraphic and radiotelephonic service is appointed as follows:

(*a*) For the stations under the control of the Ministry of Posts and Telegraphs, from amongst the officials of specialists of first, second, third and fourth class.

(*b*) For the stations under the control of the Ministry of War, amongst the officers and privates of the engineers of the R. Army.

(*c*) For the stations under the control of the Admiralty, from amongst the officers of the staff and the marines.

Should it at any time be found convenient to the management and working of the above-mentioned stations, a mixed staff selected from the three Administrations can be employed.

The Ministry of the Posts and Telegraphs can for an educational purpose always send its own staff to the radiotelegraphic and radiotelephonic commercial stations by making previous arrangements with the interested Administration.

18. The staff to be employed in the radiotelegraphic stations licensed to private persons must possess a certificate proving their professional ability.

Such a document is granted either by the Ministry of Posts and Telegraphs, or by the Admiralty, according to the service for which it is intended.

Section V.

19. *Limitations to the use of Radiotelegraphic and Radiotelephonic Apparatus.*—Cargo and passenger vessels are prohibited from using their own radiotelegraphic or radiotelephonic stations when they are at anchor in the State waters, except in cases of giving warning of danger or appeals for help, or when they are about to sail, or for

urgent reasons within half an hour after their arrival and when the communication with the land is cut off for special reasons or for sanitary measures.

A breach of this rule will render the transgressor liable to the penalties imposed by Article 3 of the law.

Section VI.

20. *Taxes.*—The land tax for one radiotelegram is composed:

(*a*) Of the radiotelegraphic tax due to the coast station;

(*b*) Of the radiotelegraphic tax due to the station on board;

(*c*) Of the telegraphic tax.

For taxation purposes only those radiotelegrams exchanged with Board stations are considered.

21. All the radiotelegraphic and radiotelephonic stations installed before the promulgation of the law must apply for a licence within one calendar month of the present regulation.

The following paragraph relating to Wireless Telegraphy is taken from the "Law of 30th June, 1912," which contains regulations concerning marine, commercial and postal services:—

"The undertakers (of said services) are obliged to adopt (on board their ships) . . . . wireless telegraph and telephone apparatus, whose system and power will be indicated, and, if necessary, modified by the Ministry of the Navy."

JAMAICA

THE TELEGRAPH CONTROL LAW, 1904.

NO person shall, within the Colony or any of its Dependencies, establish, maintain or use any telegraphic apparatus, mechanism, or contrivance, of what nature or kind soever the same may be, without due permission or licence under the hand of the Governor previously obtained for that purpose.

It is hereby expressly declared that what is commonly known as "wireless telegraphy," including the Marconi apparatus and any similar or other mechanism or contrivance whatsoever for the transmission of telegraphic messages without the employment of wires or cables, is a telegraphic apparatus, mechanism, or contrivance within the meaning of this Section.

2. It shall be lawful for the Governor in Privy Council from time to time to make and as he shall see fit repeal, alter or vary rules and regulations for all or any of the following purposes, viz:—

Permitting or licensing any person to establish, maintain, or use any telegraphic apparatus, mechanism, or contrivance, whether for the service of the public or for any private purpose;

Attaching conditions, restrictions, and limitations to the exercise of the privilege by such permission or licence conferred:

Providing suitable penalties and forfeitures for the contravention of the prohibition above contained in Section 1 of this law, and to the breach of any rule or regulation made thereunder, and providing for the recovery thereof, summarily or otherwise; provided that the penalty (over and above forfeitures) to be imposed for any one offence shall in no case exceed a fine of Two Hundred Pounds, or in default of payment thereof imprisonment, with or without hard labour, for a period not exceeding twelve months;

The exercise of all such powers and control over telegraphic establishments (by temporarily entering into possession thereof or otherwise) as may be necessary for the public safety, whether at all times, or in any case of emergency which may arise;

And generally for the better carrying out of the purposes of this law.

Such rules and regulations shall come into force as from the date of publication thereof in the *Jamaica Gazette*.

3. Nothing in this law contained shall invalidate or impair any legal right already possessed by any telegraph or cable company, relative to the laying down or landing of any telegraphic cable, the removal, renewal, maintenance, and use thereof, or any other like matter.

4. Law 1 of 1903 is hereby repealed.

LAW 21 OF 1909.

THE DIRECT WEST INDIA CABLE COMPANY'S LAW, 1909.

Whereas the Direct West India Cable Company, Limited, is desirous of establishing a wireless installation for communication between ships and the shore in Jamaica;

And whereas under the provisions of Law 7 of 1904, entitled "The Telegraph Control Law, 1904," no person shall establish, maintain, or use within the Island of Jamaica, or any of its Dependencies, any apparatus or machine whereby communication by Wireless Telegraphy can be held between the said Island and ships, without having first obtained the sanction of and a Licence from the Governor;

And whereas a Licence to erect such a wireless station has been granted to the Direct West India Cable Company, Limited, by the Governor of Jamaica;

Be it enacted by the Governor and Legislative Council of Jamaica, as follows:—

1. The protection, rights, powers, and facilities already granted to The Direct West India Cable Company, Limited, under Law 16 of 1898, entitled "The Direct West India Cable Company's Law, 1898," are granted and extended for the purposes of wireless telegraphy installation to be installed by the company or worked and maintained by them in so far as they may be applicable to the satisfactory and efficient working and maintenance of a wireless station or stations.

2. The Government of Jamaica shall acquire for the use and at the expense of the company a piece of land of sufficient dimensions at a place to be selected by the company and approved by the Government suitable and convenient for the economical erection, maintenance, and working of the installation, and when acquired such piece of land shall be conveyed to the company in fee simple, or if the Government of Jamaica possesses a piece of land of sufficient dimensions at a place approved by the company suitable and convenient for the economical erection, maintenance, and working of the installation and which the Government considers it desirable the company should have, the Government may sell the said piece of land at a price to be mutually agreed upon, or the Government may rent it to the company on such terms as may be agreed on during the period of the licence or for so long as the company may continue to work a wireless station or stations.

The acquisition of land by the Government of Jamaica under this section shall be deemed as an acquisition for public work within the meaning of the Public Lands Acquisition Law, 1897 (Law 31 of 1897).

JAPAN

IN accordance with the Telegraph Act of Japan, 1900, "The Telegraph and Telephone Service shall be under the supervision of the Government," but private telegraphs or telephones may be established subject to certain regulations. The following regulations have been made regarding wireless telegrams:—

1. The expression "wireless telegram" means any telegram to be transmitted by wireless telegraphy.

2. In the present Regulations the term "coast station" means any telegraph office on land equipped with wireless telegraph apparatus, and the term "ship station" means any telegraph office on board a ship equipped with wireless telegraph apparatus.

3. Wireless telegrams shall bear the following abbreviated instruction:—

"R A" in the case of Romanised telegrams.

4. The name of a coast station through which a wireless telegram destined for a ship station is to be transmitted shall be indicated within parentheses in the address of the telegram, but such indication shall not be counted in the number of words even in the case of a Romanised telegram.

In case such coast station cannot transmit the telegram, but there is another coast station which is able to do so, the intermediary of the latter may be resorted to. If a telegram destined for a ship can be delivered direct to the addressee from a telegraph office on land, it may be delivered from such office without the use of wireless telegraphy.

(a) Wireless telegrams to be transmitted by way of intermediate ship station, with the exception of those handed in at a ship station, shall bear the following abbreviated instruction :—

"R S" in the case of Romanised telegrams.

Such intermediary transmission can in no circumstances be made more than once.

5. If the sender of a wireless telgram destined for a ship station wishes to indicate the term during which his telegram is to be kept at the coast station, the number of days shall be inserted in the telegram as paid instruction.

Wireless telegrams without such instruction will be retained at the coast station for nine days from the day of handing in. However, in case the transmission of a telegram cannot be effected on account of the ship station's leaving out of the radius of action of the coast station or for any other reasons, the telegram may not be retained, if the retention is deemed unnecessary.

6. If the sender wishes to prolong the term of retention mentioned in Article 5, application to that effect shall be made to the coast station before the expiration of the term. The same applies to further prolongation of the term. In such case, the term of retention will be nine days, unless specially indicated.

The application shall contain the date of handing in, number of characters or words and the names of the sender and addressee of the wireless telegram.

The sender may make the application mentioned in Paragraph 1 through the office of origin. If he wishes it notified to the coast station by telegraph, he shall pay the charge for a paid service telegram for the purpose.

7. The transmission of a wireless telegram is to be effected when both the sending and receiving offices are within the guaranteed range of action of each other.

8. Wireless telegrams concerning the distress of a ship shall be sent or received with absolute priority by a coast or ship station, all other correspondence being suspended.

9. Paid service telegrams concerning enquiry, rectification and stoppage of a wireless telegram to which reply is required can be exchanged only between telegraph offices on land.

10. "Urgent telegrams," "redirected telegrams," and "telegrams with acknowledgment of receipt" are admissible between telegraph offices on land.

The sender of a wireless telegram with acknowledgment of receipt will be notified of the date and time at which the coast station has transmitted the telegram to the ship station.

(a) Telegrams of the same text originating from the same ship station or from the same telegraph office on land, and passing

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through the same coast station, may be made a multiple telegram, so far as concerns the transmission between wireless telegraph stations or between telegraph offices on land, as the case may be, no matter whether the addresses of such telegrams be in different localities or they be served by different offices of destination. The telegram shall bear the following abbreviated instruction instead of that for an ordinary multiple telegram :—

"S M" in the case of Romanised telegrams.

Paragraph 2 of Article 4 is not applicable to the multiple telegram mentioned in the preceding paragraph when it is to be distributed to two or more ship stations, unless every copy of such telegram can be transmitted through the same coast station or delivered from the same telegraph office on land.

(*b*) Reply-paid wireless telegrams shall bear the abbreviated instruction for "reply paid," "urgent reply paid," or "collated reply paid," completed by the mention of the prepaid amount. If a prepaid amount is 60 sen in the case of *kana* telegrams, and 75 sen in the case of Romanised telegrams, the mention of the amount is not required.

11. Wireless telegrams are subject to the following charge for the operation at a coast station or a ship station in addition to the ordinary telegraph charge. It is provided, however, that the ordinary telegraph charge is not levied on a telegram which is to be transmitted only by wireless telegraphy.

For Government and Ordinary Telegrams.

Coast charge: For a *kana* telegram, 20 sen up to fifteen characters, 5 sen for every additional five characters or less.
For a Romanised telegram, 25 sen up to five words, 5 sen for every additional word.

Ship charge: Ditto.

For Press Telegrams.

Coast charge: 20 sen for every fifty characters or fraction thereof.

Ship charge: Ditto.

(*a*) The following charge is levied in the same way as mentioned in the preceding Article on a supplementary copy of a multiple wireless telegram.

For Government and Ordinary Telegrams.

Coast charge: For a *kana* telegram, 10 sen;
For a Romanised telegram, 15 sen.

Ship charge: Ditto.

For Press Telegrams.

Coast charge: One-half the charge for the original telegram.

Ship charge: Ditto.

(*b*) If, in the case where Paragraph 2 of Article 4 is applied, the amount paid fall insufficient, the deficiency is collected from the addressee. In the case of a multiple telegram the amount to be collected is divided by the number of copies, and the quotient shall be the sum to be collected from one addressee.

12. Wireless telegrams are free from special charge applicable to telegrams handled out of the ordinary hours of duty.

13. The following charges for a wireless telegram shall be refunded less the amount which has been appropriated for another charge :—

(1) The charges pertaining to the transmission by wireless telegraphy when not effected.

(2) The charges pertaining to the transmission on telegraph lines when not effected.

14. An application for the refund of charges for a wireless telegram handed in at a ship station may be sent in through any telegraph office.

15. The term of retention mentioned in Articles 5 and 6 is not reckoned in the period of delay giving rise to refunds.

16. All matters not provided for in the present Regulations are governed by other rules applicable to "inland telegrams," with the exception of Articles 71, 114, 121, 126 to 130, 146 to 148 of the Regulations regarding Inland Telegrams.

(*a*) The provisions of every preceding Article are applicable to telegrams exchanged by means of wireless telegraphy between offices on land in case of interruption or bad working of submarine cables. The Minister of Communications may fix a special charge for such telegrams, if he deems necessary.

With regard to the special treatment of wireless telegrams, as well as the special charge mentioned in the preceding paragraph, it will be notified in other ways.

The following supplementary regulations came into operation on July 1st, 1913, and apply to all Japanese possessions :—

1. Foreign wireless telegrams are understood to be those which are treated according to the regulations of the London International Radiotelegraphic Convention or to the regulations concerning the radiotelegraphic service concluded between the Government of the Empire and foreign Governments or companies.

2. The rates to be charged for foreign messages through Japanese coast and ship stations are as follows :—

1. Coast station rate, 24 yen (fr. 0.60) per word.

2. Ship station rate, 16 yen (fr. 0.40) per word.

The coast station rate referred to in the preceding paragraph includes the rate applicable to the transmission on telegraph lines for wireless messages originating in or destined for the

Japanese Empire or Southern Manchuria or for ships' stations transmitted through Japanese coast stations and the Japanese telegraph service. As regards urgent wireless messages for transmission over land lines, an extra 10 yen (fr. 0.25) will be charged.

3. The rates to be charged for foreign radiotelegrams through foreign coast or ship stations will be indicated separately.
4. The ordinary rate for foreign wireless messages accepted by a Japanese ship station for transmission through a foreign coast station will be fixed by the owners of the said foreign coast station.
5. For the acknowledgment of receipt of foreign wireless messages handed in at a Japanese telegraph office and destined for a ship station and transmitted thereto through a Japanese wireless coast station, the rate for the acknowledgment of receipt of interior telegrams for transmission between Japan and Southern Manchuria will be charged.
6. At the request of the receiver, or of the person empowered to receive messages for and on behalf of the receiver, wireless messages may be retransmitted only over Japanese land lines.
7. When the Japanese coast station given by the sender of a foreign wireless message destined for a ship cannot transmit the said message it may be transmitted through another Japanese coast station, provided such station is suitable for the purpose. This provision also applies in case the Japanese ship station cannot transmit a foreign wireless message to a Japanese coast station mentioned by the sender and where another Japanese coast station exists and which is capable of performing the duty.
8. Japanese ship stations cancel foreign wireless messages when they are not in a position to transmit the same to the corresponding stations.
9. Should a foreign wireless message be cancelled in accordance with Article 8, the sender shall be at once advised and the money paid by him returned without delay.
10. For everything which is not mentioned in these regulations the regulations relating to foreign telegrams are applicable.

MAURITIUS

AN Ordinance (No. 33) was issued in 1903 empowering the Governor to grant or withhold leave to erect receiving and transmitting stations for Wireless Telegraphy.

Clause 1 reads :—

No telegraphic or electrical station, apparatus, machinery, or implements whatsoever, for the purpose of electrical communications, transmission, emission, or reception of messages,

by what is generally known as "wireless telegraphy," between any places in Mauritius, or between any place in Mauritius with any place out of Mauritius, shall be erected or used in any place in Mauritius, whether on public or private property, without the sanction of the Governor previously obtained.

Section 2 reads :—

The Governor may refuse such sanction or grant it under such conditions as he may think fit.

By Section 3 :—

The word "place" in paragraph (1) shall include any ship or floating conveyance within or without the waters of Mauritius, except vessels of His Majesty's Navy.

Clause 2 :—

Any person contravening any of the provisions of this Ordinance shall be liable to a fine not exceeding 5,000 rupees, and every apparatus, machinery, or implement used in, or connected with, the commission of the offence shall be forfeited.

Clause 3 :—

The Court may further order, on the application of the Ministère Public, or person authorised by the Ministère Public, the immediate pulling down or removal of any building, apparatus, machinery, or implement used in the commission of the offence.

The Wireless Telegraphy Ordinance No. 33 of 1903 has been amended by the Wireless Telegraphy (Amendment) Ordinance, 1912, the effective clause (1) of which reads :—

It shall be lawful for the Governor in Executive Council to make regulations concerning the use of wireless telegraphy on board merchant ships, whether British or foreign, while in the territorial waters of this Colony.

NEWFOUNDLAND

WIRELESS telegraphy in Newfoundland is governed by the Post and Telegraph Acts, 1891 to 1906. The 1906 Act reads as follows :—

1.—(1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy, in any place in this Colony, or on board any ship registered in this Colony, except under and in accordance with a licence granted in that behalf by the Postmaster-General, with the consent of the Governor in Council.

(2) Every such licence shall be in such form and for such period as the Postmaster-General may determine, and shall contain the terms,

conditions, and restrictions on and subject to which the licence is granted, and any such licence may include two or more stations, places or ships.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour, and be liable on conviction in a summary manner before a Stipendiary Magistrate to a penalty not exceeding fifty dollars, and on conviction on indictment to a fine not exceeding five hundred dollars, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Act except by order of the Postmaster-General.

(4) If a Stipendiary Magistrate is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship as aforesaid without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Postmaster-General, and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used, or intended to be used, for wireless telegraphy therein.

(5) When a fine under this Act is imposed by a Court, Judge or Magistrate, and the master or owner of any ship is ordered to pay the same and the same is not paid at the time and in the manner prescribed, the Court, Judge, or Magistrate making the order may, in addition to any other powers they may have for the purpose of compelling payment, direct the amount remaining unpaid to be levied by distress and sale of the ship, her tackle, furniture and apparel.

(6) The Postmaster-General may make regulations for prescribing the form and manner in which applications for licences under this Act are to be made, and with the consent of the Governor in Council, the fees payable on the grant of any such licence.

(7) The expression "wireless telegraphy" means any system of communication by telegraph as defined in "The Post and Telegraph Acts, 1891 to 1904," without the aid of any wire connecting the points from and at which the messages or other communications are sent and received.

2. This Act shall be read with and form part of "The Post and Telegraph Acts, 1891 to 1904," and the said Acts and this Act may be cited as "The Post and Telegraph Acts, 1891 to 1906."

The Act of 1905, Cap. VII., refers to taxes upon business

transacted by telegraph and telephone companies within and in transit through the Colony. Clause 2, Section 2, reads as follows :—

> A sum equal to one per cent. in manner hereinafter provided of the total amount received by or due to the company in respect of all telegraphic messages passing over the land lines of the company or transmitted or received by any wireless method of telegraphy to or from any place within this Colony from or to any other place within this Colony during a period of twelve calendar months ending on the first day of May of each year: Provided that this sub-section shall not apply to messages which originate or are delivered in any place outside the Colony.
>
> The first of such payments shall be made on the 30th day of June, 1906, in respect of the period of twelve months ending on the preceding first day of May.

Section 4 of the same Clause (2) reads as follows :—

> A sum of four thousand dollars ($4,000) in respect of every wireless telegraph station or other means of communication by wireless methods of telegraphy between this Colony and any place, ship or vessel outside this Colony, for the time being belonging to or worked by or on behalf of the company which now is or hereafter shall be established in this Colony.

The first of such payments shall be made on the 30th day of June, 1906: Provided that if the Governor in Council is satisfied that any such wireless telegraph station or other such means of communication is established for the purpose only of reporting passing ships or vessels, he may dispense the payment of such last-named sum and discharge the company from liability therefor in respect of such station or means of communication.

Clause 1 (1) of the Act of June 15th, 1905, Cap. XXI., reads :—

Whenever in the opinion of the Governor an emergency shall have arisen in which it is expedient for the public service that the Government of the Colony shall have control over the transmission of messages over any telegraph line, telephone line, or by any other form of telegraphy, it shall be lawful for the Governor in Council at any time to assume and for any length of time retain possession of any telegraph line, telephone, or any form of telegraphy in this Colony, and of all things necessary for the efficient working thereof, and may for the same time require the exclusive service of the operators and other persons employed in working such telegraph line, telephone, or any form of telegraphy; and the company or other proprietor of such telegraph line, telephone, or any form of telegraphy, shall give up possession thereof, and the operators and other persons so employed shall, during the time of such possession, diligently and faithfully obey such orders and trans-

mit and receive such despatches as they are required to receive and transmit by any officer duly authorised by the Governor in Council, and every company or other proprietor, operator or person violating any of the provisions of this section shall incur a penalty not exceeding one hundred dollars ($100) for every refusal or neglect to comply with the requirements thereof, such penalty to be recovered by action in the name of the Minister of Finance and Customs, in a summary manner before a Stipendiary Magistrate or Justice of the Peace.

In 1906 an agreement was made under which the Marconi Wireless Telegraph Company of Canada undertook to operate all the Labrador stations during the fishing season of each year, the Newfoundland Government to pay the company an annual royalty, and the revenue accruing from this traffic to go to the latter, who further agreed to forward all traffic over the Newfoundland Government Postal Telegraph System.

The success of this arrangement prompted the Government to propose an extension of the system on the Labrador by two or more stations—the Marconi Company to erect and operate these stations on the terms provided in the agreement. In the summer of 1910 stations were accordingly erected by the Marconi Company at Cape Harrison and Mokkovik. In 1911 it was agreed to establish a station between Indian Harbour and Cape Harrison to complete the chain on the Labrador.

After further negotiations, an important agreement was executed in December, 1912, which covers the following points: The old agreement terminating in 1916 is extended for a further period of ten years, terminating in 1926; all other undertakings entered into in the earlier agreement will be continued until 1926; the Marconi Company to erect and operate a station at Fogo, on the East Coast of Newfoundland—this station to be the property of the Marconi Company, and to be exempt from the Government tax of $4,000 during the term of the agreement.

THE following Act respecting the provision of wireless telegraphy on steamers engaged in the trade of Newfoundland was passed on September 4th, 1914:—

"WIRELESS TELEGRAPHY (STEAMERS) ACT."

1. Every steamer to which this Act applies shall be provided:

(1) With a wireless telegraph installation approved of by the Minister of Marine and Fisheries;

(2) With at least one qualified wireless operator approved of by the Postmaster-General;

(3) With a Morse signalling apparatus approved by the Minister of Marine and Fisheries;

(4) With at least one person on board capable of operating such signalling apparatus and of reading signals from other ships.

2. The wireless telegraphy installation provided on a ship to which this Act applies shall be maintained in good order and shall be attended to by an operator qualified as aforesaid in accordance with rules and regulations to be made by the Governor in Council under this Act for the purposes thereof.

3. No steamer to which this Act applies shall receive a clearance at any Custom House for the Seal fishery or otherwise unless and until the Collector is satisfied that the provisions for this Act in respect of said steamer have been complied with.

4. If any requirement of this Act is not complied with in the case of any steamer to which this Act applies, the master or owner shall be liable for each offence to a fine of twenty-five hundred dollars, to be recovered in a summary manner before a Stipendiary Magistrate.

5. This Act shall apply to any steamer which ordinarily is engaged in prosecuting the Seal fishery from any port of this Colony, when engaged in the Seal fishery or when carrying more than sixty persons; and to any other vessel carrying passengers from or within this Colony when named by the Governor in Council in a Proclamation to be published in the *Royal Gazette*.

6. Nothing in this Act shall affect the obligation to obtain a licence for a wireless telegraphy installation under "The Postal and Telegraph Acts, 1891 to 1906," or prevent the Governor in Council or other person exercising a like control over such wireless telegraphy in times of war or otherwise as may be exercised in respect of other wireless telegraphy.

NEW ZEALAND

THE Post and Telegraph Department is responsible for the administration of wireless telegraphy in New Zealand. The permanent head of this Department is the Secretary of the General Post Office, at Wellington.

In July of last year Regulations were made for the control of ships carrying wireless telegraph apparatus while within the territorial waters of New Zealand. The Regulations relating to ship stations were also amended by new Regulations issued on September 7th.

No licenses are granted for amateur or experimental stations in New Zealand and the erection of such stations is prohibited.

The following extract from Section 10 of the Post and Telegraph Act 1908 relates to wireless telegraphy in the Dominion :—

162. The Governor may from time to time establish stations for

the purpose of receiving and transmitting telegraph messages within New Zealand or between New Zealand and parts beyond New Zealand by what is commonly known as "wireless telegraphy," including in that expression every method of transmitting messages by electricity otherwise than by wires, whether such method is in use at the time of the coming into operation of this Act, or is hereafter discovered or applied.

163. The provisions of Part VII. of this division of this Act shall, as far as is applicable, *mutatis mutandis*, extend and apply to stations established under this part of this Act, and to communications by wireless telegraphy.

164. Every person who erects, constructs, or establishes any station or plant for the purpose of receiving or transmitting communications by wireless telegraphy without having first obtained the consent of the Governor in Council is liable to a fine not exceeding five hundred pounds, and any plant, machinery, instruments, and material used by him for such purpose may be forfeited and dealt with as the Minister directs.

Part VII. of this division of the Act referred to deals with the construction and regulation of electric lines. It authorises the Governor to establish electric lines and purchase lines and plant. He may make regulations as to the management, working and maintenance of any telegraph. Any officer or person employed in the working of any telegraph who improperly divulges the contents of any telegram transmitted or presented for transmission by such telegraph, or the purport of such telegram, is liable to a fine not exceeding one hundred pounds, or to imprisonment with hard labour for any period not exceeding six months.

The following regulations are for the control of ships carrying wireless telegraph apparatus while within territorial waters of New Zealand:—

WHEREAS by Section 9 of the Post and Telegraph Amendment Act, 1913 (hereinafter termed "the said Act"), it is provided that the Governor may from time to time by Order in Council make such regulations as he thinks proper governing the use of wireless-telegraph apparatus on merchant ships, whether foreign ships or British ships not registered in New Zealand, while within the territorial waters of New Zealand, and that such regulations may provide for the detention of any merchant ship on which a breach of the regulations has been made pending the institution and determination of proceedings in respect of such breach and the recovery of any fine imposed in respect thereof:

Now, therefore, His Excellency the Governor of the Dominion of New Zealand, in pursuance and exercise of the power and authority

conferred upon him by the said Act, and acting by and with the advice and consent of the Executive Council of the said Dominion, doth hereby make the following regulations; and doth hereby order that such regulations shall have effect on and from the date of publication of this Order in Council in the *New Zealand Gazette*.

REGULATIONS.

1. In these regulations, if not inconsistent with the context:—

"Territorial waters of New Zealand" means and includes all tidal waters included within the Dominion of New Zealand, and all parts of the open sea within one marine league of the coasts of that Dominion measured from low-water mark.

"Minister of Telegraphs" means the Minister of Telegraphs for the time being.

"Wireless Telegraphy" has the same meaning as in Section 162 of the Post and Telegraph Act, 1908.

"Telegraph" has the same meaning as in Section 119 of the Post and Telegraph Act, 1908.

"Naval signalling" means signalling by means of any system of Wireless Telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and naval stations, or between a ship of His Majesty's Navy or a naval station and any other wireless-telegraph station, whether a coast station or a ship station.

"The Admiralty" means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

"Coast station" means a wireless-telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between the land and ships at sea.

"Ship station" means a wireless-telegraph station established on board a ship which is not permanently moored.

2. These regulations shall apply only to foreign merchant ships and to British merchant ships not registered in New Zealand, while such British or foreign ships are within the territorial waters of New Zealand.

3. All apparatus for Wireless Telegraphy on board a merchant ship while in the territorial waters of New Zealand shall be worked in such a way as not to interfere with Naval signalling, or with the working of any wireless-telegraph station lawfully established, installed, or worked in the Dominion of New Zealand or the territorial waters thereof; and, in particular, the said apparatus shall be so worked as not to interrupt or interfere with the transmission of messages between wireless-telegraph stations established on ships at sea and wireless-telegraph coast stations.

4. No apparatus for Wireless Telegraphy on board a merchant ship shall be worked or used while such ship is in any of the harbours of the Dominion of New Zealand, except with the consent in writing of the Minister of Telegraphs.

5. The foregoing regulations shall not apply to the use of Wireless Telegraphy for the purpose of making or answering signals of distress.

6. If and whenever an emergency shall have arisen in which it is expedient in the public interest that His Majesty's Government shall have control over the transmission of messages by the said apparatus, it shall be lawful for any officer of His Majesty's Navy or Army, or for any other person authorised in that behalf by the Admiralty, or by the Minister of Telegraphs, to take possession of or to cause the said apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty, and to be used for His Majesty's service and subject thereto for such ordinary services as to the said officer or person may seem fit; and in that event any person authorised by the said officer or person may enter upon any ship on which such apparatus is installed and take possession of the said apparatus and use the same as aforesaid.

7. Any such officer or person may in such event as aforesaid, instead of taking possession of the said apparatus as aforesaid, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the said apparatus, either wholly or partly, and in such manner as he may direct, and such persons may enter upon any ship on which the said apparatus is installed accordingly; or the said officer or person may direct the person or persons in charge of the said apparatus to submit to him, or any person authorised by him, all messages tendered for transmission or arriving by the said apparatus, or any class or classes of such messages, to stop or delay the transmission of any messages, or deliver the same to him or his agent, and generally to obey all such directions with reference to the transmission of messages as the said officer or person may prescribe, and the said person or persons in charge of the said apparatus shall obey and conform to all such directions.

8. If any breach of these regulations is committed by any person on board any ship while in the territorial waters of New Zealand, the person so committing the same and the owner and master of the ship shall be severally liable on summary conviction to a fine not exceeding £100.

9. Whenever the Minister of Telegraphs or the Secretary of the Post Office has reasonable cause to believe or suspect that any breach of these regulations has been committed on board any ship while in the territorial waters of New Zealand, he may give notice in writing to the Collector of Customs at any port in New Zealand to detain the ship, under Section 9 of the Post and Telegraph Amendment Act, 1913, until the sum of £100, or such smaller sum as may be specified

in the notice, has been deposited with the Collector by or on behalf of the owner of the ship.

10. If on the receipt of that notice, or at any time within three months thereafter, the ship is found within such port, the Collector of Customs shall withhold the certificate of clearance of the ship, under Section 35 of the Customs Act, 1913, until and unless the aforesaid sum is deposited with him or the aforesaid notice of detention is withdrawn.

11. If within six months after the date of the offence in respect of which the ship has been detained a conviction for that offence is obtained against any person, the sum so deposited shall be available for the satisfaction of any fine and costs imposed or awarded by the conviction, and the residue, if any, shall be returned to the person by whom the deposit was made.

12. If within the period of six months aforesaid no such conviction is obtained, the sum so deposited shall be returned to the person by whom it was deposited.

Wireless Telegraph Regulations for Ship Stations.

WHEREAS by Order in Council dated the twentieth day of November, one thousand nine hundred and eleven, and published in the *New Zealand Gazette* of the twenty-third day of November, one thousand nine hundred and eleven, regulations were made under the authority of the Post and Telegraph Amendment Act, 1911 (hereinafter termed "the said Act"), as to the granting of licenses for the installation and working of apparatus for wireless telegraphy on board any ship registered in New Zealand, and whether on the high seas or in New Zealand waters, and as to the form, period, terms, conditions, and restrictions thereof, and as to the fees payable in respect thereof: And whereas it is desirable to revoke such regulations, and to make others in lieu thereof:

Now, therefore, His Excellency the Governor of the Dominion of New Zealand, in pursuance and exercise of the power and authority conferred upon him by the said Act, and of all other powers and authorities in that behalf enabling him, and acting by and with the advice and consent of the Executive Council of the said Dominion, doth hereby revoke the regulations made by the above-mentioned Order in Council, and in lieu thereof doth hereby make the following regulations for the purposes hereinbefore mentioned; and doth hereby order that such regulations and the revocation of the regulations first before recited shall have effect on and from the date of publication of this Order in Council in the *New Zealand Gazette*.

REGULATIONS.

1. In these regulations, if not inconsistent with the context :—

"Minister of Telegraphs" means the Minister of Telegraphs for the time being.

"Wireless Telegraphy" has the same meaning as in Section 162 of the Post and Telegraph Act, 1908.

"Telegraph" has the same meaning as in Section 119 of the Post and Telegraph Act, 1908.

"Naval signalling" means signalling by means of any system of Wireless Telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and naval stations, or between a ship of His Majesty's Navy or a naval station and any other wireless-telegraph station, whether a coast-station or a ship station.

"The Admiralty" means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

"The International Telegraph Convention" and "the International Telegraph Regulations" mean respectively the International Convention of St. Petersburg dated the 10th-22nd July, 1875, and the service regulations made thereunder; and include respectively any modifications of the convention or regulations made from time to time.

"The Radio-Telegraph Convention, 1912," means the convention signed at London on the 5th day of July, 1912, and the service regulations made thereunder; and includes any modification of the convention or regulations made from time to time.

"Coast-station" means a wireless-telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between the land and ships at sea.

"Ship-station" means a wireless-telegraph station established on board a ship which is not permanently moored.

2. The Minister of Telegraphs may, at the request of any person or company desirous of establishing, installing, working, and using on ships belonging to such person or company, and registered in New Zealand, apparatus for Wireless Telegraphy, grant to such person or company (hereinafter called "the licensee") a license, in the form of the Schedule hereto, for the period, upon the terms, and subject to the conditions and restrictions hereinafter appearing.

3. Each ship-station is bound to exchange radio-telegrams with any coast-station, or with any other ship-station, without distinction as to the radio-telegraph system adopted by that station.

4. Each ship-station shall be of such class mentioned in Article 13 of the Service Regulations annexed to the Radio-telegraph Convention, 1912, as is specified in the license issued in respect thereof, and the equipment of the station, hours of duty observed, and other requirements shall be appropriate to such class in accordance with the provisions of the Radio-Telegraph Convention, 1912.

5. The apparatus used at all ship-stations shall, as far as possible, be in keeping with scientific and technical progress. The waves emitted must be as pure and as little damped as possible.

6. The apparatus must be capable of transmitting and receiving at a speed of at least equal to twenty words per minute, the word being reckoned at the rate of five letters.

7. The apparatus shall be so constructed as to be capable of using wave-lenghts of 600 and 300 metres as measured by the standard of measurement in use by the Post and Telegraph Department for the time being; and such other wave-lengths not exceeding 600 metres as shall be authorised from time to time by the Minister of Telegraphs: Provided always that the wave-length of 600 metres shall normally be used for communication, and, further, that the wave-length of 1,800 metres may be used for transmission in the exceptional case referred to by Article 35 (2) (*a*) of the Service Regulations annexed to the Radio-Telegraph Convention, 1912; Provided, further, that only wave-lengths of 600 metres shall be used by the licensee during the period of any war in which the United Kingdom is engaged.

8. The licensed apparatus shall not be used by the licensee, or by any other person either on behalf or by permission of the licensee, for the transmission or receipt of messages except messages authorised by these regulations; and the licensee shall not, except with the consent in writing of the Minister of Telegraphs, send or receive messages from or at the licensed apparatus when in any harbour in the Dominion of New Zealand.

9. (1) The licensee shall not by the transmission of any message by means of the licensed apparatus, or otherwise by the use of the licensed apparatus, interfere with naval signalling.

(2) If the Admiralty are of opinion that the working of the licensed apparatus at any ship-station is inconsistent with the free use of naval signalling, the licensee shall, when required in writing by the Minister of Telegraphs so to do, close the said station.

(3) These provisions for the protection of naval signalling shall be construed to be without prejudice to the generality of any other provisions of the license.

10. The licensee shall observe the International Telegraph Convention and International Telegraph Regulations so far as the said convention and regulations are capable of being applied to Wireless Telegraphy in common with ordinary land and submarine telegraphy.

11. The licensee shall observe the provisions of any regulations from time to time made under the provisions of the Post and Telegraph Act, 1908, and its amendments, by the Governor in Council or by the Minister of Telegraphs in relation to the conduct of wireless-telegraph business, so far as the same are applicable to the licensee.

12. The licensee shall observe the provisions of the Radio-Telegraph Convention, 1912.

13. The licensee shall comply with all such directions and observe all such rules as may be given or made by the Minister of Telegraphs from time to time for the purpose of preventing interference with the working of any other wireless-telegraph station, and for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless-telegraph station.

14. The licensed apparatus shall not, without the consent of the Minister of Telegraphs, be altered or modified in respect of any of the particulars referred to in the license issued in respect thereof, and such apparatus shall at all times be maintained in good working order.

15. Except as provided in these regulations, the licensee shall transmit messages by means of the licensed apparatus on equal terms, without favour or preference, whether as regards rates of charge, order of transmission, or otherwise.

16. The licensee shall, so far as possible, receive from ships and light-stations all requests for assistance and all signals of distress, and shall answer such requests and signals and retransmit them with the least possible delay, and with priority over all other messages, to the proper authorities by means of the licensed apparatus or by any other means in the power of the licensee.

17. The licensed apparatus at ship-stations shall be worked only by a person or persons holding a certificate or certificates issued or recognised by the Minister of Telegraphs. Certificates shall be granted to persons of British nationality possessing the qualifications prescribed by the Radio-Telegraph Convention, 1912, and shall be in such form and subject to such conditions, directions, or rules as the Minister of Telegraphs shall from time to time prescribe; and such certificates may at any time be withdrawn at the discretion of the Minister of Telegraphs in case of misconduct, or breach on the part of the holder of the Radio-Telegraph Convention, 1912, or of any conditions, direc-

tions, or rules prescribed by the Minister of Telegraphs for the guidance of operators or for the working of such ship-stations.

18. (1) The licensee, his servants and agents, shall not divulge the contents or the purport of the contents of any message, or make any use whatever of any message coming to his or their knowledge, other than to the addressee or his authorised agent, or to properly authorised officials of His Majesty's Government or of the Minister of Telegraphs, or to a competent legal tribunal.

(2) The licensee shall render to the Minister of Telegraphs such accounts as the Minister of Telegraphs shall direct in respect of all charges due or payable under the Radio-Telegraph Convention, 1912, in respect of messages exchanged between the licensed ship-stations and coast-stations, and shall pay to the Minister of Telegraphs, at such times and in such manner as the Minister of Telegraphs shall direct, all sums which shall be due from the licensee under such accounts.

19. The licensee shall keep full accounts, records, and registers of all messages transmitted by means of the licensed apparatus; and in such registers each of such messages shall be accompanied by its identifying number and date, and full particulars of its place of origin and of ultimate destination, and such further particulars as the Minister of Telegraphs shall from time to time reasonably require to be shown. The licensee shall preserve all used message-forms written and printed, and transcripts of messages, and all other papers for such period as is from time to time prescribed by the Radio-Telegraph Convention, 1912, and, in default of any provisions on the subject in the said convention, for such period as is from time to time prescribed by the International Telegraph Regulations; and such registers and message-papers shall be open to the inspection of the Minister of Telegraphs or his authorised officers.

20. The Minister of Telegraphs, and any agent authorised in that behalf in writing by him, may at all reasonable times enter upon any licensed ship-station for the purpose of inspecting, and may inspect, any apparatus fixed or being in such station for the purpose of sending and receiving messages by wireless telegraphy, and all other telegraphic instruments and apparatus fixed or being in such station, and the working and user of such apparatus and telegraphic instruments.

21. The licensee shall carry on every ship on which a ship-station is established a print or copy of the license, certified under the hand of an appropriate officer of the Minister of Telegraphs to be a true copy, and shall produce such print or copy for inspection if required to do so by the competent authorities of the countries where the ship calls, and also such documents as may be prescribed by the Minister of Telegraphs for the purpose of enabling the licensee to communicate with

coast-stations and ship-stations, in accordance with the Radio-Telegraph Convention, 1912.

22. (1) Every license shall be in force from the date of the granting thereof until the 31st December of the year in which it is issued, and no longer; but may be renewed from year to year.

(2) The licensee shall pay to the Minister of Telegraphs for and in respect of the license granted, and of every renewal thereof, a royalty of 5s. in respect of each ship-station included in the license.

(3) All royalties payable under any license shall be payable on the date of the granting or renewal thereof, as the case may be.

23. Except with the consent in writing of the Minister of Telegraphs, the licensee shall not assign, underlet, or otherwise dispose of or admit any other person or body to participate in the benefit of any license.

24. If and whenever an emergency shall have arisen in which it is expedient in the public interest that His Majesty's Government shall have control over the transmission of messages by the licensed apparatus, it shall be lawful for any officer of His Majesty's Navy or Army, or for any other person authorised in that behalf by the Admiralty, or by the Minister of Telegraphs, to take possession of or to cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty, and to be used for His Majesty's service and subject thereto for such ordinary services as to the said officer or person may seem fit; and in that event any person authorised by the said officer or person may enter upon any ship on which any such apparatus is installed and take possession of the said apparatus and use the same as aforesaid.

25. Any such officer or person may in such event as aforesaid, instead of taking possession of the licensed apparatus as aforesaid, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus either wholly or partly and in such manner as he may direct, and such persons may enter upon any ship on which any apparatus is installed accordingly; or the said officer or person may direct the licensee, his servants or agents, to submit to him, or any person authorised by him, all messages tendered for transmission or arriving by the licensed apparatus, or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him or his agent, and generally to obey all such directions with reference to the transmission of messages as the said officer or person may prescribe, and the licensee, his servants or agents, shall obey and conform to all such directions.

26. In any of the following cases, that is to say:—

(*a*) In case any sum of money which ought to be paid by the licensee to the Minister of Telegraphs under or by virtue of these regulations shall be in arrear and unpaid for one calendar month after the time at which the same ought to be paid under or by virtue of the provisions herein contained; or

(*b*) In case of any breach, non-observance, or non-performance by or on the part of the licensee, his servants or agents, of any of the provisions (other than a provision for the payment of money) or conditions herein contained,—

then and in any such case the Minister of Telegraphs may, by notice in writing, revoke and determine the license as to all or any of the ship-stations thereby licensed, and thereupon the said license shall absolutely cease, determine, and become void as to all or any of the said ship-stations, as the case may be, but without prejudice to any right of action or remedy which shall have accrued to His Majesty under these regulations or otherwise.

27. Nothing in these regulations shall prejudice or affect the right of the Minister of Telegraphs from time to time to establish, extend, maintain, and work any system or systems of telegraphic communication (whether of a like nature to those licensed hereunder or otherwise) in such manner as he shall in his discretion think fit. Neither shall anything herein contained prejudice or affect the right of the Minister of Telegraphs from time to time to enter into agreements for or to

SCHE

LICENSE FOR THE INSTALLATION AND WORKING OF APPARATUS FOR

Name of Ship on which Station established.	Class of Ship station under the Radio-telegraph Convention, 1912.	Call-signal.	Nature of Services Performed.	Hours of Service.	Normal Range of Signalling in Nautical Miles.	
					By Night	By Day.
1.	2.	3.	4.	5.	6.	7.

grant licenses relative to the working and use of telegraphs (whether of a like nature to those licensed hereunder or otherwise) or the transmission of messages in any part of New Zealand by means of Wireless Telegraphy, or by any other means, with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit. And (save as in these regulations expressly provided) nothing herein contained shall be deemed to authorise the licensee to exercise any of the powers or authorities conferred on or acquired by the Minister of Telegraphs by or under the Post and Telegraph Act, 1908.

28. Any notice, request, or consent (whether required to be in writing or not) to be given by the Minister of Telegraphs under these regulations may be under the hand of the Secretary for the time being of the Post and Telegraph Department, and may be served by sending the same in a registered letter addressed to the licensee at the office or place of residence for the time being of the licensee, or, if such notice, request, or consent relates to any particular ship-station, by delivery to the master of the ship upon which such station is installed; and any notice to be given by the licensee under these regulations may be served by sending the same in a registered letter addressed to the Secretary, General Post Office, Wellington.

29. All licenses heretofore issued under the regulations hereby revoked shall continue in force, subject to the regulations under which they were issued, until the expiry of the current term thereof, but shall not be capable of renewal under the regulations so revoked.

DULE.

WIRELESS TELEGRAPHY ON BOARD SHIPS OWNED BY .

Character of Apparatus.		Power.		
System of Radiotelegraphy with the Characteristics of the System of Emission.	Wave Lengths (in Metres).	Source and Maximum Output.	Maximum to be normally taken by Sending Instruments.	If Alternator is used, Number of Cycles per Second.
8.	9.	10.	11.	12.

NIGERIA (NORTHERN)

THE following Proclamation providing for the control by the Governor of electrical communication by Wireless Telegraphy was issued in 1904 :—

1. This Proclamation may be cited as the Wireless Telegraphy Proclamation.

2. No person shall import, keep, use or establish any apparatus or installation for transmission of messages by wireless telegraphy without previously obtaining from the Governor a licence setting forth the terms and conditions upon which the same is granted.

3. Any person infringing this Proclamation shall be liable upon conviction in addition to confiscation of every such apparatus and installation to a penalty not exceeding £500 or in default to imprisonment for a term not exceeding twelve months or to both.

4. It shall be lawful for the Governor from time to time by Proclamation to prescribe the terms and conditions upon which, if at all, such licence is granted.

NIGERIA (SOUTHERN)

1. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1913.

2. In this Ordinance, the following words and expressions shall have the meanings hereby assigned to them unless there is something in the subject or context repugnant to such constructions :—

"Wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received.

"Colony" includes Protectorate.

3. (1) A person shall not establish any wireless telegraph station or install or work any apparatus for wireless telegraphy in any place in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made under this Ordinance.

5. (1) The Governor may make regulations for carrying into effect the purposes of this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or revoked by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a District Commissioner is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any police officer or any person appointed in that behalf by the Inspector-General of Police and named in the warrant, and a warrant so granted shall authorise the police officer or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on conviction before a District Commissioner, anything in the Supreme Court Ordinance to the contrary notwithstanding, to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

8. Nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than that of wireless telegraphy.

9. The Wireless Telegraphy Ordinance and the Wireless Telegraphy (Amendment) Ordinance, 1912 [THE YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913, p. 183], are hereby repealed.

SCHEDULE.—SECTION 5 (2).

REGULATIONS.

(1.) All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with

(*a*) Naval signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages

between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(II.) In these Regulations "Naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

(III.) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

(IV.) For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

(V.) Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

(VI.) These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

NORWAY

LAW of July 24th, 1914, supplementing and amending the Law of April 29th, 1899, relating to the forwarding of communications by aid of telegraphic conductors or such like installations and relating to the repeal of Law No. 2 of July 16th, 1907 :—

Section 1. On ships which sail under the Norwegian flag and which do not belong to the Norwegian Navy, stations or installations for telegraphing or telephoning by wireless both within and without the boundaries of the Kingdom may only be installed and worked after an authorisation obtained in advance, which will be granted by the King, or whoever may be authorised thereto, on certain definite conditions for a stipulated period of time. The permission may at any time be withdrawn if the conditions imposed are not adhered to.

Detailed Rules and Regulations relating to the fitting up and working of such stations or installations shall be drawn up by the King.

On ships which sail under a foreign flag and are within Norwegian territorial waters, wireless telegraphing and telephoning can only be carried on—even if they have permission for same from the authorities of the foreign country—subject to observance of the provisions which are made with respect thereto by the King or whom-

soever he may have authorised for the purpose who may, moreover, forbid all telegraphing or telephoning from such ships, whenever circumstances may be considered to require it.

Section 2. The exceptions mentioned in the Law of April 29th, 1899, under Section 1, 2nd paragraph, relating to the working of plant which may be used by a commune or private person for his own use, or such as railways may install for their own working, shall not apply so far as the working of installations for wireless telegraphy or telephony are concerned.

Section 3. Any infractions of the aforementioned conditions shall be punished pursuant to the provisions laid down in the Law of April 29th, 1899, Section 6.

Moreover, any transgression of the rules or provisions which are drawn up with regard to Section 1 of the present Law shall be punished by fines.

Section 4. This Law shall come into force immediately. The Law of July 16th, 1907, containing additions and amendments to the Law of April 29th, 1899, relating to the forwarding of communications by means of telegraph lines or similar installations, is hereby repealed.

The following paragraph, taken from the "Law of August 18th, 1914," amending the law of April 29th, 1899, relates directly to Wireless Telegraphy :—

Within the boundaries of Norway, or its territorial waters, stations and installations for wireless telegraphy and telephony may only be erected or worked after permission has been obtained from the King or whomever he may authorise thereto, and on such conditions as are laid down in the said permission.

The following regulations are based on the law of July 24th, 1914 :—

1. No radiotelegraphic station on board a foreign vessel within the limits of Norwegian territorial waters can be used without a special licence.

Application for such licence must be made to the Ministry of Telegraphs, which Ministry, after consultation with the Ministry of Marine, will decide on the application.

2. The licence granting the right to use wireless telegraphic stations within the radius of Norwegian territorial waters may be limited to definite places and to fixed hours of the day.

Wireless transmission of messages must be stopped immediately on the order of the Ministry of Telegraphs, Ministry of Marine, or of any coast station established by the aforesaid Ministries.

3. If the vessel is in a Norwegian port situated within a radius of 5 kilometres from the nearest telegraphic station, the station on board

the vessel cannot communicate either with Norwegian coast stations or with foreign coast stations.

Without a special licence, a wireless station on board a vessel in a Norwegian port cannot be used for the exchange of messages with other ship stations, unless for the purpose of advising accidents.

4. However, the preceding provisions do not apply to foreign ships of war, as far as the interchange of messages between themselves is concerned.

It is the duty, nevertheless, of stations on board foreign warships to conform to the provisions in Article 2, Paragraph 2, above.

5. If a station is used when a ship is in Norwegian territorial waters this station must conform to the provisions of the International Telegraphic Convention, and the regulations appended thereto.

THE licence for the erection and working of a wireless telegraph or telephone station on board ship contains the following conditions :—

1. The station to belong to class ..... as required by the London International Convention, 1912 (Article XIII. b), and thus to have ..... time for service.

2. As to erection and design, the plan approved by the Telegraph Administration must be followed in all respects, and must not be deviated from without the permission of said Administration.

3. The licensee is bound as regards erection and working of the station in all respects to conform to any International Conventions or resolutions with reference to radiotelegraphy and telephony as well as to the decisions which might be issued by the Department for Official Works or by the Telegraph Administration, efficient at any time and entered upon by Norway.

4. The Telegraph Administration may in the interests of the service, and after the necessary consultation with the Marine Administration, demand any change as to the wave-lengths employed and indicated in said schedule—within the limits prescribed by the regulations—either as a temporary or a permanent arrangement for the working of the station.

5. The licensee shall maintain the station in good working order.

6. The station must convey telegrams to and from persons on board ship and communicate with other ship stations and coast stations regardless of the system and apparatus of said stations.

7. Signals calling for help from ships in distress must take precedence over all other correspondence.

8. While the ship is lying in a Norwegian port, the station shall not be used for correspondence either with Norwegian or with foreign coast stations.

When the ship is in a Norwegian port, the station shall not be used for communication with other ship stations, except when it is necessary for the prevention of accidents, or unless special permission has been granted by the Norwegian Telegraph Administration after consultation with the Marine Administration.

9. The call signal of the station will be .....

10. The rate due to the ship will be ..... öre (..... centimes) per word, with a minimum rate of ..... öre (..... centimes) per telegram.

11. Ship stations shall be operated by one, and in the case of stations in Class I, by two or more telegraphists who must possess the certificate of the Telegraph Administration proving that they have acquired the knowledge and practice required by, and in accordance with, International agreements valid at any time.

Such certificate is only acquired by passing a test arranged by the Telegraph Administration. Petty Officers or men of the Signal Department of the Navy, specially trained as radiotelegraphists for the Navy, are entitled to such certificate after having satisfied the Telegraph Administration that they are thoroughly acquainted with the forwarding and sending of telegrams, and after having acquired from the Authorities concerned a testimonial to the effect that they comply with the International requirements as far as technical knowledge of the apparatus, experience, etc., are concerned.

The stations must be in charge of operators who are Norwegian citizens, unless special exemption has been granted by the Telegraph Administration, and telegraphists must be pledged to secrecy in respect of all traffic which they handle.

12. The licensee shall be responsible for the taxes which are due for the forwarding of telegrams despatched from the ship's station—that portion of the tax due to the coast-station being included.

The Telegraph Department, on the other hand, must pay to the licensee the rates due to the ship station for incoming telegrams.

The correspondence shall be entered into a journal which, together with the original telegrams despatched and receipts for telegrams received, also other documents which might be demanded, shall be forwarded to the Telegraph Administration as far as possible at the end of each month.

Settlement on taxes due to both parties shall be made quarterly or monthly, according to further agreements between the Telegraph Administration and the licensee.

With the consent of the Telegraph Administration, the licensee has a right for stations on board ships, exclusively sailing in foreign waters, to make an agreement for special courses of settlement with the Administrations, relating to the coast stations generally used.

Besides this the Telegraph Administration may make agreements with foreign Administrations as to courses of settlement other than those mentioned above.

13. The station is subject to the control of the Department of Public Works, and will be inspected by the Officer in charge, appointed by the Department or by the Telegraph Administration. For the execution of the control the licensee will have to pay a fee, stipulated by the Department.

14. When State or other public considerations demand it, the Department for Official Works or the Marine Administration may forbid the forwarding of correspondence of any kind, in which case the licensee shall have no right to claim a compensation in this case.

The Telegraph Administration or the Marine Administration may forbid all correspondence from the station, either at certain places or at certain hours of the day when it is deemed necessary to do so in the interests of the service.

15. The Norwegian State shall be entitled, at six months' notice, to redeem the station against compensation which might be decided according to estimated value. This estimate shall be made by a Committee of three members, one to be nominated by the owner, one by the Telegraph Administration, and one by the Department of Public Works. The member nominated by the Department of Public Works shall be Chairman of the Committee. The questions submitted to the Committee shall be decided by simple majority.

If the shipowner has not nominated a member within thirty days after having been called upon to do so, or if the member nominated by him fails to attend the meeting, the estimated value (which will be binding) shall be given by the other members. In case the voting on any question is equal, the Chairman shall have right to give his casting vote.

In the estimate nothing but the technical value of the station at the time of valuation shall be considered.

The estimates shall be decided within a certain period fixed by the Telegraph Administration. The expenses in this connection will be defrayed by the Government.

16. The licence will be withdrawn—

(*a*) In case it be not utilised within one year after the issue of same;

(*b*) In case the regulations thereof are not adhered to;

(*c*) In case the ship no longer flies the Norwegian flag.

17. Disputes with reference to the interpretation of this licence shall be decided by the King, whose decision shall be final.

SCHEDULE.

1. System.	2. Type of Station.	3. Normal Range (by day).	4. Wave-lengths (The Normal Wave length to be Underlined.	5. Description of the Generating Plant.	6. Description of Transmitting and Receving Apparatus. (Detailed Winding Diagram enclosed.)

7. Form of the Aerial. (Sketch together with Dimensions enclosed.)	8. Description of the Wireless Emergency Set. (For Ship stations of First and Second Class. Detailed by a Winding Diagram Enclosed.)	9. Remarks.

THE State Telegraph Department issued in December, 1908, the following "Notice to Mariners" applying to wireless telegraph equipments on board ships in Norwegian territorial waters:—

1. Wireless telegraph or wireless telephone stations on board foreign vessels must not be operated, except by special permission, within Norwegian territorial waters. Requests for such permission must be sent to the Telegraph Department, which will communicate its decision after conference with the Marine Department.

2. Permission to operate the stations on board foreign vessels within Norwegian territorial boundaries may be restricted to certain fixed places, or to certain fixed periods of the 24 hours. Correspondence by means of the wireless apparatus shall be at once suspended whenever it shall be so desired by the Telegraph Department, the Marine Department, or by any one of the coast stations under their authority.

3. During the stay of a vessel in a Norwegian harbour, within a distance of 5 kilometres (2 $\frac{7}{10}$ths miles) from the nearest telegraph station, the station on board a foreign vessel must not be employed for telegraphing either with Norwegian or foreign coast stations. Without special permission, the station during a vessel's stay in a Norwegian harbour must not be employed for communicating with other ship station, except for the purpose of preventing accidents.

4. The regulations above mentioned do not, however, apply to stations on board vessels of war belonging to foreign powers, which carry on mutual correspondence. Such stations are, however, bound to submit themselves to the regulations contained in the second clause of Section 2.

5. Whenever the station on board a foreign vessel is employed during her stay in Norwegian territorial waters, this shall be done subject to the regulations contained in the International Telegraph Convention, with the rules pertaining thereto.

NYASALAND PROTECTORATE

THIS Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1908.

2. No person shall establish or use any apparatus or installation for the purpose of operating wireless telegraphs without a licence from the Governor.

Any person contravening this section shall be liable on conviction to a fine not exceeding £100 or to imprisonment with or without hard labour for a term not exceeding twelve months with or without the option of a fine, and in addition any apparatus or installations in respect of which an offence under this section is committed may be forfeited and sold or disposed of as the Governor may direct.

3. The Governor in Council may from time to time make, and when made shall publish in the *Gazette*, rules prescribing the terms and conditions upon which licences to establish or use apparatus or installations for the purpose of operating wireless telegraphs may be granted, and may impose a penalty on conviction for breach of any rules so made of a fine not exceeding £50 or imprisonment with or without hard labour for a term not exceeding six months with or without the option of a fine, and such Rules may further provide for forfeiture and sale or disposal as the Governor may direct of any such apparatus or installations as aforesaid.

PORTUGAL

THE Direction-General of Posts and Telegraphs deals with all matters relating to the general applications of Wireless Telegraphy for commercial purposes and for ship and shore com-

munication. The Ministry of War, Marine and Colonies controls the special applications of Wireless Telegraphy, when intended for purposes of national defence, in the Army and Navy.

The following Act was approved on June 25th, 1913 :—

1. On the expiration of a period of three months from the approval of the Regulation for the execution of the present law, no Portuguese steam vessel, with accommodation for more than 50 passengers (including crew), shall be permitted to sail from any port without having installed a wireless telegraph apparatus of the system which suits it best, in good working order, and capable of dispatching and receiving radiotelegrams within a radius of action which must never be less than 100 miles.

(*a*) From this provision those steamers are excepted which navigate only between ports situated at distances of less than 200 miles.

(*b*) For steam vessels, which navigate in the Colonies where there are coastal radiotelegraph stations, and which only occasionally come to the Metropolis, the period granted for the installation of wireless telegraphy, to which the present article refers, shall be six months.

2. The wireless telegraph material of a vessel, and the respective service of transmission and reception of radiotelegrams, shall be under the charge of one or more duly qualified telegraphists.

§ The number of telegraphists, their qualifications, and that of the indispensable auxiliary staff, the organisation of their technical instruction, provisions with respect to the service of supervision, conditions of the installation of the apparatus, and the official verification of their working, shall be determined pursuant to the Regulation drawn up for the execution of the present law.

3. It is the province of the captain of the vessel to give instructions and orders for the complete carrying out of the Laws and Regulations in force with respect to the radiotelegraphic service, and he shall exercise the necessary supervision, carrying out and causing to be carried out any provisions which he may consider advantageous for the good working of the said service.

4. The captain shall be held responsible for any negligence in complying with the requirements of Article 1, and on conviction he shall be liable to a fine not exceeding Rs.200 and the suspension of his master's certificate for one year.

5. Negligence or failure on the part of the captain to carry out the provisions of Article 3 shall render him liable to a fine not exceeding Rs.50, which may be accompanied with imprisonment not exceeding one month after the first offence.

6. If there should be a disaster, stranding or loss of the vessel, resulting from the lack of vigilance of the telegraph staff, and the said

fault was due to the negligence of the captain in failing to carry out and causing to be carried out the provisions in force relating to the radio-telegraph service, the captain shall be liable to a fine not exceeding Rs.200, accompanied or not, according to the gravity of the offence, with suspension of his certificate for a period from one to five years.

If the serious injury, or the death, of one or more persons should result from the disaster, the penalties applicable shall be respectively those laid down in Articles 368 and 369 of the Penal Code.

7. The offences referred to in Articles 4, 5 and 6 constitute maritime crimes, and shall be judged by the Commercial Maritime Tribunal pursuant to the Disciplinary Code of the Mercantile Marine.

8. All the wireless apparatus intended for Portuguese vessels shall be exempt from Customs and Municipal Duty.

9. Any legislation contrary hereto is hereby repealed.

THE following regulations were issued on August 29th, 1913:

1. Ships may be equipped with any wireless telegraph apparatus which is in keeping with scientific progress.

2. The shipping or any other company may establish and work a wireless telegraph station on board ship. The station must possess a licence granted by the Government of the nationality to which the ship belongs. The "class" of the station is mentioned in the licence.

3. There are three classes:—

(*a*) Long voyage passenger steamers with accommodation for more than 150 passengers must maintain continuous service.

(*b*) The same type of steamer with accommodation for less than 150 passengers must maintain continuous *receiving* service, whereas the transmission may be limited.

(*c*) Cargo or fishing boats, or vessels carrying more than 50 persons (including crew), may have limited service.

4 and 5. Wave-lengths of 300 m, 600 m, and more than 1,800 m may be employed. Small boats may work on a 300 m wave when sending, but *600* when receiving. The waves must be as pure and as undamped as possible.

The oscillator must not be directly connected to the antenne, except in case of distress, or on certain small steamers where the energy employed in the primary does not exceed 50 watts.

6. The cabin must be divided into two parts so that the transmitting gear and the spark gap may be separated from the receiving apparatus. Double walls must be used to isolate the interior from the exterior.

7. The instruments must be able to receive and send 100 letters per minute.

8. New installations employing a power of more than 50 watts

Professor Luigi Lombardi

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must possess such arrangements as will enable them to have a range inferior to their normal, the smallest being approximately 15 miles. All old stations must be brought to this standard as soon as possible.

9. The receiving instruments must be able to tune for waves up to 600m, being highly protected against perturbations.

10. The power measured at the terminals of the generator must not exceed 1 k.w. in normal circumstances. An increase is allowed when a station desires to communicate with a land station other than the nearest, at a distance of more than 200 miles from the nearest land station, and when, in exceptional circumstances, the communication cannot be effected with 1 k.w.

11. First and second class steamers must carry an emergency set in as safe a place as is possible. The emergency set must be able to work for six hours at least at a distance of 80 miles for first class, and 50 miles for second class steamers.

12. The apparatus must be operated by a telegraphist who possesses a certificate from the Portuguese Government, or, in urgent cases and for one trip only, from any other Government which has signed the International Convention.

13. There are two certificates :—

(*a*) 1st Class (same as International).

(*b*) 2nd Class (12 words, adjustment of apparatus, knowledge of each instrument and its work, and rules *re* handling of telegrams).

Service.—Any member of the crew able to assist the telegraphist in his work, and possessing a knowledge of the operation of the apparatus, may be an " auxiliary " operator.

14. Second class telegraphists may be employed on board where the wireless service is only for the shipping company's requirements, or on fishing vessels, or they may act as assistants in cases where there is already one first class operator. On first class steamers *two* first class telegraphists must be employed.

15. On second class steamers, one first class and one second class telegraphist should be employed; on third class vessels one second class telegraphist will suffice.

Service.—As long as land stations do not exist in the Portuguese colonies, Portuguese steamers plying there are allowed to carry one first class telegraphist and one " auxiliary."

16. Transmitting must be performed by a first or a second class telegraphist, except in urgent cases.

17. The certificates state that the telegraphist has taken an oath of secrecy with regard to the correspondence.

18. The captain has authority over the working of the station.

19. Portuguese operators are preferred.

20. Should none be obtainable, foreigners may be employed if they are in possession of the Portuguese Government's certificate.

In urgent cases where no certificated telegraphist is available, provisional certificates may be issued for one voyage.

21. Certificates are supplied by the Commission after the examination of the telegraphist.

22 and 23. Captains are also bound by an oath of secrecy.

32. All telegrams sent and received on board must be registered by the captain on forms supplied by the Government. The date and hour of the sending or reception of these telegrams must be indicated.

33. Only the telegraphists and the captain are allowed to enter the wireless cabin.

34. The wireless room and the bridge must be connected by either a speaking tube or a telephone, unless they are within easy distance of one another

RHODESIA (SOUTHERN)

THE term "electric telegraph" whenever used in the "Electric Telegraph Act, 1861," or any law amending the same or relating to "electric telegraphs," shall be interpreted as including any system or means of conveying signs, signals, or communications by electricity, magnetism, electro-magnetism, or other like agency, and whether with or without the aid of wires; and including the system commonly known as wireless telegraphy, or aetheric signalling, and any improvements or developments of such system; and the term "line of electric telegraph" shall be interpreted as including any apparatus, instrument, mast, standard, wire, substance, matter, or thing whatever, which is, or may be, used for the purpose of sending, transmitting, conveying, or receiving such signs, signals, or communications.

2. The meaning of the term "person" shall be further extended so as to include individuals, partnerships, companies, and corporations.

3. The provision of the first section of the said Act as to its application to Southern Rhodesia shall be read and construed as including the territorial waters thereof.

4. Within Southern Rhodesia, or the territorial waters thereof, no person not thereto expressly authorised by some law shall erect or make use of any mast, standard, or apparatus of any kind, for the purpose of signalling without wires by means of electricity, magnetism, electro-magnetism, or other like agency, or shall erect or construct any line of electric telegraph, except under a licence to be granted by the Administrator.

5. The Administrator may authorise the issue of a licence for the establishment or use of any apparatus or installation for the trans-

mission of signs, signals, or communications, by electric telegraph, with or without the aid of wires, and may revoke the same at any time, and there shall be payable annually in respect of such a licence, such sum not exceeding One Hundred Pounds sterling, as may be fixed by regulation.

6. The terms and conditions of such licence, and the duration thereof, shall be subject to such regulations as may from time to time be made by the Administrator.

7. Any person who shall establish or use, or attempt to establish or use, any such apparatus or installation as is mentioned in Sections 1 and 4 of this Ordinance, in contravention of the provisions thereof, or of any other law relating to electric telegraphs, or of any regulation thereunder, shall be liable upon conviction to forfeit all apparatus so used, and to a penalty not exceeding Two Hundred and Fifty Pounds, and, in default of payment, to imprisonment, with or without hard labour, for a period not exceeding three months, and, in case of a second or subsequent conviction, in addition to such forfeiture to a penalty not exceeding Five Hundred Pounds, or in default of payment to imprisonment, with or without hard labour, for a period not exceeding six months.

8. Any Magistrate or Justice of the Peace before whom information shall be given on oath by credible persons, that the provisions of this Ordinance are being, or have been, or are likely to be infringed, may issue a search warrant, and authorise the seizure of any instruments, apparatus or appurtenances reasonably suspected to be intended for use in such contravention.

9. Notwithstanding the provisions of Section 4 of "The Electric Telegraph Act, 1861," all regulations made under the authority of that Act shall be published in the *Gazette*, and be subject, *mutatis mutandis*, to the provisions of Section 7 of Act No. 5 of 1883 of the Cape of Good Hope.

10. This Ordinance may be cited as the "Electric Telegraph Amendment Ordinance, 1904," and shall be read as one with "The Electric Telegraph Act, 1861," of the Cape of Good Hope, and the "Telegraph Protection Ordinance, 1901," and the said laws may be cited together as the "Electric Telegraph Laws, 1861 to 1904."

POSTAL NOTICE NO. 55 OF 1912.

PUBLIC attention is hereby directed to the provisions of the "Electric Telegraph Amendment Ordinance, 1904," under which no person not thereto expressly authorised by some law shall erect or make use of any mast, standard or apparatus of any kind for the purpose of signalling without wires by means of electricity, magnetism, electro-magnetism or other like agency, or shall construct any line of electric telegraph except under a licence to be granted by the Administrator.

The term "Line of Electric Telegraph" is defined as any apparatus, instrument, mast, standard, wire, substance, matter or thing whatever which is or may be used for the purpose of sending, transmitting, conveying or receiving signs, signals or communications.

All persons having, or desiring to have, such lines of electric communication, including telephone lines, whether on their private property or otherwise, are hereby notified that application for licence to use such lines must be made to the Administrator through the Postmaster General.

The licence fees payable in respect of such lines, as published in Government Notice No. 391 of 1912 are as follow:—

(*a*) 1s. per annum for a private telephone or telegraph line exclusively on the private property of the person constructing and using the same;

(*b*) 10s. per annum for a private telephone or telegraph line passing beyond the boundaries of the owner's land. (The licence does not confer any right to erect telephone or telegraph lines outside the boundaries of the applicant's land, and the applicant must make his own arrangements in this regard);

(*c*) £50 per annum for any installation of wireless telegraphy or telephony.

All persons having in use lines of electric communication which have not been authorised by the Administrator are hereby notified that unless the required permission be applied for within one month of the date of publication of this Notice they will render themselves liable to the penalties provided in section 7 of the Telegraph Ordinance above referred to.

RUSSIA

THE following Statute and regulations have been adopted for the institution of an inter-departmental Radiotelegraphic Committee:—

Statute.

1. To establish the attached regulations concerning an inter-departmental Radiotelegraphic Committee and the necessary personnel.

2. To make Paragraph 1 effective as from July 1st, 1912.

3. To allot for the expenses of the said Committee (13,200 roubles annually) from the Imperial Treasury commencing from the year 1913 and to debit the expenses for 1912 (amounting to 6,600 roubles) to the anticipated surplus on the estimates for 1912.

Regulations.

1. An inter-departmental Committee is instituted for the co-ordination of the work of the various departments relating to the existence and use of the Imperial network of radiotelegraphic and radiotele-

phonic stations and for the consideration of schemes for the establishment and maintenance of radiotelegraphic and radiotelephonic communication which require preliminary discussion between the departments affected thereby.

This Committee is attached to the Headquarters Staff of the Postal Telegraph Department.

2. The Committee shall consist of a President and of permanent members appointed by the Ministries of the Interior of War, Routes of Communication and of Foreign Affairs. When schemes for the establishment and exploitation of radiotelegraphic and radiotelephonic stations for the use of the Ministry of Finance or other departments are under consideration representatives of the department in question shall be appointed to attend the meetings of the Committee and have the right to vote.

When legal aspects of radiotelegraphic and radiotelephonic communication are under discussion a representative of the Ministry of Justice shall be invited to attend and shall have the right to vote.

The Ministries of the Interior, of War, of Marine, of Routes of Communication and of Commerce and Industries shall each appoint two members to the Committee and the Ministry of Foreign Affairs shall appoint one member.

3. When necessary the Ministry of the Imperial Court shall appoint two representatives to attend the meetings of the Committee and the Ministry of Justice or other Ministries shall each appoint one member.

In the event of the representative of any of the Ministries being unable to attend the meetings of the Committee the Ministry in question may appoint a temporary substitute.

4. The President of the Committee and one of the permanent members of each department that furnishes two members must have special scientific and technical knowledge, and any temporary substitute appointed to represent these must be in possession of the same qualifications.

The President of the Committee shall be appointed by His Imperial Majesty on the recommendation of the Minister of the Interior and the members of the Committee.

Understudies need not be of equal rank with the members for whom they act as substitutes.

During the absence of the President the fulfilment of his duties shall devolve upon one of the members appointed by the Ministry of the Interior.

5. The duties of the Committee are as follows :—

(*a*) The examination of schemes which have been worked out by the various departments for radiotelegraphic and radiotelephonic installations with the object of co-ordinating them and

of fitting them into a general plan for a network of radiotelegraphic and radiotelephonic stations throughout Russia.

(*b*) The regulation of the mutual relations between the radiotelegraphic and radiotelephonic stations of different departments during their operations.

(*c*) The examination of matter relating to communication between ship and shore stations.

(*d*) The consideration of proposals made by various departments for the issue of new laws, rules and regulations concerning radiotelegraphic and radiotelephonic communication.

(*e*) The preparation of materials and questions to be brought forward by Russia for discussion at International Radiotelegraphic and Radiotelephonic Conferences.

(*f*) The drafting of general technical regulations, rules and standards relating to radiotelegraphic and radiotelephonic installations.

(*g*) The investigation of the general requirements of Russia in the matter of specialists in radiotelegraphy and telephony, and in the matter of their education and of the right to radiotelegraphic and radiotelephonic communication.

(*h*) Action as consultants in connection with questions concerning radiotelegraphic and radiotelephonic communications which may be referred to the Committee by various departments and particularly the examination of and reporting upon the practical value of new inventions relating to radiotelegraphy and radiotelephony.

(*i*) All other matters and questions concerning radiotelegraphic and radiotelephonic communication.

6. All matters and questions relating to radiotelegraphic and radiotelephonic communication enumerated in Sections *a* to *e* and *h* of the preceding paragraph (5) shall be brought forward by the various departments for the decision of the Committee.

Matters indicated in Sections *f*, *g* and *i* of the same paragraph shall be examined by the Committee either on their own initiative or at the request of the departments interested.

7. Matters shall be submitted to the Committee in accordance with the instructions and resolutions of Ministers or Commanders-in-Chief in a complete form and with a definitely worded request from the department.

8. Communications between the President of the Committee and the Senate or the Chiefs of Headquarters or Chiefs of departments or their subordinates or Governors shall be made in accordance with Clauses 233-236 of the Institution of Ministries.

9. For the preliminary technical consideration of complicated

affairs the Committee shall be empowered to appoint, when required, special sub-committees consisting of members of the Committee who are particularly concerned in the matter and of well-informed persons who may be invited by the Committee and who will have the right to vote at the meeting of the sub-committees. At such meeting a member chosen by the Committee will preside.

10. For the carrying out of scientific and technical researches the Committee shall be permitted to use the laboratories of the Chamber of Weights and Measures and of other institutions in St. Petersburg, under conditions to be defined by special agreement between the Ministry of the Interior and other Ministries.

11. The final preparation and presentation of affairs to the Committee will be performed by one of the permanent members. Matters of a departmental character will be presented by a representative of the Ministry responsible for bringing the matter before the Committee for consideration.

12. The Committee will meet, by order of the President, at the Headquarters of the Postal Telegraph Department, not less than once per month, with the exception of the summer holiday season, when meetings will be convened as required.

13. To form a quorum at meetings, the attendance is required of the representatives of the department which has introduced the business under discussion, and of at least one permanent member each from the Ministries of the Interior, of War, of Marine and of Commerce and Industries.

14. All affairs in the Committee shall be decided by a simple majority of votes, each department having only one vote through its representatives. At meetings of sub-committees qu tions shall be decided by a simple majority of votes of all membe of the sub-committee, including experts who may have been invited o attend the meetings.

In case of the votes of two parties being equal, the President shall give the casting vote.

15. In case of a department disagreeing with a decision of the Committee, the latter may, if they consider it necessary, refer the matter to the Council of Ministers.

16. In connection with each matter examined by the Committee a short protocol must be prepared and signed at the same meeting by all members of the Committee who are present. Independently of the protocols detailed journals of the meetings will be kept and these will include the opinions of the Committee concerning the business under consideration. In case of a division of votes the protocol and the journal must contain the opinions both of the majority and the minority, together with a statement as to the Ministries which were included in each party.

17. The originals of journals and protocols will be kept with the documents of the Committee, but copies of the journals must be communicated within seven days to the Chiefs of Headquarters and to Chiefs of sections of those departments which are represented on the Committee.

18. The procedure to be followed in bringing matters before the Committee must be decided by the Committee and confirmed by the Minister of the Interior by agreement with other Ministers concerned.

19. The secretarial work in connection with the Committees shall be carried out by the secretary of the Committee, by his assistant, and by the officials allotted for the clerical work of the Committee.

20. The Secretary of the Committee shall be chosen by its President, whose choice must be confirmed by the Minister of the Interior. The appointment of the assistant secretary is confirmed by the President of the Committee. Only persons who have received a University education and who have a technical knowledge of radiotelegraphy and radiotelephony will be qualified to hold such posts.

The following are the principal provisions of the Decree concerning wireless telegraphy in Russia of February 20th, 1908:—

By a "radiotelegraphic station" is understood every installation designated for telegraphic communications and capable of producing on the spot or receiving from a distance electro-magnetic waves.

Stations of this kind comprise:—

1. Stations designated for a special use.
2. Stations designated for a general use, that is to say, open to accept telegrams from the public.

The form of administration, working, and supervision of radiotelegraphic station are regulated by the personnel of the Telegraph Service, except in the case of the special and supplementary provisions to be eventually fixed.

The establishment of radiotelegraphic stations for public use and the general management of the Radiotelegraphic Service of the Empire are under the jurisdiction of the General Direction of Posts and Telegraphs, to which likewise belongs the direction of the establishment of the aforesaid stations by the various Government departments, with all questions affecting their destination, power, range, and technical construction.

The carrying out by scientific associations and schools of public instruction of scientific experiments and researches in radiotelegraphy is subject to an authorisation, by special request, of the Minister for the Interior. These experiments, as well as the working of radiotelegraphic stations for purposes of instruction, can be interdicted in cases where such experiments and instructions would exercise a harmful influence on neighbouring radiotelegraphic stations, or, in general, prejudice the interests of others.

Stations on board ships anchored in ports, or sailing near the coasts, are subjected to special regulations decreed by the Minister for the Interior in common accord with the Ministers of War, of the Marine, of Ways and Communications, of Foreign Affairs and of Commerce and Industry.

SAINT HELENA

THE following Ordinance provides for the regulation of wireless telegraphy :—

1. From and after the passing of this Ordinance the Governor-in-Council may make regulations as he may deem requisite for regulating the use of wireless telegraphy on merchant ships whether British or foreign while in the territorial waters of this Colony.

2. The Master of any ship and any person who shall act in contravention of any regulation now published or which may hereafter be published shall be liable on conviction to a penalty not exceeding ten pounds.

3. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1912."

REGULATIONS.

Made by the Governor-in-Council under Ordinance No. 7 of 1912, entitled "An Ordinance to provide for the Regulation of Wireless Telegraphy."

(1) All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of this Colony shall be worked in such a way as not to interfere with (*a*) naval signalling or (*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(2) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of this Colony except with the special or general permission of the Governor.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases as may be deemed desirable.

(4) These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

SAINT LUCIA

Wireless Telegraphy Ordinance

No. 10 of 1912.

THIS Ordinance may be cited as the Wireless Telegraphy Ordinance, 1912.

2. In this Ordinance "wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (*a*) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(*b*) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations under this Ordinance.

5. (*a*) The Governor may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the *Gazette* have the same effect as if enacted in this Ordinance.

(*b*) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(*c*) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any

place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any police officer or any person appointed in that behalf by the Chief of Police and named in the warrant, and a warrant so granted shall authorise the police officer or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used for wireless telegraphy therein.

7. (*a*) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(*b*) Proceedings shall be taken before the First District Court on the complaint of the Chief of Police or of any person thereto authorised by him in writing, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. The Wireless Telegraph Ordinance, 1903, is hereby repealed.

SCHEDULE—SECTION 5 (2).

Regulations

ALL apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with

(*a*) Naval signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof; and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. In these Regulations "naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and naval stations, or between a ship of His Majesty's Navy or a naval station and any other wireless telegraph station whether on shore or on any ship.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

4. For the purpose of any proceedings under these regulations the

master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in charge or command of the ship.

6. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Passed the Legislative Council this 25th day of November, 1912.

SAINT VINCENT

THIS Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. In this Ordinance "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions, and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Colony otherwise than in accordance with regulations under this Ordinance.

5. (1) The Governor in Council may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the Gazette have the same effect as if enacted in this Ordinance.

(2) The Regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be

subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance, or of any licence granted under this Ordinance, he may grant a search warrant to any Police Officer or any person appointed in that behalf by the Chief of Police and named in the warrant, and a warrant so granted shall authorise the Police Officer or person named therein to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (1) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(2) Proceedings shall be taken before the Police Magistrate of the First District on the complaint of the Chief of Police or of any person thereto authorised by him in writing, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. "The Wireless Telegraph Ordinance, 1904," and "The Wireless Telegraph Amendment Ordinance, 1912," are hereby repealed.

REGULATIONS.

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with—

(*a*) Naval signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. In these Regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval

Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

4. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

6. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. Regulations made by the Governor in Council on the 17th day of December, 1912, under the authority of the Wireless Telegraph Ordinances, 1904 and 1912, are hereby repealed.

SEYCHELLES ISLANDS

NO telegraphic or electrical station, apparatus, machinery, or implements whatsoever, whether for the purpose of electrical communications by what is generally known as "wireless telegraphy," or for any other purpose connected with the transmission, emission, or reception of messages between the Seychelles Islands and any place within or outside the Seychelles Islands, shall be erected or used in any place in the Seychelles Islands, whether on private property or not, without the sanction of the Administrator previously obtained.

(2) The Administrator may refuse such sanction or grant it under such conditions or restrictions as he may think fit.

(3) The word "place" in sub-section (1) shall include any ship or floating conveyance within or without the Seychelles waters, except vessels of His Majesty's Navy.

2. Any person contravening any of the provisions of this Ordinance shall be guilty of an offence and shall be liable, on prosecution before the Court of Seychelles, to a fine not exceeding 5,000 rupees (Rd. 5,000), and every apparatus, machinery, or implement used in, or connected with, the commission of the offence shall be forfeited.

3. The Court may further order, on the application of the Crown Prosecutor, or of any person authorised by the Administrator to that effect, the immediate destruction, pulling down, or removal of any building, apparatus, machinery, or implements used in the commission of the offence.

4. All prosecutions against this Ordinance shall be instituted at the instance of the Crown Prosecutor or Inspector of Police or any person authorised by the Administrator to that effect.

5. This Ordinance may be cited as "The Telegraphic and Electrical Stations Ordinance, 1903."

SIAM.

Radio-Telegraph Law.

THIS Law may be cited as "The Radio-Telegraph Law, B.E. 2457." *(1914.)*

2. It shall come into force from the date of its publication in the Government Gazette.

Coast and Land Stations.

3. The right to establish and work radio-stations for telegraphic and telephonic purposes on Siamese soil and on board ships permanently anchored in Siamese territorial waters is an exclusive privilege of the Government.

This privilege shall be reserved to the Department of Posts and Telegraphs in the Ministry of Communications.

4. The Army and Navy may establish and work independently radio-telegraph stations or field apparatus subject to such conditions as may be from time to time sanctioned in writing by the Minister of War or Marine.

Any station established under this section may be opened to public correspondence only under special arrangement with the Department of Posts and Telegraphs.

Ship Stations.

5. No merchant ship under the Siamese flag shall establish or work any radio-telegraph or telephone apparatus without a licence from the Minister of Communications.

The Minister of Communications shall not grant such licence until he has been satisfied that the apparatus can work in accordance with the provisions of the International Radio-Telegraph Convention of London, 5th July, 1912, and will be handled by qualified operators.

Such licence shall be for such time and subject to such conditions as the Minister of Communications may deem good.

6. No ship, whether under the Siamese or a foreign flag, excepting ships of war, is allowed while in Siamese territorial waters to send a message by means of her radio-telegraph apparatus when and where such message can be forwarded by the Government system, either with or without wires, except for the purpose of transmitting messages to or from a ship in distress.

SECRECY.

7. No person or persons engaged in or having knowledge of the operation of any radio-station shall disclose the contents of any message transmitted or received by such station for the purpose of transmission, except to the person to whom the same may be directed or his authorised agent, or to another station employed to forward such message to its destination, or in obedience to the directions of a Court of competent jurisdiction.

PENALTIES.

8. Whoever establishes or works any apparatus contrary to the provision of Section 3 and 6, or in excess of the conditions laid down under Section 4 of this Law, shall be punished with imprisonment not exceeding six months or fine not exceeding five hundred ticals or both.

The captain or master of a ship, and the person directly responsible for the offence, if any, shall both be liable to punishment for every infringement of the provisions of Section 6.

9. Any person infringing Section 5 of this law shall be punished with fine not exceeding one hundred ticals.

10. Upon the conviction of any person of an offence under the foregoing sections, the Court may order the forfeiture of any apparatus used for the commission of such offence.

11. Any person injuring apparatus or committing any act of mischief to a radio-telegraph station lawfully established, or doing anything to prevent or intended to prevent the transmission or delivery of any radio-telegraph message by any such station, shall be guilty of an offence under Section 196 of the Penal Code.

12. Whoever commits any offence against Section 7 of this Law shall be punished under Section 279 to 281 of the Penal Code.

EXECUTION.

13. The Minister of Communications shall have charge and control of the execution of this Law.

It shall be lawful for him to frame regulations and to fix the scale of fees for land, coast, and ship charges in the transmission of messages by radio-telegraphy or telephony, as well as for licences under Section 5.

It shall also be lawful for him to frame regulations about the qualifications required from operators.

All such regulations shall be in accordance with the detailed Service Regulations appended to the International Radio-Telegraph Convention.

Such regulations, on being sanctioned by His Majesty and published in the Government Gazette, shall be deemed to be part of this Law.

Given on the 24th day of April, B.E. 2,457 *(1914)*, being the 1,261st day of the Present Reign.

SIERRA LEONE

AN ORDINANCE TO AMEND "THE WIRELESS TELEGRAPH ORDINANCE, 1903," REGULATIONS.

No. 19 of 1912.

BE it enacted by the Governor of the Colony of Sierra Leone, with the advice and consent of the Legislative Council thereof, as follows:—

1. This Ordinance may be cited as the Wireless Telegraphy Amendment Ordinance, 1912.

2. (1) A person shall not work any apparatus for wireless telegraphy installed on a merchant ship, whether British or foreign, whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with the regulations contained in the Schedule to this Ordinance.

(2) The Governor-in-Council may amend, vary or revoke any of the regulations contained in the Schedule to this Ordinance and may make any other regulations, and such last-mentioned regulations shall be of the same effect as if they were contained in this Ordinance.

3. Any person acting in contravention of any regulation contained in or made under this Ordinance, shall be guilty of an offence and, on summary conviction thereof, shall be liable to a penalty not exceeding One hundred pounds, or to imprisonment, with or without hard labour, for any period not exceeding Twelve calendar months.

The Schedule.

(1) All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with (*a*) naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, or in the Protectorate, and in particular, the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(2) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the Colony, except with the special or general permission of the Governor.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships, while in the territorial waters, shall be subject

to such further rules as may be made by the Governor-in-Council from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

(4) These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Passed by the Legislative Council the 22nd of November, 1912.

SOMALILAND PROTECTORATE

THIS Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. In this Ordinance "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which messages or other communications are sent or received. Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Protectorate, except under and in accordance with a licence granted in that behalf by the Commissioner.

(2) Every such licence shall be in such form and for such period as the Commissioner may determine, and shall contain the terms, conditions, and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Protectorate, otherwise than in accordance with regulations under this Ordinance.

5. (1) The Commissioner may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication have the same effect as if enacted in this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Commissioner, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Protectorate shall be subject to such further regulations as may be made by the Commissioner from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

Professor André Blondel

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6. If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance, or of any licence granted under this Ordinance, he may grant a search warrant to any Police Officer or any person appointed in that behalf by the District Commissioner and named in the warrant, and a warrant so granted shall authorise the Police Officer or person named therein to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (1) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding rupees seven hundred and fifty, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(2) Proceedings shall be taken before the District Court, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. The Wireless Telegraphs Ordinance, 1908, is hereby repealed.

REGULATIONS.

i. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Protectorate shall be worked in such a way as not to interfere with—

(*a*) Naval Signalling, or

(*b*) The working of any wireless telegraph station lawfully established, installed, or worked in the Protectorate or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless stations established on ships at sea.

ii. In these Regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station, whether on shore or on any ship.

iii. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Protectorate, except with the special or general permission of the Commissioner.

iv. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

v. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

vi. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

SPAIN

SPAIN has shown a keen interest in the developments of wireless telegraphy, for in 1899 sub-commissions were appointed by the Council of State of National Defence, which issued their periodical reports to the Spanish Government; and in 1905, by Royal Decree of May 21st, a Royal and permanent Commission was created, under the presidency of the Chief of the General Staff, comprising representatives of the War, Navy and the Interior Ministries, previous to the Berlin Convention of Wireless Telegraphy of 1906.

By Royal Order of the President of Ministers and Minister of War of February 9th and 17th, 1907, respectively, the Cortes of Spain were recommended to pass a law for establishing a wireless system for communication in Spain, which law was promulgated on October 26th, 1907, followed by a Royal Decree of January 24th, 1908, declaring of national interest "the construction and erection of a net of wireless stations in the Peninsula and Canary and Balearic Islands, in order to carry out wireless communication between ships and shore stations, between the Balearic and Canary Islands and the Peninsula, Inland and International services." In the same year a public company was formed; their tender was accepted and a concession granted for the installation of a number of stations and exploitation of the wireless service, for a term of 21 years and 8 months. The contract for this important net of wireless stations was successfully carried out and is in course of completion by Marconi's Wireless Telegraph Company, Limited, for the Compania Nacional de Telegrafia sin Hilos.

In October of 1909 the Minister of Public Works called for public tenders for the carrying of mails by steamer between Spain

and its possessions in Africa, as well as to Central and South American countries, stipulating in the conditions of the tender that the ships of the firms tendering for the mail service should be provided with wireless apparatus—not only those carrying passengers, but also those carrying cargo and passengers; for the former the law to be in force from the date of accepting the tender, and the latter from January 1st, 1913.

The following Royal Decree was issued in 1913, and relates to the regulation of wireless telegraphy on board Spanish merchant vessels:—

1. That from the first day of August, 1912, all Spanish mercantile ships shall be fitted with wireless telegraph apparatus, provided (*a*) they are engaged in carrying passengers or mails, and (*b*) that they carry more than fifty persons on board during a transatlantic voyage, including in this number the crew.

2. The wireless telegraph apparatus shall have the necessary efficiency and be erected according to the instructions contained in the regulations issued by the Ministry of the Interior and the General Direction of Posts and Telegraphs, in order to put into force the Royal Decree of January 24th, 1908, and as a consequence of the International Congress of Berlin signed by the representatives of Spain on November 3rd, 1906.

3. This Royal Decree shall be communicated to the shipping companies, pointing out that wireless telegraph stations on board have to be approved by the Department.

4. The shipping companies shall communicate with this centre through the harbour authorities when the installation has been completed and is in a position to work efficiently, so that a technical commission may recognise and test it in order to issue a complete report of same, and to add the said report to the action with a view to finally sanctioning the service, according to previous permission of the War Office and of the Home Office.

A Bill was also submitted before the Spanish Cortes to the effect that "no passenger shall embark in Spanish ports on any ship which has not been provided with wireless apparatus, the maritime authorities only granting the necessary authorisation after ascertaining the good working order of the apparatus." This Bill did not become law, but we understand that a further attempt will be made to give effect thereto.

A BILL was passed into law which provides for the organisation of a school of Wireless Telegraphy, with the object of instructing pupils, whether already in the telegraph service or not, in the theory and practice of radiotelegraphy, and to fit them for service either on shore or ship stations of private companies.

There will be three courses of study, the first one lasting six months. The pupils will then have to pass a test consisting of the transmission of at least 20 words per minute for not less than five nor more than ten minutes, with an allowance of 1 per cent. of uncorrected mistakes.

The second course will last three months, and will comprise a course of study of the apparatus used in radiotelegraphy, the tuning of same for different wave lengths, commutations, etc., the regulations regarding the exchange of wireless messages, and the adjustment of slight irregularities.

A higher and final course will also be given for those wishing to further pursue their studies. Foreign languages also figure in the curriculum of the school.

STRAITS SETTLEMENTS

THERE are as yet no commercial Wireless Telegraph stations in the Colony of the Straits Settlements. A station is in course of erection at Singapore, and others are projected. When in operation these stations will be under the control of the Postmaster-General at Singapore.

The following Ordinance, dated December 16th, 1912, provides for the Regulation of Wireless Telegraphy :—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1912."

2. The expression "wireless telegraphy" means any system of communication by telegraph as defined by "The Telegraph Ordinance, 1895," without the aid of any wire connecting the points from and at which the messages or other communications are sent or received :

Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may, whenever he shall deem it expedient to do so, licence the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony.

4. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor in Council may determine, and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (1) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand dollars or to imprisonment of either description for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Public Prosecutor.

(2) If a magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (1) The Governor in Council may make regulations for all or any of the following matters:—

(*i.*) For prescribing the form and manner in which applications for licences under this Ordinance are to be made;

(*ii.*) for prescribing the fees payable on the grant of any licence;

(*iii.*) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*iv.*) for prohibiting, except with the special or general permission of the Postmaster-General of the Colony the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, whilst such ship is in any of the harbours of the Colony;

(*v.*) for prohibiting or regulating in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Colony the use of wireless telegraphy on board such ships while in such

waters by such further rules as the Governor may see fit to make from time to time, and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraphs (*iii.*) (*iv.*) and (*v.*) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted, subject to such special terms, conditions and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

8. (1) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any Regulation made thereunder, or in breach of the conditions and restrictions subject to or upon which any licence has been issued, shall be deemed to be an offence against this Ordinance, and for every such offence not otherwise specially provided for the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine of five hundred dollars.

(2) All convictions, forfeitures and fines under this Ordinance or any Regulations made thereunder may be had and recovered before a district court.

Regulations.

THE following Regulations, dated January 5th, 1914, were made under the "Wireless Telegraphy Ordinance, 1912":—

1. All apparatus for Wireless Telegraphy on board a merchant ship whether British or foreign in the waters of the Colony shall be worked in such a way as not to interfere with (*a*) Naval signalling, or (*b*) the working of any Wireless Telegraph station lawfully established, installed, or worked in the Colony or the waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between Wireless Telegraph stations established as aforesaid on land and Wireless Telegraph stations established on ships at sea.

2. No apparatus for Wireless Telegraphy on board a merchant ship whether British or foreign shall be worked or used whilst such ship is in any of the harbours of the Colony except with the special or general permission of the Postmaster-General of the Colony.

3. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by Wireless Telegraphy, the use of Wireless Telegraphy on

board merchant ships whether British or foreign while in the waters of the Colony shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

4. These Regulations shall not apply to the use of Wireless Telegraphy for the purpose of making or answering signals of distress.

SWEDEN

THE Administration of Wireless Telegraphy in Sweden is under the control of the Royal Board of Telegraphs :—Director-General of Telegraphs, Sven Ludwig Herman Rydin; Assistant Director-General and Director of Traffic Department, N. L. H. Johanson; Director of Administrative Department, Count A. Hamilton; Director of Line Department, K. E. Landström; Inspector of Wireless Telegraphy, A. S. Litström; Manager of Government School for Wireless Telegraphy, J. G. Holmström.

The Act of August 31st, 1907, concerning the establishment and working of installations of radio-telegraphy and radio-telephony reads as follows :—

1. Whomsoever desires to establish in Sweden, on land, or on board a vessel permanently moored in Swedish waters, an electric installation of radio-telegraphy or radio-telephony for public or private use, must apply for an authorisation from the King.

2. The authorisation of the King must likewise be applied for, by any person or persons desiring to establish on board a Swedish vessel other than permanently moored, an installation of the kind referred to in Paragraph 1.

3. The authorisation granted by the King, as prescribed in Paragraphs 1 and 2, can only be granted for a certain period. In granting the authorisation, His Majesty prescribes, under the reservation of private rights, the manner and conditions under which the installation may be established and worked.

4. Whomsoever establishes or works, without the authorisation of the King or contrary to the provisions prescribed in the authorisation, an installation within the meaning of the present law, is liable to a fine of from 25 to 1,000 kronen if the penalty incurred by this contravention is not included in the Penal Code.

5. If an installation within the meaning of the present law has been established without the authorisation of the King, or contrary to the provisions prescribed simultaneously with the authorisation, or if the authorisation has been revoked later by the King, it is the duty

of the Governors of Provinces to take the necessary steps to prevent any use being made of the installation.

6. Every fine imposed under the present law reverts to the State. Fines not paid on account of the insolvency of the delinquent are expurgated by terms of imprisonment as prescribed in the Penal Code.

7. The provisions of this law do not apply to State installations.

8. Regulations concerning foreign vessels not permanently moored in Swedish waters, and all dispositions which may be considered necessary for the proper working in Sweden of installations within the meaning of this Act, are made by the King.

THE following Royal Decree of June 20th, 1913, which came into force on July 1st, 1913, replaces that of August 31st, 1907 (see YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913, pp. 151-2):—

1. The working of installations of radio-telegraphy or radio-telephony on board a foreign vessel not permanently moored in Swedish waters is, except in cases of distress, prohibited in those parts of the Swedish Archipelago and Swedish waters near to the coast stations which shall be designated by the Direction General of Telegraphs acting conjointly with the Admiralty.

It is the duty of the Direction General of Telegraphs, acting conjointly with the Admiralty, to communicate these provisions to navigators in the way he judges most convenient, and likewise to inform the Government Department concerned.

2. In order to exploit such stations in a Swedish port on board foreign vesels above referred to a special authorisation of the General Direction of Telegraphs, acting in conjunction with the Admiralty, must be obtained; the parties interested shall furthermore be bound to conform to the instructions, detailed edicts, if necessary, made by the Direction General of Telegraphs.

3. When an installation of the kind referred to above is exploited on board one of the foreign ships above-mentioned, the interested parties, if no regulation exists to the contrary, shall conform to the instructions fixed by the International Radio-telegraphic Convention which are in force with the service regulations thereto annexed.

4. Every contravention of this Decree, or of the regulations prescribed by the Direction General of Telegraphs in virtue of Article 2 above, will be subject to a fine of 25 to 1,000 kronen.

The fines revert to the State. Fines not payable by reason of the insolvency of the delinquent are expurgated by terms of imprisonment as laid down in the Penal Code.

5. The provisions of Article 4 hereof shall not apply to vessels of war.

THE following resolution made by the Direction General of Telegraphs relating to the prohibition of working radio-telegraphic and radio-telephonic installations in proximity to Swedish coast stations was issued on August 22nd, 1913:—

In view of the Royal decision relating to the installing of wireless stations on board of certain Swedish vessels:

In view of the Royal Order of June 20th, 1913, relating to the working in Sweden of radio-telegraphic and radio-telephonic installations on board foreign vessels:

The Direction General of Telegraphs, conjointly with the Admiralty, brings to the notice of interested parties that within a radius of ten nautical miles from the nearest Swedish coast station the operation of radio-telegraphic or radio-telephonic stations established either on board of Swedish vessels or on board of foreign vessels is prohibited during the hours when such coast station is open for traffic, except in cases of distress or for the purpose of corresponding with the nearest coast station.

This resolution does not refer to Swedish ships of war.

(The above Regulation refers to the working of wireless stations on board foreign vessels, only whilst they are within the territorial waters of the Swedish Kingdom.)

SWITZERLAND.

THERE are at present no laws in existence to regulate wireless telegraphy in Switzerland. The establishment and exploitation of wireless stations is a State monopoly, which is based on the general Federal Law of December 16th, 1907, relating to the administration of telegraphs and telephones.

The Telegraph Administration, however, grants licences, for a limited length of time, for receiving stations only, where these are to be used solely for the reception of time signals and meteorological information. A fee of five francs is charged at the time of granting the licence, and the Telegraph Administration reserves to itself the right to cancel such licence at any time.

TRINIDAD AND TOBAGO.

BE it enacted by the Governor of Trinidad and Tobago with the advice and consent of the Legislative Council thereof as follows:—

1. This Ordinance may be cited as the Wireless Telegraphy Ordinance 1909.

2. No person shall work any apparatus for wireless telegraphy

installed on any merchant ship whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations from time to time made in that behalf by the Governor.

Such regulations may impose penalties recoverable summarily for the breach of any such regulations, not exceeding ten pounds for each offence.

All such regulations shall be published in the *Royal Gazette*, and production of such *Gazette* containing a copy of such regulations shall in all legal proceedings be sufficient evidence of the due making and tenor thereof.

Passed in Council this twentieth day of December, in the year of Our Lord one thousand nine hundred and nine.

REGULATIONS.

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with (*a*) Naval signalling or (*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be worked so as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the Colony, except with the special or general permission in writing of the Director of Public Works of the Colony. Such special or general permission shall only be given to any ship subject to the condition that it shall not exchange signals with another ship except on the private business of the owners.

3. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government shall have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whilst in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

4. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

5. Any person committing a breach of these Regulations shall be guilty of an offence, and on conviction shall be liable to a penalty not exceeding ten pounds.

Made by the Governor under the Wireless Telegraphy Ordinance 1909 (35-1909) this third day of February, 1910.

UGANDA PROTECTORATE

THIS Ordinance may be cited as "The Wireless Telegraphs Ordinance, 1908."

2. No person shall use or establish any apparatus or installation for the purpose of operating wireless telegraphs without a licence from the Governor.

Any person contravening the terms of this section shall be liable on conviction to a fine not exceeding Rs. 1,500 or to imprisonment of either kind for a term not exceeding twelve months, and any apparatus or installation in respect of which an offence under this section is committed may be forfeited and sold or disposed of as the Governor may direct.

3. It shall be lawful for the Governor from time to time by rules to prescribe the terms and conditions upon which licences to use or establish apparatus or installations for the purpose of operating wireless telegraphs may be granted.

UNION OF SOUTH AFRICA.

WIRELESS Telegraphy in the Union of South Africa is under the control of the Postmaster-General.

Chapter V., Section 1, of the "Post Office Administration and Shipping Combinations Discouragement Act, 1911," relates to the conditions under which telegraphs and wireless telegraphs may be worked:—

In this Act, unless inconsistent with the context—

"telegraph" shall include "telephone," and shall mean any system or means of conveying signs, signals, sounds, or communications, by the agency of electricity, magnetism, electro-magnetism, or by any agency of a like nature, whether with or without the aid of wires, and shall include the system commonly known as wireless telegraphy, or ætheric signalling, and any improvements or developments of that system.

"Telegraph line" shall include any apparatus, instrument, pole, mast, standard, wire, pipe, tunnel, pneumatic or other tube, thing, or means whatever, which is or may be used in connection with or for the purpose of sending, transmitting, conveying, or receiving telegraphic signs, signals, sounds, or communications.

1. The Postmaster-General shall have the exclusive privilege of constructing and maintaining telegraph lines and of transmitting telegrams or other communications by telegraph within the Union or the territorial waters thereof, and of performing all the incidental services of receiving, collecting, or delivering telegrams or other such communications: Provided that—

(*a*) the owners of any system of railways may maintain and work

for the purposes of any such railway, for the time and to the extent authorised by any law, any telegraph lines constructed in pursuance of rights conferred by that law; and

(*b*) the Postmaster-General may construct, maintain, or lease telegraph lines for private use or may, by license, authorise any person to construct, maintain, and work private telegraph lines within the Union or its territorial waters and may prescribe the fees and conditions therefor.

UNITED STATES OF AMERICA

THE Congress of the United States has delegated to the Department of Commerce the duty of the enforcement of the Wireless Communication Laws and the International Radiotelegraph Convention, and the work is handled through the Bureau of Navigation, Washington. The officers engaged in this duty are as follows:—Secretary of Commerce, William C. Redfield; Assistant Secretary of Commerce, E. F. Sweet; Commissioner of Navigation, E. T. Chamberlain; Deputy Commissioner of Navigation, A. J. Tyrer; Radio Engineer, V. Ford Greaves; General Radio Inspector, L. R. Krumm. There are, in addition, twelve inspectors and assistant inspectors, stationed at various districts established by the Bureau of Navigation.

During the past year considerable progress has been made in the United States in the development of the commercial as well as the scientific side of wireless telegraphy.

The high power Marconi station at Belmar, New Jersey, has been completed and will be opened for public service. This station is intended for direct communication with the new station at Carnarvon, in North Wales, which was completed in May last. The Belmar wireless station is connected by land lines with New York, whilst the Carnarvon station is similarly connected with London. The duplex system is employed at both these stations, so that traffic can be handled with the maximum efficiency, both as regards speed and accuracy.

On September 24th last communication was formally opened between the two new stations at San Francisco, California, and Honolulu in the Hawaiian Islands. The station at Honolulu is destined to link San Francisco with Japan when the high-power station now in course of erection at Yokohama has been completed.

THE following "Act to Require Apparatus and Operators for Radio Communication on certain Ocean Steamers," which was approved on July 23rd, 1912, amends Section 1 of the Act approved June 24th, 1910:—

1. That from and after October 1st, 1912, it shall be unlawful for any steamer of the United States or of any foreign country navigating the ocean or the Great Lakes and licensed to carry, or carrying, fifty or more persons, including passengers or crew or both, to leave or attempt to leave any port of the United States unless such steamer shall be equipped with an efficient apparatus for radio communication, in good working order, capable of transmitting and receiving messages over a distance of at least 100 miles, day or night. An auxiliary power supply, independent of the vessel's main electric power plant, must be provided which will enable the sending set for at least four hours to send messages over a distance of at least 100 miles, day or night, and efficient communication between the operator in the radio room and the bridge shall be maintained at all times.

The radio equipment must be in charge of two or more persons skilled in the use of such apparatus, one or the other of whom shall be on duty at all times while the vessel is being navigated. Such equipment, operators, the regulation of their watches, and the transmission and receipt of messages, except as may be regulated by law or international agreement, shall be under the control of the master, in the case of a vessel of the United States; and every wilful failure on the part of the master to enforce at sea the provisions of this paragraph as to equipment, operators, and watches shall subject him to a penalty of $100.

That the provisions of this section shall not apply to steamers plying between ports, or places, less than 200 miles apart.

2. That this Act, so far as it relates to the Great Lakes, shall take effect on and after April 1st, 1913, and so far as it relates to ocean cargo steamers shall take effect on and after July 1st, 1913: Provided, that on cargo steamers, in lieu of the second operator provided for in this Act, there may be substituted a member of the crew or other person who shall be duly certified and entered in the ship's log as competent to receive and understand distress calls or other usual calls indicating danger, and to aid in maintaining a constant wireless watch so far as required for the safety of life.

The remaining sections of the Act of June 24th, 1910, which are unchanged, read as follows:—

2. That for the purposes of this Act apparatus for radio communication shall not be deemed to be efficient unless the company installing it shall contract in writing to exchange, and shall, in fact, exchange,

as far as may be physically practicable, to be determined by the master of the vessel, messages with shore or ship stations using other systems of radio communication.

3. That the master or other person being in charge of any such vessel which leaves or attempts to leave any port of the United States in violation of any of the provisions of this Act shall, upon conviction, be fined in a sum not more than $5,000, and any such fine shall be a lien upon such vessel, and such vessel may be libelled therefor in any district court of the United States within the jurisdiction of which such vessel shall arrive or depart, and the leaving or attempting to leave each and every port of the United States shall constitute a separate offence.

4. That the Secretary of Commerce and Labour shall make such regulations as may be necessary to secure the proper execution of this Act by collectors of customs and other officers of the Government.

Regulations

1. *Administration.*

1. The Department has established for the purpose of enforcing, through radio inspectors and others, the Acts relating to radio communication and the International Convention, the following districts with the principal office for each district at the custom house of the port named:

(1) Boston, Mass.—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

(2) New York, N. Y.—New York (county of New York, Staten Island, Long Island, and counties on the Hudson River to and including Schenectady, Albany, and Rensselaer) and New Jersey (counties of Bergen, Passaic, Essex, Union, Middlesex, Monmouth, Hudson, and Ocean).

(3) Baltimore, Md.—New Jersey (all counties not included in second district), Pennsylvania (counties of Philadelphia, Delaware, all counties south of the Blue Mountains, and Franklin County), Delaware, Maryland, Virginia, District of Columbia.

(4) Savannah, Ga.—North Carolina, South Carolina, Georgia, Florida, Porto Rico.

(5) New Orleans, La.—Alabama, Mississippi, Louisiana, Texas, Tennessee, Arkansas, Oklahoma, New Mexico.

(6) San Francisco, Cal.—California, Hawaii, Nevada, Utah, Arizona.

(7) Seattle, Wash.—Oregon, Washington, Alaska, Idaho, Montana, Wyoming.

(8) Cleveland, Ohio.—New York (all counties not included in second district), Pennsylvania (all counties not included in third district), West Virginia, Ohio, Michigan (Lower Peninsula).

(9) Chicago, Ill.—Indiana, Illinois, Wisconsin, Michigan (Upper Peninsula), Minnesota, Kentucky, Missouri, Kansas, Colorado, Iowa, Nebraska, South Dakota, North Dakota.

2. Radio inspectors are authorised to communicate directly in their respective districts with collectors of customs, and to co-operate with them in the enforcement of the laws.

3. The radio inspectors and customs officers, as far as practicable, shall visit steamers subject to the Act, before they leave port, and ascertain if they are equipped with the apparatus in charge of the operators prescribed by the Act.

4. Where a steamer subject to the Act is without the apparatus and the operators prescribed, or either of them, and is about to attempt to leave port, the radio inspector or customs officer visiting the vessel shall—

(*a*) Notify the master of the fine to which he will be liable, and of the particulars in respect of which the law has not been complied with;

(*b*) notify at once the collector of customs, if necessary by telephone;

(*c*) the radio inspector or customs officer shall submit to the collector of customs of the port a written report stating the exact nature of the violation, the section of the law violated, and the penalties involved, and all of the circumstances in connection therewith which will be of service to the collector and to the Secretary of Commerce in determining what action shall be taken;

(*d*) statements should be obtained from operators, ship officers, or other witnesses at the time the violation is discovered and should accompany the report to the collector of customs;

(*e*) the collector of customs will report the case to the Secretary of Commerce in the usual manner as a navigation fine case.

5. The Act does not authorise the refusal of clearance in case of violation of its provisions, but specifically provides for the imposition of a fine in a sum not more than $5,000.

6. The Act does not apply to a vessel at the time of entering a port of the United States. Radio inspectors and customs officers may, however, accept as evidence of the efficiency of the apparatus and the skill of an operator messages shown to have been transmitted and received by him over a distance of at least 100 miles, by day, during the voyage to the United States.

7. Collectors of customs and radio inspectors are enjoined that the reports required by paragraph 4 (*c*) of these regulations must be precise statements of the facts as the basis for proceedings by the United States Attorney.

8. Violations by the master of a vessel of the United States of the provisions of the second paragraph of Section 1 will be reported to the collector of customs directly and the usual procedure in cases of fines and penalties will be followed.

2. *Operators.*

1. In so far as licensed operators are concerned, a sharp distinction should be drawn between the Act of July 23rd, 1912, which requires apparatus and operators for radio communication on steamers, and the Act of August 13th, 1912, to regulate radio communication.

The Act of July 23rd, 1912, amending the Act of June 24th, 1910, is designed to promote safety at sea through the employment of apparatus and operators to transmit and receive distress calls and other calls relating to perils and aids to navigation. It provides that in the case of American and foreign vessels subject to its provisions "the radio equipment must be in charge of two or more persons skilled in the use of such apparatus." This Act does not require that the operators shall be licensed, and the penalty prescribed in Section 3 of the Act is not incurred by the master of a vessel whose operators are "skilled in the use of such apparatus," even though they may not be licensed.

The Act of August 13th, 1912, is designed to execute in behalf of the United States the International Radiotelegraphic Convention and thus to promote orderly exchanges by radio communication. For this purpose the International Radiotelegraphic Convention (Service Regulations) provides that the service of the station on shipboard shall be carried on by a telegraph operator holding a certificate issued by the Government to which the vessel is subject.

Section 3 of the Act of August 13th, 1912, carries out this provision of the International Convention by providing licences for operators on American vessels. If an unlicensed person serves in charge or in supervision of the use and operation of the apparatus both he and his employer are liable to a fine of not more than $100 or imprisonment for not more than two months or both. This section and penalty do not apply to operators on foreign ships. But operators on the ships of foreign nations signatory to the International Radiotelegraphic Convention, as shown above, are required to have certificates or licences from their own Governments, and if not so certificated, the obligations of the convention have not been observed. The convention in the Service Regulations provides for this situation.

Lt.-Col. George Owen Squier

Military Attaché to the American Embassy in London.

See Biographical Notices, page 772.

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The Act of July 23rd, 1912, as stated, requires that on American and foreign ships the operators must be "skilled in the use of such apparatus," but does not require that they must be licensed. To facilitate commerce and simplify administration, operators presenting American licences or foreign certificates are accepted as "skilled in the use of such apparatus," except where there may be special reasons to doubt the operator's skill or reliability. Where operators on American or foreign ships do not have such licences or foreign certificates, radio inspectors or customs officers under the Act of July 23rd, 1912, may accept other competent evidence of skill or may examine such operators.

2. The Service Regulations of the International Convention require that—

> The service of the station on shipboard shall be carried on by a telegraph operator holding a certificate issued by the Government to which the vessel is subject.

Such certificate shall attest the professional efficiency of the operator as regards—

(*a*) Adjustment of the apparatus and knowledge of its functioning.

(*b*) Transmission and acoustic reception at the rate of not less than 20 words a minute (Continental Morse) for commercial first-grade operators and not less than 12 words per minute for second-grade operators.

(*c*) Knowledge of the regulations governing the exchange of wireless telegraph correspondence.

(*d*) The certificate shall furthermore state that the Government has bound the operator to secrecy with regard to the correspondence.

3. The International Convention has been ratified by the principal maritime nations, dominions, and provinces. Radio operators holding valid certificates issued by foreign Governments which are parties to the convention will be recognised by this Department as persons "skilled in the use of such apparatus" within the meaning of the Act, unless in the case of a specific individual there may be special reason to doubt the operator's skill and reliability. Such certificates should be ready at hand for the inspection of radio inspectors or customs officers before the steamer departs from the United States.

4. In the case of a vessel subject to the Act under the flag of any nation not a party to the International Convention, the radio operator, before the departure of the vessel from the United States, must furnish to the inspector evidence that he is "skilled in the use of the apparatus." This evidence shall consist of an examination on board by the radio inspector.

5. The Department of Commerce issues licences to radio operators certifying the degree of knowledge of radio-telegraphy possessed by them and their ability as operators, under the International Convention.

Examinations for operators' licences can be taken at the following points: The United States Navy Yards at Boston, Mass., Brooklyn, N. Y., Philadelphia, Pa., Washington, D. C., Norfolk, Va., Charleston, S. C., New Orleans, La., Mare Island (San Francisco), Cal., Puget Sound, Wash.; at the naval stations at Key West, Fla., San Juan, P. R., and Honolulu, Hawaii; at the Naval Academy, Annapolis, Md., and the United States Naval Radio Station at Colon, Republic of Panama; also at Fort Sam Houston, San Antonio, Tex., Fort Wood, New York Harbour, Fort Omaha, Nebr., Fort Leavenworth, Kans.; Fort Mason, San Francisco, Cal.; School for Enlisted Specialists, Fort Monroe, Va.; at the Army stations at St. Michael and Fairbanks; and by special arrangement at the Army stations at Fort Gibbon and Valdez, Alaska; also at the Bureau of Standards, Washington, D. C.; and by the Department's radio inspectors at the custom houses in their districts and elsewhere, if practicable, by arrangement with them.

Applicants for licences should communicate in advance with the commandants or commanding officers of the Navy yards or Army posts or Naval or Army stations named, or with the Director of the Bureau of Standards, or with the radio inspectors at the custom houses in regard to examinations. In emergencies arrangements for the examination of ship operators can be made on short notice with the naval stations or radio inspectors in different ports. An effort should be made to arrange beforehand for any desired examination.

The operators' licences will be delivered to the successful applicants at the time of examination, or as soon thereafter as possible. The operator's licence is not valid until the oath has been accomplished.

The licence provides that the holder shall take the oath for the preservation of the secrecy of messages before a notary public or other officer authorised to administer oaths.

6. The requirements which applicants must meet to secure licences of the several grades and scope and limitations of employment authorised by the licences of the several grades are as follows:—

Commercial first grade.—The applicant must pass a satisfactory examination in—

(*a*) The adjustment, operation, and care of the apparatus, including correction of faults and change from one wave to another.

(*b*) Transmitting and receiving by ear at a speed of not less than 20 words a minute in Continental Morse Code (five letters to the word).

(*c*) Use and care of storage battery or other auxiliary power apparatus.

(*d*) Knowledge of the international regulations applying to radio communication in force.

(*e*) Knowledge of requirements of the Acts of Congress to regulate radio communication.

Commercial second grade.—The applicant must pass a satisfactory examination in all the subjects prescribed above for the first grade, with the exception that the minimum speed in transmitting and receiving shall be not less than 12 words in Continental Morse Code, and the examination in the subjects will not be as comprehensive as that given first-grade operators.

Commercial cargo grade.—The examination should be conducted so as to determine the following facts :—

(1) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the distress signal (SOS) when included in a list of other words or signals sent slowly (approximately five words a minute).

(2) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the radio call letters of the vessel on which he desires to operate, when sent slowly and repeated several times.

(3) That the applicant is sufficiently familiar with the type of receiving apparatus of the vessel on which he desires to operate to determine by a buzzer or similar test that the detector or receiving apparatus is properly adjusted to receive signals.

Amateur first grade.—The applicant must have a sufficient knowledge of the adjustment and operation of the apparatus *which he wishes to operate,* and of the regulations of the International Convention and Acts of Congress in so far as they relate to interference with other radio communications, and impose certain duties on all grades of operators. The applicant must be able to transmit and receive in Continental Morse at a speed sufficient to enable him to recognise distress calls or the official " Keep out " signals. A speed of at least five words per minute must be attained (five letters to the word).

7. Ship stations on vessels of the United States are classed under the Act of August 13th, 1912, as follows :—

Class A.—Ocean passenger steamers which are required to carry at least two operators and maintain a constant skilled watch. On vessels of this class carrying or licensed to carry less than 100 passengers one operator should hold the commercial first-grade licence and the other may hold a second-grade licence. Vessels of this class carrying or licensed to carry 100 or more passengers and under the London Convention vessels having constant service should have at least two operators, each holding commercial first-grade licences.

Class B.—Cargo steamers which have crews of 50 or more are required to carry two operators, one holding a second-grade commercial licence or higher; the second may be a member of the crew holding a cargo or amateur first-grade operator's licence, requiring a transmitting and receiving ability of at least five words per minute. Vessels of this

class maintain a constant receiving watch, but the transmitting service may be during limited hours as required by the vessel.

Class C.—Vessels of this class are those voluntarily equipped with radio apparatus and not subject to the Act quoted herein. The vessels have no fixed hours of service, but should be provided with at least one operator holding a commercial first or second-grade licence.

The following-named vessels come in this class :—

(1) Passenger steamers where the licensed capacity and number of crew combined number less than 50.

(2) Cargo steamers with crews less than 50.

(3) Tugs and towing steamers, etc., with crews less than 50.

(4) Motor vessels.

(5) Sailing vessels and barges.

(6) Yachts.

(7) Steamers of any kind plying between ports or places less than 200 miles apart.

8. An operator's licence may be granted to any person without regard to sex, nationality, or age, if the applicant can fulfil the requirements for the class of licence desired. Although no stated experience is required, the examinations for the different grades are such as requires a proper amount of experience to pass.

9. *Temporary permits.*—Section 3 of the Act of August 13th, 1912, provides :—

> In case of emergency, the Secretary of Commerce may authorise a collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the Radio Ship Act of June 24th, 1910.

The permits should be issued only to persons who the collector of customs has reason to believe are skilled in the use of the apparatus, but have not had the opportunity to present themselves for examination before Government officers authorised to conduct examinations and furnish licences. The temporary permit is valid for one trip only. The collector of customs will forward to the Department of Commerce (Bureau of Navigation) a report covering each temporary permit issued and the reasons for its issue.

3. *Apparatus.*

1. When the radio apparatus is certified as complying with the requirements of law by the competent authorities of a foreign Government, such certificate will be recognised by this Department, but the radio inspector or customs officer may, if he deem it necessary or desirable, satisfy himself that the apparatus is in good working order.

2. Whenever practicable, the radio inspector shall satisfy himself on his visit before the departure of a steamer subject to the Act that

the apparatus is efficient and in good working order within the meaning of the Act, and, if satisfied, he shall issue a certificate in the form in Appendix A (p. xxx.). The duplicate of these certificates should be filed with the collector of customs as a record of the radio-equipment of vessels sailing from his port.

3. When inspection of the apparatus by a radio inspector or customs officer is not practicable, the master of the steamer may furnish to the visiting customs officer a certificate in the form of Appendix B (p. xxx.). Such certificate shall be retained in the files of the collector of customs.

Whenever the radio inspector is absent from his home port, he will notify the collector of customs, who will arrange for the collection of certificates and survey of equipment.

4. The current necessary to transmit and receive messages shall at all times while the steamer is under way be available for the radio operator's use.

5. An auxiliary power supply, independent of the vessel's main electric power plant, must be provided which will enable messages to be sent for at least four hours over a distance of at least 100 miles, day or night.

Storage battery sets of sufficient voltage and capacity to operate the regular motor generator or source of primary alternating current are recommended. A complete separate auxiliary set comprising power source and wireless equipment may be provided if the required results are obtained.

Any auxiliary engine for wireless purposes must operate on a fuel which will fulfil the requirements of Rule XI., section 5, of the General Rules and Regulations of the Steamboat-Inspection Service, reading as follows:—

> None of the inflammable articles specified in section 4472, Revised Statutes, or oil that will not stand a fire test of 300° F. shall be used as stores on any pleasure steamer or steamer carrying passengers except that vessels not carrying passengers for hire may transport gasoline or any of the products of petroleum for use as a source of motive power for motor boats or launches of such vessels. (Sec. 4472, R.S.)

6. Efficient communication between the radio room and the bridge must be maintained. A speaking tube or telephone will comply with this requirement. A bell and messenger service will not be acceptable unless there are special conditions justifying this equipment. The speaking tube or telephone must terminate in the radio room and on the bridge, or in the chart room if readily accessible from the bridge. If the radio room is adjacent to or accessible from the bridge so that orders may be transferred direct, no means of communication will be

required. Any arrangement calling for the services of a third person to transmit the message will not be satisfactory. The radio inspectors will notify the ship authorities whether the means of communication provided is satisfactory at the time of inspection.

7. One extra pair of head telephones, extra cords, and extra detectors should always be kept on hand.

8. A storage battery voltmeter, hydrometer, a supply of electrolyte, and distilled water should be a part of the regular equipment, but are not prescribed in terms by statute. The absence of these and similar inexpensive emergency articles will be brought to the attention of the master and of the company installing the apparatus by the radio inspector, in writing, and if after a reasonable interval they have not been supplied, the inspector will communicate the fact to the Commissioner of Navigation.

4. *Constant Watch.*

On vessels of the United States it is the statutory duty of the master to see that one operator is on duty at all times. The radio service of the ship is under the supreme authority of the master.

5. *Miscellaneous.*

1. The amended Act applies to vessels licensed to carry as well as those actually carrying 50 or more persons, etc.

2. Distances under the Act are to be computed in nautical miles.

6. *Additions or Amendments.*

Additional or amendatory regulations will be issued from time to time as they may appear necessary.

APPENDIX A.—*Radio Service Form 752.*

Certificate of Radio Inspection.

PORT OF ——— ———,

——— ———, 191—.

This is to certify that I have to-day examined the apparatus for radio communication on the S.S. ———, of which ——— ——— is master, about to leave this port for ———, and I have found the same efficient and in good working order, as prescribed by the Act of June 24, 1910, as amended by the Act of July 23, 1912.

(Signed) ——— ———,

Radio Inspector.

(Or) ——— ———,

Customs Inspector.

APPENDIX B.—*Radio Service Form 753.*

Master's Certificate of Radio Apparatus.

NOTICE.

The radio equipment must be in charge of two or more persons skilled in the use of such apparatus, one or the other of whom shall be

on duty at all times while the vessel is being navigated. Such equipment, operators, the regulation of their watches, and the transmission and receipt of messages, except as may be regulated by law or international agreement, shall be under the control of the master, in the case of a vessel of the United States; and every wilful failure on the part of the master to enforce at sea the provisions of this paragraph as to equipment, operators, and watches shall subject him to a penalty of $100. (Act of July 23, 1912.)

PORT OF ——— ———,
——— ———, 191—.

This is to certify that I have to-day examined the apparatus for radio communication on the S.S. ———, of which I am master, about to leave this port for ———, and I have found the same efficient and in good working order, as prescribed by the Act of June 24, 1910, as amended by the Act of July 23, 1912.

(Signed) ——— ———, *Master.*

An Act to regulate radio-communication, approved August 13th, 1912:—

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a person, company, or corporation within the jurisdiction of the United States shall not use or operate any apparatus for radio communication as a means of commercial intercourse among the several States, or with foreign nations, or upon any vessel of the United States engaged in interstate or foreign commerce, or for the transmission of radiograms or signals the effect of which extends beyond the jurisdiction of the State or Territory in which the same are made, or where interference would be caused thereby with the receipt of messages or signals from beyond the jurisdiction of the said State or Territory, except under and in accordance with a licence, revocable for cause, in that behalf granted by the Secretary of Commerce and Labour upon application therefor; but nothing in this Act shall be construed to apply to the transmission and exchange of radiograms or signals between points situated in the same State: *Provided,* That the effect thereof shall not extend beyond the jurisdiction of the said State or interfere with the reception of radiograms or signals from beyond said jurisdiction; and a licence shall not be required for the transmission or exchange of radiograms or signals by or on behalf of the Government of the United States, but every Government station on land or sea shall have special call letters designated and published in the list of radio stations of the United States by the Department of Commerce and Labour. Any person, company, or corporation that shall use or operate any apparatus for radio communication in violation of this section, or knowingly aid or abet another person, company, or corporation in so doing, shall be deemed

guilty of a misdemeanour, and on conviction thereof shall be punished by a fine not exceeding $500, and the apparatus or device so unlawfully used and operated may be adjudged forfeited to the United States.

Sec. 2. That every such licence shall be in such form as the Secretary of Commerce and Labour shall determine, and shall contain the restrictions, pursuant to this Act, on and subject to which the licence is granted; that every such licence shall be issued only to citizens of the United States or Porto Rico or to a company incorporated under the laws of some State or Territory or of the United States or Porto Rico, and shall specify the ownership and location of the station in which said apparatus shall be used and other particulars for its identification and to enable its range to be estimated; shall state the purpose of the station, and, in case of a station in actual operation at the date of passage of this Act, shall contain the statement that satisfactory proof has been furnished that it was actually operating on the above-mentioned date; shall state the wave length or the wave lengths authorised for use by the station for the prevention of interference and the hours for which the station is licensed for work; and shall not be construed to authorise the use of any apparatus for radio communication in any other station that that specified. Every such licence shall be subject to the regulations contained herein, and such regulations as may be established from time to time by authority of this Act or subsequent Acts and treaties of the United States. Every such licence shall provide that the President of the United States in time of war or public peril or disaster may cause the closing of any station for radio communication and the removal therefrom of all radio apparatus, or may authorise the use or control of any such station or apparatus, by any department of the Government, upon just compensation to the owners.

Sec. 3. That every such apparatus shall at all times, while in use and operation as aforesaid be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce and Labour. Every person so licensed who in the operation of any radio apparatus shall fail to observe and obey regulations contained in or made pursuant to this Act or subsequent Acts or treaties of the United States or any one of them, or who fail to enforce obedience thereto by an unlicensed person while serving under his supervision, in addition to the punishment and penalties herein prescribed, may suffer the suspension of the said licence for a period to be fixed by the Secretary of Commerce and Labour not exceeding one year. It shall be unlawful to employ any unlicensed person or for any unlicensed person to serve in charge or in supervision of the use and operation of such apparatus, and any person violating this provision shall be guilty of a misdemeanour, and on conviction thereof shall be punished by a

fine of not more than $100 or imprisonment for not more than two months or both, in the discretion of the court, for each and every such offence: *Provided*, That in case of emergency the Secretary of Commerce and Labour may authorise a collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the radio ship Act of June 24, 1910.

Sec. 4. That for the purpose of preventing or minimising interference with communication between stations in which such apparatus is operated, to facilitate radio communication, and to further the prompt receipt of distress signals, said private and commercial stations shall be subject to the regulations of this section. These regulations shall be enforced by the Secretary of Commerce and Labour through the collectors of customs and other officers of the Government as other regulations herein provide for.

The Secretary of Commerce and Labour may, in his discretion, waive the provisions of any or all of these regulations when no interference of the character above mentioned can ensue.

The Secretary of Commerce and Labour may grant special temporary licences to stations actually engaged in conducting experiments for the development of the science of radio communication, or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave lengths, at such hours and under such conditions as will ensure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations.

In these regulations the naval and military stations shall be understood to be stations on land.

REGULATIONS.

1. *Normal Wave Length.*—Every station shall be required to designate a certain definite wave length as the normal sending and receiving wave length of the station. This wave length shall not exceed 600 metres or it shall exceed 1,600 metres. Every coastal station open to general public service shall at all times be ready to receive messages of such wave lengths as are required by the Berlin convention. Every ship station, except as hereinafter provided, and every coast station open to general public service shall be prepared to use two sending wave lengths, one of 300 metres and one of 600 metres, as required by the international convention in force: *Provided*, That the Secretary of Commerce and Labour may, in his discretion, change the limit of wave length reservation made by regulations 1 and 2 to accord with any international agreement to which the United States is a party.

2. *Other Wave Lengths.*—In addition to the normal sending wave length all stations, except as provided hereinafter in these

regulations, may use other sending wave lengths: *Provided,* That they do not exceed 600 metres or that they do exceed 1,600 metres: *Provided further,* That the character of the waves emitted conforms to the requirements of regulations 3 and 4 following.

3. *Use of a "Pure Wave."*—At all stations if the sending apparatus, to be referred to hereinafter as the "transmitter," is of such a character that the energy is radiated in two or more wave lengths, more or less sharply defined, as indicated by a sensitive wave meter, the energy in no one of the lesser waves shall exceed 10 per cent. of that in the greatest.

4. *Use of a "Sharp Wave."*—At all stations the logarithmic decrement per complete oscillation in the wave trains emitted by the transmitter shall not exceed two-tenths, except when sending distress signals or signals and messages relating thereto.

5. *Use of "Standard Distress Wave."*—Every station on shipboard shall be prepared to send distress calls on the normal wave length designated by the international convention in force, except on vessels of small tonnage unable to have plants insuring that wave length.

6. *Signal of Distress.*—The distress call used shall be the international signal of distress:— . . . — — — . . .

7. *Use of Broad "Interfering Wave" for Distress Signals.*—When sending distress signals, the transmitter of a station on shipboard may be tuned in such a manner as to create a maximum of interference with a maximum of radiation.

8. *Distance Required for Distress Signals.*—Every station on shipboard, wherever practicable, shall be prepared to send distress signals of the character specified in regulations 5 and 6, with sufficient power to enable them to be received by day over sea a distance of 100 nautical miles by a shipboard station equipped with apparatus for both sending and receiving equal in all essential particulars to that of the station first mentioned.

9. *"Right of Way" for Distress Signals.*—All stations are required to give absolute priority to signals and radiograms relating to ships in distress; to cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, to refrain from sending until all signals and radiograms relating thereto are complete.

10. *Reduced Power for Ships near a Government Station.*—No station on shipboard, when within fifteen nautical miles of a naval or military station, shall use a transformer input exceeding one kilowatt, nor, when within five nautical miles of such a station, a transformer input exceeding one-half kilowatt, except for sending signals of distress, or signals or radiograms relating thereto.

11. *Intercommunication.*—Each shore station to general public service between the coast and vessels at sea shall be bound to exchange radiograms with any similar shore station and with any ship station without distinction of the radio systems adopted by such stations, respectively, and each station on shipboard shall be bound to exchange radiograms with any other station on shipboard without distinction of the radio systems adopted by each station, respectively.

It shall be the duty of each such shore station, during the hours it is in operation, to listen in at intervals of not less than fifteen minutes and for a period of not less than two minutes, with the receiver tuned to receive messages of 300 metre wave lengths.

12. *Division of Time.*—At important seaports and at all other places where naval or military and private or commercial shore stations operate in such close proximity that interference with the work of naval and military stations cannot be avoided by the enforcement of the regulations contained in the foregoing regulations concerning wave lengths and character of signals emitted, such private or commercial shore stations as do interfere with the reception of signals by the naval and military stations concerned shall not use their transmitters during the first fifteen minutes of each hour, local standard time. The Secretary of Commerce and Labour may, on the recommendation of the department concerned, designate the station or stations which may be required to observe this division of time.

13. *Government Stations to Observe Division of Time.*—The naval or military stations for which the above-mentioned division of time may be established shall transmit signals or radiograms only during the first fifteen minutes of each hour, local standard time, except in case of signals or radiograms relating to vessels in distress, as hereinbefore provided.

14. *Use of Unnecessary Power.*—In all circumstances, except in case of signals or radiograms relating to vessels in distress, all stations shall use the minimum amount of energy necessary to carry out any communication desired.

15. *General Restrictions on Private Stations.*—No private or commercial station not engaged in the transaction of *bona fide* commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes shall use a transmitting wave length exceeding 200 metres, or a transformer input exceeding one kilowatt, except by special authority of the Secretary of Commerce and Labour contained in the licence of the station: *Provided,* That the owner or operator of a station of the character mentioned in this regulation shall not be liable for a violation of

the requirements of the third or fourth regulations to the penalties of $100 or $25, respectively, provided in this section unless the person maintaining or operating such station shall have been notified in writing that the said transmitter had been found, upon tests conducted by the Government, to be so adjusted as to violate the said third and fourth regulations, and opportunity has been given to said owner or operator to adjust said transmitter in conformity with said regulations.

16. *Special Restrictions in the Vicinities of Government Stations.*—No station of the character mentioned in regulation 15 situated within five nautical miles of a naval or military station shall use a transmitting wave length exceeding 200 metres or a transformer input exceeding one-half kilowatt.

17. *Ship Stations to Communicate with Nearest Shore Stations.*—In general, the shipboard stations shall transmit their radiograms to the nearest shore station. A sender on board a vessel shall, however, have the right to designate the shore station through which he desires to have his radiograms transmitted. If this cannot be done, the wishes of the sender are to be complied with only if the transmission can be effected without interfering with the service of other stations.

18. *Limitations for Future Installations in Vicinities of Government Stations.*—No station on shore not in actual operation at the date of the passage of this Act shall be licensed for the transaction of commercial business by radio communication within fifteen nautical miles of the followng naval or military stations—to wit: Arlington, Virginia, Key West, Florida, San Juan, Porta Rico, North Head and Tatoosh Island, Washington, San Diego, California; and those established or which may be established in Alaska and in the Canal Zone; and the head of the department having control of such Government stations shall, so far as is consistent with the transaction of governmental business, arrange for the transmission and receipt of commercial radiograms under the provisions of the Berlin convention of 1906 and future international conventions or treaties to which the United States may be a party, at each of the stations above referred to and shall fix the rates therefor, subject to control of such rates by Congress. At such stations and wherever and whenever shore stations open for general public business between the coast and vessels at sea under the provisions of the Berlin convention of 1906 and future international conventions and treaties to which the United States may be a party shall not be so established as to ensure a constant service day and night without interruption, and in all localities wherever and whenever such service shall not be maintained by a commercial shore station within 100 nautical miles of a naval radio

station, the Secretary of the Navy shall, so far as is consistent with the transaction of Government business, open naval radio stations to the general public business described above, and shall fix rates for such service, subject to control of such rates by Congress. The receipts for such radiograms shall be covered into the Treasury as miscellaneous receipts.

19. *Secrecy of Messages.*—No person or persons engaged in or having knowledge of the operation of any station or stations shall divulge or publish the contents of any messages transmitted or received by such station, except to the person or persons to whom the same may be directed, or their authorised agent, or to another station employed to forward such message to its destination, unless legally required so to do by the court of competent jurisdiction or other competent authority. Any person guilty of divulging or publishing any message, except as herein provided, shall, on conviction thereof, be punishable by a fine of not more than $250 or imprisonment for a period of not exceeding three months, or both fine and imprisonment, in the discretion of the court.

20. *Penalties.*—For violation of any of these regulations, subject to which a licence under sections 1 and 2 of this Act may be issued, the owner of the apparatus shall be liable to a penalty of $100, which may be reduced or remitted by the Secretary of Commerce and Labour, and for repeated violations of any such regulations the licence may be revoked.

For violation of any of these regulations, except as provided in regulation 19, subject to which a licence under section 3 of this Act may be issued, the operator shall be subject to a penalty of $25, which may be reduced or remitted by the Secretary of Commerce and Labour, and for repeated violations of any such regulations the licence shall be suspended or revoked.

Sec. 5. That every licence granted under the provisions of this Act for the operation or use of apparatus for radio communication shall prescribe that the operator thereof shall not wilfully or maliciously interfere with any other radio communication. Such interference shall be deemed a misdemeanour, and upon conviction thereof the owner or operator, or both, shall be punishable by a fine of not to exceed $500 or imprisonment for not to exceed one year, or both.

Sec. 6. That the expression "radio communication" as used in this Act means any system of electrical communication by telegraphy or telephony without the aid of any wire connecting the points from and at which the radiograms, signals, or other communications are sent or received.

Sec. 7. That a person, company, or corporation within the jurisdiction of the United States shall not knowingly utter or transmit, or cause to be uttered or transmitted, any false or fraudulent distress signal

or call or false or fraudulent signal, call, or other radiogram of any kind. The penalty for so uttering or transmitting a false or fraudulent distress signal or call shall be a fine of not more than $2,500 or imprisonment for not more than five years, or both, in the discretion of the court, for each and every such offence, and the penalty for so uttering or transmitting, or causing to be uttered or transmitted, any other false or fraudulent signal, call, or other radiogram shall be a fine of not more than $1,000 or imprisonment for not more than two years, or both, in the discretion of the court, for each and every such offence.

Sec. 8. That a person, company, or corporation shall not use or operate any apparatus for radio communication on a foreign ship in territorial waters of the United States otherwise than in accordance with the provisions of sections 4 and 7 of this Act and so much of section 5 as imposes a penalty for interference. Save as aforesaid, nothing in this Act shall apply to apparatus for radio communication on any foreign ship.

Sec. 9. That the trial of any offence under this Act shall be in the district in which it is committed, or if the offence is committed upon the high seas or out of the jurisdiction of any particular State or district, the trial shall be in the district where the offender may be found or into which he shall be first brought.

Sec. 10. That this Act shall not apply to the Philippine Islands.

Sec. 11. That this Act shall take effect and be in force on and after four months from its passage.

The United States Court, at Norfolk (Virginia), decided recently that vessels entering American ports for bunker coal only are not subject to the provisions of the U.S. Wireless Telegraph Act, making it compulsory for certain classes of vessels to carry wireless telegraph outfits.

THE following Regulations were issued on July 1st, 1913:—

Part 1. Licences—Apparatus.

A. APPARATUS EXEMPT FROM LICENCE.

The Act does not apply either afloat or ashore to—

(*a*) Apparatus for radio communication which merely receives radiograms and is not equipped for sending.

(*b*) Apparatus for the transmission of radiograms exclusively between points in the same State, if the effect of such transmission does not extend beyond the State (so as to interfere with the radio communication of other States), or if the effect of such transmission does not interfere with the reception of radiograms from beyond the State (so as to interfere with the interstate radio communication of that State).

(*c*) Apparatus for radio communication which has been issued to the Organised Militia by the War Department or to the Naval Militia by the Navy Department, and is used for official purposes only.

The owner or operator of any apparatus who may be in doubt whether his apparatus, under this paragraph, is exempt from licence may write the facts to the radio inspector for his district or to the Commissioner of Navigation, Deparment of Commerce, Washington, D. C., before applying for a licence.

B. Ship Stations.

The apparatus for transmission of radiograms, or signals on any vessel of the United States not permanently moored, requires a licence.

For the purposes of the administration of the Act, ship stations or vessels of the United States shall be of these classes :

Class A.—Ocean and Great Lakes passenger steamers subject to the Act of July 23rd, 1912, and required to carry two operators and maintain a constant skilled watch.

Class B.—Cargo steamers with crews of 50 or more, required to carry two operators, the second of whom may be a member of the crew certified as competent to receive distress calls, etc., maintaining a transmitting service during limited hours but a constant receiving watch.

Class C.—Vessels voluntarily equipped with radio apparatus and not subject to the Act of June 24th, 1910, as amended July 23rd, 1912, with no fixed hours of service, such as—

1. Passenger steamers, where the licensed capacity and number of crew combined are less than 50.
2. Cargo steamers with crews less than 50.
3. Tugs and towing steamers, etc., with crews less than 50.
4. Motor vessels.
5. Sailing vessels and barges.
6. Yachts.
7. Steamers of any kind plying between ports or places less than 200 miles apart.

C. Land Stations.

Apparatus for radio communication on land within the jurisdiction of the United States (excluding the Philippine Islands and excluding apparatus of the Government of the United States) must be licensed if—

(*a*) The apparatus is a means of commercial intercourse among the several States or with foreign nations; or

(*b*) The apparatus transmits radiograms or signals the effect of which at any time extends beyond the State; or

(*c*) The apparatus interferes with the receipt of messages in any State from beyond such State.

For the purposes of the administration of the Act, stations on land are divided into two general dsecriptions, according to geographical location:

I. COAST OR SHORE STATIONS are stations which transmit messages to vessels at sea or on the Great Lakes or whose operations can affect the transmission of messages between ship and ship, or ship and coast. Vessels of the United States permanently moored are classed as coast stations under the International Convention.

II. INLAND STATIONS are stations which cannot transmit messages to vessels at sea or on the Great Lakes and whose operations can not affect the transmission of messages between ship and ship, or ship and coast. This may be due to their geographical location or to their range, dependent on power and aerial, or conditions. In some instances actual inspection may be necessary to determine whether a station should be licensed as a coast station or an inland station.

An operator or owner in doubt as to the classification of his station should communicate the facts to the radio inspector of his district when applying for a licence.

As the means for enforcing the radio laws are limited, it is necessary to give ship and commercial stations precedence over amateur stations. The owner of an amateur station may operate his station in accordance with the laws if his application for a licence has been properly filed but has not been acted upon. An application for an operator's licence must also have been filed and every effort made to obtain the licence before the station may be operated.

"Provisional" station licences are issued to amateurs remote from the headquarters of the radio inspector of the district in which the station is located. These licences are issued as a matter of convenience and record. If, upon inspection, the station is found to comply with the law, the inspector will strike out the word "Provisional" and insert the date of inspection and his signature at the bottom of the licence.

If such a station is found not to comply with the law, the provisional licence may be cancelled until such time as the apparatus is readjusted to meet the requirements of the law: *Provided, however,* that consideration will be given to any reports of interference filed against such a station.

Classes of Land Stations.

Both coast stations (the words "coast stations," "shore stations," and "coastal stations" are used interchangeably) and inland stations are divided for the purposes of the administration of the Act into the following classes:—

1. Public-service stations, (*a*) general, (*b*) limited.
2. Limited commercial stations.
3. Experiment stations for the development of radio communication.
4. Technical and training school stations.
5. General amateur stations.
6. Special amateur stations.
7. Restricted amateur stations.

Description of Classes.

1. (*a*) *Public-service stations, general,* are those open to general business between coast and ships or between land stations, and include those operated by common carriers under the Act of February 4th, 1887, to regulate commerce, amended June 18th, 1910. They are required to maintain a constant receiving service when open. Every coastal station open to public service shall at all times be ready to receive messages of such wave lengths as are required by the International Convention in force. (Sec. 4, first regulation, Act of August 13th, 1912.)

Whenever such stations do not insure a constant service, transmitting and receiving day and night without interruption, the Secretary of the Navy is directed to open naval radio stations within 100 miles thereof to public business. (Sec. 4, 18th regulation, Act of August 13th, 1912.) The Secretary of War is authorised by the Act of May 26th, 1900 (31 Stat., 206), to open Alaskan military stations to public service.

1. (*b*) *Public-service stations, limited,* are reserved for a limited public service, determined by the object of the correspondence or other circumstances independent of the system employed. Stations of this class transmit and receive public messages to and from certain stations only, which are designated in the licence.

2. *Limited commercial stations* are not open to public service and are licensed for a specific commercial service or services defined in the licence. Stations of this class must not transmit to or accept public messages from other stations.

3. *Experiment stations.*—The Secretary of Commerce is authorised by section 4 of the Act to grant special temporary licences "to stations

actually engaged in conducting experiments for the development of the science of radio communication, or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave lengths, at such hours and under such conditions as will insure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations." Applicants for such licences should state any technical result they have already produced, their technical attainments, etc. The fact that an applicant desires to experiment with his equipment does not justify or require a licence of this class. Most experiments can be made within the limitations of general and restricted amateur station licences or by use of an artificial antenna to prevent radiation.

4. *Technical and training school stations* will be licensed in a separate class, according to the degree of technical training attained and imparted and to local conditions.

5. *General amateur stations* are restricted to a transmitting wave length not exceeding 200 metres and a transformer input not exceeding 1 kilowatt. (Sec. 4, 15th regulation, Act of August 13th, 1912.)

6. *Special amateur stations* may be licensed by the Secretary of Commerce to use a longer wave length and a higher power on special application to the Secretary of Commerce. Applications for this class from amateurs with less than two years' experience in actual radio communication will not be approved. The application must state the experience and purpose of the applicant, the local conditions of radio communication, especially of maritime radio communication in the vicinity of the station, and a special licence will be granted only if some substantial benefit to the art or to commerce apart from individual amusement seems probable. (Sec. 4, 15th regulation, Act of August 13th, 1912.)

7. *Restricted amateur stations,* within 5 nautical miles of a naval or military station, are restricted to a wave length not exceeding 200 metres and to a transformer input not exceeding one-half kilowatt. (Sec. 4, 16th regulation, Act of August 13th, 1912.)

Special stations for exceptional distances are land stations designed (coast) to carry on transoceanic radio communication as between the United States and European countries, or between the Pacific coast and Hawaii, or from the United States over similar long distances at sea to another land station, or (inland) to carry on radio communication overland over exceptional distances. These stations will all come under one of the classifications named above, and the licence will indicate the stations for which communication is authorised and indicate the range.

General public service, limited public service, limited commercial, special amateur, and special stations which come under the classification of coast stations are subject to the same requirements as to the provision for receiving and relaying distress calls.

Stations operated at different portions of the day for different purposes will require licences covering each purpose; that is, a station used during the day for limited commercial purposes and during the night for general public service will require two licences.

Part 2. Licences—Operators.

The third section of the Act prescribes that every radio apparatus required to be licensed shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce.

Licences approved and issued by the Secretary of Commerce to operators will be delivered to applicants after passing examinations given by the officers named under the head " Examination of operators for licences."

[NOTE.—*Apprentices.*—Under the supervision of a licensed operator an apprentice or unlicensed person may learn the art by the actual use of the apparatus, but the licensed operator who fails to enforce obedience to the regulations by the apprentice or unlicensed person serving under his supervision is liable to penalties as if he had himself violated the regulations.]

Operators' licences are divided into the following grades:—

I. Commercial:

1. First grade.
2. Second grade.
3. Cargo grade.
4. Extra grade.
5. Temporary permit.

II Amateur:

6. First grade.
7. Second grade.

III. Technical:

8. Experiment and instruction grade.

The requirements which applicants must meet to secure licences of the several grades and the scope and limitations of employment authorised by the licences of the several grades are as follows;—

I. COMMERCIAL.

First grade.—The applicant must pass a satisfactory examination in—

(*a*) The adjustment, operation, and care of the apparatus, including correction of faults and change from one wave length to another.

(*b*) Transmitting and receiving by ear at a speed of not less than 20 words a minute in Continental Morse (five letters to the word).

(*c*) Use and care of storage battery or other auxiliary power apparatus.

(*d*) Knowledge of the international regulations in force applying to radio communication.

(*e*) Knowledge of the requirements of the Acts of Congress to regulate radio communication—sections 3, 4, 5, 6, and 7 of the Act of August 13th, 1912. No stated experience is required, but the examination given is such that a person must be familiar with all parts and principles embodied in a ratio set and auxiliary power apparatus used, to obtain a licence.

(1) The commercial first-grade licence qualifies the operator for employment at any ship or land station of any class and is the highest certificate indicative of ability as radio operator issued at this time.

(2) Every ship station of class A must carry two or more operators, at least one of whom must have a valid commerical first-grade licence, or, in the case of a foreign ship, have an equivalent foreign licence.

[NOTE.—The requirements for this grade are the same as the international requirements imposed on operators of foreign ships by international regulation, except the knowledge of the use and care of storage battery or other auxiliary and of the Act of August 13th, 1912. Inspectors will allow a reasonable time to foreign operators on foreign ships to meet the additional requirements, supplying them as promptly as practicable with copies of the Act of August 13th, 1912.]

(3) Every ship station of class A on a steamer carrying 100 or more passengers, and under the London Convention vessels having constant service, must carry at least two operators having commercial first-grade licences.

(4) Every land station open to general public service must have at least one commercial first-grade operator.

(5) Every coast station of class 1 must have commercial first-grade operators.

Second grade.—The applicant must pass a satisfactory examination in all the subjects prescribed above for the first grade, with the exception that the minimum speed in transmitting and receiving shall not be less than 12 words a minute in Continental Morse, and the examination in the subjects will not be as comprehensive as that given first-grade operators.

(1) An operator licensed as commercial second-grade, on subsequent compliance with the speed test for the first-grade, and further examination on the subjects named, may have his licence raised to the first grade by the indorsement in red ink on the face of his licence "Examined on [date] at [place] and passed first grade by [examining officer's signature]," or a first-grade licence may be issued.

(2) Every ship station under class A (except steamers carrying 100 or more passengers) must carry a second operator, having the commercial second-grade licence, or higher.

(3) Every ship station under classes B and C must carry at least one operator licensed as commercial second grade, or higher.

(4) Every coast station of classes 2 and 6 must have at least one operator holding a valid commercial second-grade licence.

Cargo grade.—Section 2 of the Act of July 23rd, 1912, provides:

> On cargo steamers, in lieu of the second operator provided for in this Act, there may be substituted a member of the crew or other person who shall be duly certified and entered in the ship's log as competent to receive and understand distress calls or other usual calls indicating danger, and to aid in maintaining a constant wireless watch so far as required for the safety of life.

The examination will be conducted so as to determine the following facts:

(1) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the distress signal (SOS), when included in a list of other words or signals sent slowly. (Approximately five words a minute.)

(2) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the radio call letters of the vessel on which he desires to operate when sent slowly and repeated several times.

(3) That the applicant is sufficiently familiar with the type of the receiving apparatus of the vessel on which he desires to operate to determine by a buzzer or similar test that the detector or receiving apparatus is properly adjusted to receive signals.

Examining officers and radio inspectors are authorised to issue a

certificate, in the form of an amateur first-grade licence, after examination, to indicate the facts above enumerated in the case of a member of the crew or other person, and experience under this form will be credited by examining officers if the holder later applies for examination for a commercial licence. These licences will be marked "Cargo" in the upper right-hand corner under the serial number.

Extra grade.—The Department desires to establish, if practicable, a corps of specially trained and trustworthy radio operators who may be available for Government service. For this purpose a special licence will be issued to operators holding the commercial first-grade licence, whose certificates of skill in radio communication, issued under the Act of June 24th, 1910, and licences under this Act record 12 months' satisfactory ocean service as shown by masters' endorsement. A special examination in the radio regulations of the United States Navy will also be required. The commercial extra-grade licence will be issued during 1913, and will be the subject of a special circular.

Temporary permit.—Section 3 of the Act of August 13th, 1912, provides:

> In case of emergency the Secretary of Commerce may authorise a collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the radio ship Act of 1910.

The temporary permit is to be issued only in cases of emergency and will be valid for only one voyage. The collector will report in each case to the Commissioner of Navigation the circumstances which rendered necessary the issue of a temporary permit.

Radio operators holding licences of any grade or class and applying for examination for any other grade or class must submit to the examining officer an additional form, No. 756, in duplicate. If a new licence is issued, the licence held by the applicant must be surrendered.

II. Amateur.

General.—Amateurs, before applying for licences, should read and understand the essential parts of the International Radiotelegraphic Convention in force and sections 3, 4, 5, and 7 of the Act of August 13th, 1912. The Department recognises that radio communication offers a wholesome form of instructive recreation for amateurs. At the same time, its use for this purpose must observe strictly the rights of others to the uninterrupted use of apparatus for important public and commercial purposes. The Department will not knowingly issue a licence to an amateur who does not recognise and will not obey this principle.

First grade.—The applicant must have a sufficient knowledge of the adjustment and operation of the apparatus which he wishes to operate, and of the regulations of the International Convention and Acts of Congress in so far as they relate to interference with other radio communication and impose certain duties on all grades of operators. The applicant must be able to transmit and receive in Continental Morse, at a speed sufficient to enable him to recognise distress calls or the official "keep-out" signals. A speed of at least five words per minute (five letters to the word) must be attained. Applicants for licences of this grade residing at or near any place where examinations are held will communicate with examining officers and will be examined for licences of amateur grades. At places remote from examining officers, applicants will file applications with the radio inspector, who will endeavour to arrange for examinations on his inspection trips.

Second grade.—The requirements for the second grade will be the same as for the first grade. The second-grade licence will be issued only where an applicant cannot be examined or until he can be examined. An examining officer or radio inspector is authorised in his discretion to waive an actual examination of an applicant for an amateur licence, if the amateur for adequate reasons cannot present himself for examination, but in writing can satisfy the examining officer or radio inspector that he is qualified to hold a licence and will conform to its obligations.

III. Technical.

Experiment and instruction grade.—The operator's licence for this grade is a commercial licence, endorsed by the Secretary of Commerce, with a statement of the special purposes for which it is valid. It should be forwarded to the Commissioner of Navigation with a recommendation, if practicable, from a radio inspector or examining officer.

Experimenters and instructors of scientific attainments in the art of radio communication, whose knowledge of the radio laws satisfies the radio inspector or the examining officer, may obtain this grade licence, provided they are able to transmit and receive in the Continental Morse Code at a speed sufficient to enable them to recognise distress calls or the "keep-out" signals.

This licence has no reference to the instruction of radio operators as such, but is required by those operating apparatus licensed as experimental stations, but who are unable to obtain commercial-grade operators' licences.

Part 3. Applications for Licences.

Station licences for the use and operation of apparatus for radio

communication under the Act may be issued only to citizens of the United States or Porto Rico or to a company incorporated under the laws of some State or Territory or of the United States or Porto Rico.

Licences can be issued to clubs if they are incorporated or if a member will accept the responsibility for the operation of the apparatus, carrying with it the possibility of being penalised for infraction of the laws.

I. Ship Stations.

Applications for licences for ship stations should be addressed to the radio inspector for the district, including the port whence the vessel usually departs.

The application by the company operating the apparatus should state the name of the ship in respect of which the licence is required. The radio inspector will then issue the Department's blank form of application for licence to be filled in by the applicant and returned to the radio inspector with a statement when the ship will be in port and its radio apparatus may be thoroughly inspected.

II. Land Stations.

Coast stations.—The several classes of coast stations will be licensed, for reasons already assigned, in advance of inland stations.

Applications for licences for coast stations should be addressed to the Department's radio inspector for the district in which the station is located, who will forward the application Form 757.

All land stations, except general and restricted amateur stations, should state their location in latitude and longitude to seconds.

The application will state the class of the station for which a licence is desired, with particulars to show its proper classification, approximate transmitting range with a similar station, and precise location (State, county, city, or town, street and number, or, if outside of city or town limits, as exact a description of its locality as may be). A blank form for apparatus will be sent when Form 757 has been filed, and arrangements made for inspection if necessary. Requests for licences for coast stations will be taken up in the order of classes, as indicated above, and in the order of date received only so far as the relative importance of stations will permit. Amateur applicants who state that they have read the International Radiotelegraphic Convention in force and the Act of August 13, 1912, will receive attention before those who have not.

Inland stations.—The issue of licences to inland stations, as already defined, will be taken up after ship and coast stations. The procedure for application for licence will be the same as for coast stations.

III. Forms.

(*a*) The several forms of applications and licences for operators will be issued through examining officers (through the War and Navy Departments) and radio inspectors. The licences will be numbered serially.

(*b*) The forms and licences for stations and apparatus will be issued through radio inspectors. Licences for general and restricted amateur stations are issued by them direct to applicant. Station licences of all other classes are issued from the office of the Commissioner of Navigation, Department of Commerce.

IV. Commercial Operators.

Applications for operators' licences of the several commercial grades should be addressed to the nearest examining officer or radio inspector, who will arrange for examinations. Where the applicant is not within reasonable distance of an examining officer or radio inspector he may forward his application with a statement of the facts.

Commercial licences can only be obtained by examination. Where applicants are at remote points or can not proceed to examining offices efforts will be made to examine them through radio inspectors when they are in that vicinity, but special trips cannot be made for that purpose.

V. Amateur Operators.

(*a*) Amateurs in the seaboard States should write to the nearest examining officer in their vicinity for Form 756 (application for operator's licence) and to the radio inspector in their vicinity for Form 757 (application for licence for land station). If the application for operator's licence is also made to the radio inspector, both applications should be forwarded in the same envelope.

(*b*) Amateur operators at points remote from examining officers and radio inspectors will be issued second-grade amateur licences without examination, as explained previously. Examinations for first-grade licences will be given by the radio inspector when he is in that vicinity, but special trips can not be made for this purpose.

Part 4. General Observations.

1. An operator's licence may be granted to any person without regard to sex, nationality, or age if the applicant can fulfil the requirements for the class of licence desired.

2. No stated experience is required. The examinations for the different grades are such as require a proper amount of experience to pass.

3. The service regulations of the radiotelegraphic convention in force provides that "no station on shipboard shall be established or worked by private enterprise without authority from the Government to which the vessel is subject." Such authority shall be in the nature of a licence issued by said Government. Stations on foreign ships will be licensed by their Governments, respectively. Inspectors will report to the Commissioner of Navigation stations on foreign ships not so licensed.

4. The lists of call signals when issued by the Department of Commerce may be obtained from the radio inspectors or the Commissioner of Navigation and will show the location of naval and military stations.

5. Operator's licences should be framed and posted in the radio room, and licences for stations should be accessible at all times to inspectors.

6. Operator's licences should indicate on their face that the oath has been executed. This statement should be signed by a notary public.

7. Stations equipped to receive only do not require a licence.

8. No fees are charged for any operator or station licence.

9. Licensed stations require licensed operators.

10. Amateur stations within five miles of naval or military stations need not have been in actual operation on or before August 13th, 1912, to obtain a licence for a restricted amateur station.

11. Any person applying for a duplicate licence to replace an original which has been lost, mutilated, or destroyed, will be required to submit an affidavit to the Bureau of Navigation through the radio inspector or examining officer issuing the original, attesting the facts regarding the manner in which the original was lost, mutilated, or destroyed.

The Commissioner of Navigation will consider the facts in the case and advise the radio inspector or examining officer in regard to the issue of a duplicate licence. A duplicate licence will be issued under the same serial number as the original and marked "Duplicate" in red across the face.

12. These instructions may be amended and supplemented from time to time.

THE Minister of Marine of the United States of America has notified to the Berne Bureau that the following information is to be published:—

1. The Departments of the United States Government which are concerned with wireless telegraphy regret that they have not yet been able to make arrangements with the land telegraph of the United States owing to the fact that these are in the hands of commercial companies,

and have nothing to do with the Government. The idea was to arrange for the free transmission over the land telegraph, in accordance with Article 14, paragraph 2, of the Rules of Service of the London Convention. The information to be transmitted free of charge was all such as related to the date and the hour of the handing in of radiotelegrams on board ship. But the transmission of such information over land lines being subject to a tax, the Government of the United States cannot, at present, conform strictly to this rule of the Convention. The declaration of the American delegation contained in Article 2 of the Final Protocol made provision for such a possible outcome, although its exact nature was not actually set forth.

2. Multiple radiotelegrams, such as are mentioned in Article 38, paragraph 5, of the Rules of Service, will be accepted as multiple messages in all wireless transmission between ship and shore stations, but all the companies operating land telegraph lines in the United States will consider, and will charge for, a multiple wireless message as consisting of so many individual telegrams as the addresses it bears may indicate.

3. The United States is not a member of the International Telegraphic Union, and consequently is not bound to execute the rules laid down in Article 38, paragraph 8, of the London Convention Rules of Service concerning urgent radiotelegrams. The laws of the United States regulating all reciprocal arrangements between the States forbid the use of the privilege, and consequently all telegraph companies will not allow any priority in favour of telegrams for which any additional tax may have been paid.

URUGUAY

WIRELESS Telegraphy in Uruguay is controlled by the Ministry of War and Marine, and all work in connection with the administration of Wireless Telegraphy and the granting of licenses is directed by the Inspector General for Wireless Telegraphy, Don Bernardo Kayel.

In January, 1912, the Uruguayan Government issued a Decree compelling ships carrying passengers between the harbours of the Republic and those of foreign countries to be fitted with wireless telegraph installations. The carrying out of this Decree is entrusted to the General Inspection of National Services of Wireless Telegraphy :—

1. Commencing from May 1st of the present year (1912) all the ships carrying passengers between the harbours of the Republic and those of foreign countries shall be fitted with radiotelegraph installations.

2. The said installations shall be designed to receive and transmit telegrams up to a distance of not less than one hundred kilometres on the ships of river navigation, and four hundred kilometres on those of the oceanic navigation.

3. The installations shall be permanently kept in good conditions of working, and capable of intercommunicating with the stations of the Republic.

4. The stations shall be in charge of persons well acquainted with the use of radiotelegraph apparatus.

5. The service of the stations shall be entirely in accordance with the provisions of the International Radiotelegraph Convention.

6. The agents of the companies will inform, before expiration of the time fixed, the General Inspector of the National Services of Wireless Telegraphy of the characteristics, system, power, etc., of the radiotelegraph apparatus to be fitted on the ships of their companies.

7. The ships which after expiration of the time fixed by Article 1 have not complied with the provisions of this Decree, shall not be authorised to carry passengers in the harbours of the Republic.

450 ft. Steel Sectional Mast as seen from base.

[*On face page 30*

WIRELESS TELEGRAPH STATIONS OF THE WORLD

A. Land Stations
B. Ship Stations

THE tables of land and ship stations set out in the following pages should be consulted in conjunction with the map of wireless telegraph stations of the world inserted at the end of this book. The stations have been grouped together under the names of the countries in which they are established, and these countries have been arranged in alphabetical order; therefore no difficulty is likely to be experienced in locating any particular station.

The call letters of every station are given. Recently, however, the International Bureau has allotted a revised list of combinations and call letters to signatories of the Convention, and on p. 517 is published a list showing the call letters which have been reserved for the exclusive use of the respective countries.

An alphabetical list appears on pp. 518 to 559 which contains call letters for all stations (land and ship), together with the number of the page whereon particulars of each station are to be found.

Owing to the present war and the difficulty of obtaining information from some sources, this section cannot be complete at the date of publication, but every care has been taken to make the list as up-to-date and as accurate as possible.

Stations which are of a private or experimental character do not figure in the lists, except where the information available has been such as to justify their inclusion.

A. LAND STATIONS.

The following abbreviations are used in the Table of Land Stations below:—Column 2 (Geographical Position): E—East Longitude; W—West Longitude; N—North Latitude; S—South Latitude. Column 7 (Nature of Service): P G—General Public Correspondence; P R—Restricted Public Correspondence; O—Official Correspondence; P—Private Correspondence. Column 8 (Hours of Service): N—Continuous Service; X—No fixed working hours.

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
ARGENTINE (REPUBLIC)	Meridian of Greenwich.							Francs.	Francs.
Año Nuevo	Tierra del Fuego 64° 07′ 00″ W. 54° 39′ 00″ S.	LIG	432	Government ..	**600**, 1,800	O	Meridian of Córdoba [4] X	0.60	6.00
Buenos Aires	—	—	—	—	—	—	—	—	—
Cabo de las Vírgenes ..	Entrance to the Strait of Magellan 68° 23′ 00″ W. 52° 22′ 00″ S.	LIF	324	Government ..	600	P G	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
Campo Mayo	34° 32′ 00″ W. 58° 40′ 00″ S.	LIL	—	Government ..	—	—	—	—	—
Comodoro Rivadavia ..	Government of Chubut 68° 28′ 07″ W. 45° 51′ 07″ N.	LIP	275	Government ..	300,	P G	Meridian of Córdoba [4] 9 a.m. to 11 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
Dársena Norte	Buenos Aires (Town) 58° 22′ 05″ W. 34° 35′ 40″ S.	LIA	432	Government ..	600	P G	N	0.60	6.00
Dársena Sud	Buenos Aires (Town) 58° 22′ 05″ W. 34° 36′ 40″ S.	LIK	270	Government ..	600	O	X	0.60	6.00
Faro Mogotes	Province of Buenos Aires 57° 29′ 00″ W 38° 08′ 00″ S.	LIC	270	Government ..	600	P G	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
Faro Recalada	Rio de la Plata 56° 43′ 00″ W. 35° 11′ 00″ S.	LID	216	Government ..	600	P G	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
Formosa, Argentina ..	Government of Formosa 58° 12′ 00″ W. 26° 16′ 00″ S.	LIJ	270	Government ..	450, **600**	O	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
M. Guerra	34° 35′ 00″ W. 58° 22′ 00″ S.	LIN	—	Government ..	—	—	—	—	—

Mendoza	32° 53′ 00″ W 68° 50′ 00″ S.	LIM	—	Government ..						
Paz, Entre Ríos (La ..	Province of Entre Ríos 59° 38′ 00″ W. 30° 42′ 00″ S.	LII	270	Government ..	450, 600	O	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
Puerto Militar	Province of Buenos Aires near Bahia Blanca 62° 07′ 00″ W. 38° 53′ 00″ S.	LIE	270	Government ..	600	P G	9 a.m. to 4 p.m. 8 p.m. to 12 p.m.	0.60	6.00
Punta Piedras	—	—	—	—	—	—	—	—	—
Río Santiago, Buenos Aires	Near Buenos Aires 57° 53′ 05″ W. 34° 51′ 00″ S.	LIB	270	Government ..	600	O	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
Ushuaia	Tierra del Fuego 68° 20′ 00″ W. 54° 48′ 00″ S.	LIH	324	Government ..	600	P G	9 a.m. to 4 p.m., 8 p.m. to 12 p.m.	0.60	6.00
AUSTRALIAN COMMONWEALTH									
Adelaide Radio	South Australia 138° 31′ 00″ E. 34° 52′ 00″ S.	VIA	450	Government ..	300, 450, 600	P G[1]	Mean time of the meridian 142° 30′ east of Greenwich 6 a.m. to 1 a.m.	0.30 [247 241] 0.60 [245 249]	— —
Brisbane Radio	Queensland 153° 01′ 45″ E. 27° 25′ 30″ S.	VIB	450	Government ..	300, 450, 600	P G[1]	N	0.30 [247 248] 0.60 [248 249]	—
Broome Radio	Western Australia 122° 12′ 00″ E. 18° 00 00″ S.	VIO	450	Government ..	300, 450, 600	P G[250]	N	0.30 [247 248] 0.60 [248 249]	—
Cooktown Radio	Queensland 145° 15′ 30″ E. 15° 27′ 45″ S.	VIC	450	Government ..	300, 450, 600	P G[250]	Mean time of the meridian 150° east of Greenwich, 6 a.m. to 1 a.m.	0.30 [247 248] 0.60 [249 249]	—
Darwin Radio	Northern Territory 130° 48′ 30″ E. 12° 27′ 30″ S.	VID	450	Government ..	300, 450, 600	P G[250]	N	0.30 [247 248] 0.60 [248 249]	—
Esperance Radio ..	Western Australia 121° 55′ 00″ E. 33° 51′ 00″ S.	VIE	450	Government ..	300, 450, 600	P G[250]	Mean time of the meridian 120° east of Greenwich, 6 a.m. to 1 a.m.	0.30 [247 248] 0.60 [248 249]	—
Flinders Island Radio ..	Tasmania 147° 52′ 15″ E. 40° 01′ 00″ S.	VIL	450	Government ..	300, 450, 600	P G[250]	Mean time of the meridian 150° east of Greenwich, 9 a.m. to 6 p.m. Sundays, closed.	0.30 [247 248] 0.60 [248 249]	—
Geraldton Radio	Western Australia 114° 35′ 00″ E. 28° 46′ 00″ S.	VIN	450	Government ..	300, 450, 600	P G[250]	Mean time of the meridian 120° east of Greenwich, 9 a.m. to 11 p.m.	0.30 [247 248] 0.60 [248 249]	— —

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge
AUSTRALIAN COMMONWEALTH—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Hobart Radio	Tasmania (Queen's Domain) 147° 19′ 30″ E. 42° 51′ 45″ S.	VIH	300	Government ..	300, 450, **600**	P G [1]	Meantime of the meridian 150° east of Greenwich, 9 a.m. to 11 p.m.	0.30 [247 248] 0.60 [248 249]	—
Macquarie Island Radio..	158° 57′ 00″ E. 54° 31′ 00″ S.	VIQ	300	—	300, 450, **600**	P G	Mean time of the meridian 150° east of Greenwich, 6 p.m. to 12 p.m.	0.30 [247 248] 0.60 [248 249]	—
Melbourne Radio.. ..	Victoria 144° 58′ 30″ E. 37° 50′ 00″ S.	VIM	450	Government ..	300, 450, **600**	P G [1 2]	N	0.30 [247 248] 0.60 [248 249]	—
Mount Gambier Radio ..	South Australia 140° 49′ 00″ E. 37° 50′ 00″ S.	VIY	400	Government ..	300, 450, **600**	P G [250]	Mean time of the meridian 142° 30′ east of Greenwich, 6 a.m. to 8 p.m.	0.30 [247 248] 0.60 [248 249]	—
Perth Radio	Western Australia 115° 52′ 00″ E. 32° 01′ 00″ S.	VIP	400 [234] 1,250 [246]	Government ..	300, 450, **600**, 2,500	P G [250]	N	0.30 [247 248] 0.60 [248 249]	—
Port Moresby Radio ..	New Guinea 147° 09′ 30″ E. 9° 28′ 30″ S.	VIG	500	Government ..	300, 450, **600**	P G [250]	N	0.30 [247 248] 0.60 [248 249]	—
Rockhampton Radio ..	Queensland 150° 33′ 00″ E. 23° 23′ 45″ S.	VIR	450	Government ..	300, 450, **600**	P G [250]	Mean time of the meridian 150° east of Greenwich, 6 a.m. to 8 p.m.	0.30 [247 248] 0.60 [248 249]	—
Roebourne Radio ..	Western Australia 117° 12′ 15″ E. 20° 44′ 15″ S.	VIZ	450	Government ..	300, 450, **600**	P G [250]	Mean time of the meridian 120° east of Greenwich, 6 a.m. to 8 p.m.	0.30 [247 248] 0.60 [248 249]	—
Sydney Radio	New South Wales 151° 00′ 00″ E. 33° 40′ 00″ S.	VIS	400 [234] 1,250 [246]	Government ..	300, 450, **600**, 2,500	P G [1]	Mean time of the meridian 150° east of Greenwich, 7 a.m. to 2 a.m.	0.30 [247 248] 0.60 [248 249]	—
Thursday Island Radio ..	Queensland, Torres Strait 142° 12′ 45″ E. 10° 35′ 15″ S.	VII	500	Government ..	300, 450, **600**	P G [250]	N	0.30 [247 248] 0.60 [248 249]	—

Townsville Radio ..	Queensland 146° 50′ 00″ E. 19° 15′ 30″ S.	VIT	450	Government ..	300, 450, **600**	P G [250]	N	0.30 [247 248] 0.60 [246 249]	—
Wyndham Radio.. ..	Western Australia 128° 18′ 00″ E. 15° 35′ 00″ S.	VIW	450	Government ..	300, 450, **600**	P G [250]	Mean time of the meridian 120° east of Greenwich, 6 a.m. to 8 p.m.	0.30 [247 248] 0.60 [246 249]	—
AUSTRIA-HUNGARY									
Castelnuovo	Adriatic coast Mouths of Cattaro 18° 32′ 04″ E. 42° 27′ 00″ N.	OHC	By day, 250; by night, 500	Government ..	**600**, 1,800 [2]	P G [16]	N	0.20	2.00
Pola	13° 50′ 08″ E. 44° 51′ 08″ N.	OHP	By day, 250; by night, 500	Government ..	600	O	N	—	—
Sebenico	Adriatic coast 15° 53′ 03″ E. 43° 44′ 02″ N.	OHB	By day, 250; by night, 500	Government ..	**600**, 1,800 [3]	P G [16]	N	0.20	2.00
Triest	13° 45′ 30″ E. 45° 38′ 54″ N.	OHT	By day, 150; by night, 300	Government (Imperial Inspectorate of the Radio-Telegraph Service, Triest)	300, **600**	P G [16]	N	0.20	2.00
BELGIAN CONGO									
Banana	Lower Congo 12° 27′ 06″ E. 6° 00′ 21″ S.	ONA	400–1,000	Congo State ..	**300**, 600	P G	Greenwich Time, 7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m.[5] Holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.[5]	0.30	—
Basankusu	District of Lulonga 19° 46′ 00″ E. 1° 14′ 05″ N.	OQU	300	Congo State ..	**900**, 1,200	—[6]	7 a.m. to 11.30 a.m., 4 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m. 4 p.m. to 5 p.m.	—	—
Basoko	Aruwimi 23° 36′ 00″ E. 1° 14′ 00″ N.	OQO	300	Congo State ..	**900**, 1,200	—[6]	7 a.m. to 11.30 a.m. 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Boma	Lower Congo 13° 06′ 00″ E. 5° 51′ 00″ S.	OQB	300	Congo State ..	**900**, 1,200	—[6 7]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
BELGIAN CONGO—*contd*	Meridian of Greenwich.						Greenwich time	Francs.	Francs.
Coquilhatville	Equateur 18° 18′ 00″ E. 0° 04′ 00″ N.	OQC	300	Congo State ..	**900**, 1,200	—[a]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Elisabethville	Upper Luapula 27° 31′ 00″ E. 11° 38′ 00″ S.	OQH	300	Congo State ..	**900**, 1,200	—[a]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Kikondja	Tanganika, Moero 26° 25′ 00″ E. 8° 15′ 00″ S.	OQK	300	Congo State ..	**900**, 1,200	—[a]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Kindu	Maniema 25° 56′ 00″ E. 2° 56′ 00″ S.	OQD	300	Congo State ..	**900**, 1,200	—[a]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Kinshasa	Middle Congo 15° 21′ 57″ E. 4° 18′ 22″ S.	OQL	300	Congo State ..	3,800	—[a]	7 a.m. to 11.30 a.m., 4 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Kongolo	Tanganika, Moero 26° 59′ 00″ E. 5° 23′ 00″ S.	OQG	300	Congo State ..	**900**, 1,200	—[a]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
Stanleyville	Stanleyville 25° 14′ 00″ E. 0° 30′ 00″ N.	OQS	300	Congo State ..	**900**, 1,200	—[a]	7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m.	—	—

Umangi	Bangala 21° 26′ 52″ E 2° 06′ 43″ N.	OQI	300	Congo State ..	900, 1,200	— [6]	p.m. to 5 p.m. 7 a.m. to 11.30 a.m., 2 p.m. to 5 p.m. Sundays and bank holidays: 7 a.m. to 10.30 a.m., 4 p.m. to 5 p.m.	—	—
BELGIUM									
Nieuport	North Sea coast 2° 43′ 15″ E. 51° 09′ 10″ N.	OST	By day, 220; by night, 540	Government ..	300, 600	P G [16]	N	0.20 [8]	2.00 [8]
BOLIVIA									
Cobija	—	—	—	—	—	—	—	—	—
Jacuiba	—	—	—	—	—	—	—	—	—
La Paz	—	—	—	—	—	—	—	—	—
Riberalta	—	—	—	—	—	—	—	—	—
BRAZIL									
Amaralina	Bahia 38° 28′ 00″ W. 13° 01′ 00″ S.	SPA	400	Government ..	600, 1,000, 1,600	P G [244]	N	0.60 [9]	6.00 [9]
Armação	—	SNW	—	—	—	—	—	—	—
Babylonia	Rio de Janeiro 43° 10′ 10″ W. 22° 55′ 40″ S.	SPY	200	Government ..	600	P G [244]	Third time-belt west of the Greenwich belt: 6 a.m. to 12 p.m.	0.60 [10]	6.00 [10]
Belém, Pará	48° 30′ 06″ W. 1° 26′ 59″ S.	SPB	750	Government ..	600, 1,800	P G [244] ..	—	—	—
Cap S. Thomé	40° 58′ 35″ W. 22° 02′ 00″ S.	SPT	750	Government ..	600	P G [244]	N	0.60 [11]	6.00 [11]
Cruzeiro do Sul [193] ..	Amazonas 72° 36′ 15″ W. 7° 38′ 28″ S.	SQC	400	Government ..	—	P G [244]	Fourth time-belt west of the Greenwich belt: 6 a.m. to 12 p.m.	—	—
Fernando de Noronha ..	32° 25′ 12″ W. 3° 50′ 30″ S.	SPN	1,000	Government ..	600, 1,800	P G [244]	N	0.60 [12]	6.00 [12]
Guaratiba	South-west of Rio de Janeiro 43° 31′ 00″ W. 23° 04′ 00″ S.	SNX	27	Government ..	300	O	—	—	—
Ilha das Cobras	Rio de Janeiro Bay 43° 09′ 00″ W. 22° 52′ 00″ S.	SNI	27	Government ..	300	O	—	—	—
Ilha do Boqueirão ..	—	SNO	27	Government ..	300	—	—	—	—
Ilha do Governador ..	—	SOH	—	—	—	—	—	—	—
Ilha dos Abrolhos ..	—	SNN	—	—	—	—	—	—	—
Ilha Santa Martha ..	—	SOI	—	—	—	—	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
BRAZIL—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Itapura	—	—	—	Government ..	—	—	—	—	—
Junceao	Rio Grande do Sul 52° 07′ 00″ W. 32° 04′ 00″ S.	SPJ	750	Government ..	600	P G [211]	N	0.60 [14]	6.00 [14]
Ladario	—	—	—	Government ..	—	—	—	—	—
Manáos [192]	Matto Grosso 60° 01′ 45″ W. 13° 08′ 05″ S.	SQM	750	Madeira-Mamoré Railway Co.	—	P G [211]	N	—	—
Mocanguê	Rio de Janeiro Bay 43° 09′ 00″ W. 22° 52′ 00″ S.	SOQ	50	Government ..	300	O	—	—	—
Monte Serrat	Near Santos 46° 19′ 34″ W. 23° 56′ 27″ S.	SPS	200	Government ..	600	P G [211]	Third time-belt west of the Greenwich belt: 6 a.m. to 12 p.m.	0.60 [17]	6.00 [17]
Olinda, Pernambuco ..	Near Pernambuco 34° 51′ 00″ W. 8° 00′ 35″ S.	SPO	590	Government ..	600	P G [211]	Third time-belt west of the Greenwich belt: 6 a.m. to 12 p.m. [18]	0.60 [19]	6.00 [19]
Ponta Negra	East of Rio de Janeiro 42° 39′ 00″ W. 22° 55′ 00″ S.	PNA	27	Government ..	300	O	—	—	—
Porto Murtinho	—	—	—	Government ..	—	—	—	—	—
Porto Velho [192]	63° 35′ 00″ W. 8° 45′ 00″ S.	SQV	750	Madeira-Mamoré Railway Co.	—	P G [211]	N	—	—
Raza	Entrance to the Bay of Rio de Janeiro. 43° 08′ 00″ W. 23° 04′ 00″ S.	SNZ	110	Government ..	300	O	—	—	—
Rio Branco [192]	—	SQR	210	—	—	P G [211]	6 a.m. to 12 p.m.	—	—
Rio de Janeiro	—	—	—	Government ..	—	—	—	—	—
Santarém, Pará [192] ..	54° 42′ 58″ W. 2° 24′ 48″ S.	SQS	400	—	—	P G [211]	Third time-belt west of the Greenwich belt: 6 a.m. to 12 p.m.	—	—
Senna Madureira [192] ..	District of Acre 68° 39′ 35″ W. 9° 03′ 57″ S.	SQN	400	—	—	P G [211]	N	—	—

Tarauaca [192]	Amazonas 70° 43′ 30″ W. 8° 20′ 55″ S.	SQT	210	—	—	P G [211]	Fourth time-belt west of the Greenwich belt: 6 a.m. to 12 p.m.	—	—
Villegaignon	Rio de Janeiro Bay 43° 09′ 00″ W. 22° 52′ 00″ S.	SNV	27	Government ..	300	O	—	—	—
Xapury [192]	—	SQX	210	—	—	P G [246]	6 a.m. to 12 p.m.	—	—
BRITISH GUIANA									
Demerara	58° 11′ 00″ W. 6° 49′ 24″ N.	VPA	430	W. I. & Panama Tel. Co.	600	P G [29]	Local time: 8 a.m. to 12 a.m., 2 p.m. to 5 p.m.	0.60	—
BRITISH INDIA									
Allahabad	81° 55′ 00″ E. 25° 26′ 00″ N.	—	—	Government ..	—	—	—	—	—
Bombay Radio	72° 54′ 00″ E. 18° 55′ 00″ N.	VWB	300	Government ..	300 **600**	P G [23 24] ..	N	0.35	—
Calcutta Radio	88° 25′ 00″ E. 22° 35′ 00″ N.	VWC	300	Government ..	300 **600**	P G [23 25] ..	N	0.35	—
Delhi	77° 00′ 00″ E. 28° 44′ 00″ N.	—	—	Government ..	—	—	—	—	—
Diamond Island	Mouths of the Irawadi 94° 15′ 00″ E. 15° 51′ 00″ N.	VTD	300	Government ..	300, **600**	P G [23 25] ..	N	0.35	—
Jask	57° 45′ 40″ E. 25° 38′ 12″ N.	VTJ	500	Government ..	300, **600**	P G	Local time [26]: 6 a.m. to 12 p.m.	0.40	—
Karachi Radio	Mouths of the Indus 67° 00′ 00″ E. 24° 50′ 00″ N.	VWK	300	Government ..	300, **600**	P G [23 24] ..	N	0.35	—
Lahore	—	—	—	Government ..	—	—	—	—	—
Madras Radio	80° 17′ 16″ E. 13° 05′ 00″ N.	VWM	300	Government .	300, **600**	P G [25]	N	0.35	—
Mergui	Lower Burma 98° 36′ 00″ E. 12° 28′ 00″ N.	VTM	300	Government ..	670	— [21]	N	—	—
Nagpur	—	—	—	Government ..	—	—	—	—	—
Peshawar	—	—	—	Government ..	—	—	—	—	—
Port Blair	South Andaman Island 92° 45′ 00″ E. 11° 41′ 00″ N.	VTP	300	Government ..	400, **800**	— [21]	Meridian of 97° 30′ E [22]: 7 a.m. to 4 p.m. Sundays: 8 a.m. to 9 a.m., 5 p.m. to 6 p.m.	—	—
Quetta	—	—	—	Government ..	—	—	—	—	—
Rangoon Radio	Lower Burma 96° 07′ 00″ E. 16° 47′ 00″ N.	VTR	300	Government ..	300, **600**	P G [217] ..	N	0.35	—
Sandheads	At the south of the Ganges Delta 88° 09′ 00″ E. 21° 00 ′00″ N.	VWS	200	Government ..	300, **600**	P G [23]	Meridian of 82° 30′ E [27]: 6.36 a.m. to 6.36 p.m.	0.35	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
BRITISH INDIA—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Secunderabad	—	—	—	Government ..	—	—	—	—	—
Simla	77° 11′ 00″ E. 31° 06′ 00″ N.	—	—	Government ..	—	—	—	—	—
Table Island	At the north of the Andaman Islands 93° 21′ 15″ E. 14° 11′ 00″ N.	VTT	300	Government ..	300, **600**	P G [23 25] ..	Meridian of 97° 30′ E [22]. 7 a.m. to 4 p.m. Sundays: 8 a.m. to 9 a.m., 5 p.m. to 6 p.m. N	0.35	—
Victoria Point	Extreme south of Lower Burma 98° 32′ 30″ E. 9° 59′ 00″ N.	VTV	300	Government ..	300, **600**, 700	P G [23 25] ..		0.35	—
BRITISH SOMALILAND							Time of the Meridian of Aden, 3 hours in advance of Greenwich time		
Aden Radio	Arabia 45° 03′ 00″ E. 12° 46′ 00″ N.	VPI	250	Colonial Office ..	600	P G [23]	N	0.60	—
Berbera Radio	45° 01′ 30″ E. 10° 26′ 00″ N.	VPJ	250	Colonial Office ..	600	P G [29]	6 a.m. to 6 p.m. 8 p.m. to 8.30 p.m.	0.60 [30]	— [30]
Bulhar	—	—	—	Colonial Office ..	—	—	—	—	—
BRITISH WEST INDIES									
Bermuda	64° 45′ 00″ W. 32° 20′ 00″ N.	BZB	—	Government ..	—	O	—	—	—
Jamaica (Bowden) ..	76° 19′ 00″ W. 17° 53′ 00″ N	VPH	200	Government ..	600	P G	Local time [31]: 7 a.m. to 7 p.m.	0.60	6.00
Nassau, Bahamas ..	Bahama Islands 77° 22′ 00″ W. 25° 04′ 00″ N.	VPN	400	Government ..	**600**, 1,800	P G [32]	Time of the Meridian 75° west of Greenwich: 7 a.m. to 3 p.m.	0.30 [38]	3.00 [38]
Tobago	60° 40′ 00″ W. 11° 12′ 00″ N.	VPM	250	Government ..	600	P G [30]	Local time: 8 a.m. to 5 p.m. Sundays and public holidays: 8 a.m. to 12 a.m.	0.60 [33]	— [33]

Trinidad	61° 30′ 00″ W. 10° 40′ 00″ N.	VTL	400	Government ..	300, 600	P G	to 10 p.m. Eastern European time.		
BULGARIA									
Varna	27° 55′ 00″ E. 43° 12′ 00″ N.	LZF	270	Government ..	300, 600	P G	9 a.m. to 12 a.m., 2 p.m. to 6 p.m.	0.30	3.00
CANADA AND NEWFOUNDLAND									
Alert Bay	British Columbia, Queen Charlotte Sound, Cormorant Island 126° 55′ 36″ W. 50° 35′ 20″ N.	VAF	350	Government, Naval	300, 600, 1,600	P G	N	0.60 [39 41]	6.00 [39 41]
American Tickle	53° 28′ 00″ W. 55° 41′ 00″ N.	VOC	100	Marconi Co. ..	600	— [42]	8 a.m. to 8 p.m. [45 123]	0.60	6.00
Battle Harbour ..	55° 36′ 00″ W. 52° 17′ 00″ N.	VOA	150	Marconi Co. ..	300, 600	— [43]	8 a.m. to 8 p.m. [45 123]	0.60	6.00
Belle Isle	To the north of Newfoundland 55° 21′ 49″ W. 51° 52′ 53″ N.	VCM	250	Marconi Co. ..	300, 600	P G [46]	N	0.30 [35]	3.00 [35]
Camperdown	Nova Scotia, Halifax 63° 37′ 07″ W. 44° 31′ 11″ N.	VCS	250	Marconi Co. ..	300, 600	P G [37 16 218] ..	N [37]	0.30 [36 37]	3.00 [36 37]
Cape Bear	Prince Edward Island 62° 27′ 15″ W. 46° 00′ 45″ N.	VCP	150	Marconi Co. ..	300, 600	P G [46 243] ..	December-March N April-November, 8 a.m. to 8 p.m. [45]	0.15 [38]	1.50 [35]
Cape Harrison	58° 03′ 00″ W. 54° 52′ 00″ N.	VOH	150	Marconi Co. ..	600	— [43]	8 a.m. to 8 p.m. [45 123]	0.60	6.00
Cape Lazo	British Columbia, east coast of Vancouver Island 124° 53′ 43″ W. 49° 42′ 30″ N.	VAC	350	Government, Naval	300, 600	P G [46]	N	0.60 [39 40 41]	6.00 [39 40 41]
Cape Race	Newfoundland 53° 04′ 17″ W. 46° 39′ 24″ N.	VCE	500	Marconi Co. ..	300, 600, 1,600	P G [46]	N	0.85 [35]	8.50 [35]
Cape Ray	Newfoundland 59° 18′ 00″ W. 47° 37′ 00″ N.	VCR	350	Marconi Co. ..	300, 600, 1,600	P G [46 16] ..	N	0.30 [35]	3.00 [35]
Cape Sable	Nova Scotia 65° 37′ 15″ W. 43° 23′ 19″ N.	VCU	250	Marconi Co. ..	300, 600	P G [37 46 243] ..	N	0.85 [37]	8.50 [37]
Clarke City	Province of Quebec, North shore of River St. Lawrence 66° 37′ 17″ W. 50° 11′ 00″ N.	VCK	250	Marconi Co. ..	300, 600	P G [46 16] ..	N [42]	0.30 [35]	3.00 [35]

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
CANADA AND NEWFOUNDLAND—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Dead Tree Point ..	British Columbia, Queen Charlotte Islands, Graham Island 131° 55′ 55″ W. 53° 21′ 30″ N.	VAH	200	Government, Naval	300, **600**	P G [36]	8 a.m. to 6 p.m. [44]	c.60 [39 41]	6.00 [39 41]
Digby Island	British Columbia, Prince Rupert 130° 22′ 23″ W. 54° 17′ 02″ N.	VAJ	250	Government, Naval.	300, **600**	P G [46]	N	0.60 [39 4]	6.00 [39 41]
Domino	55° 44′ 00″ W. 52° 28′ 00″ N.	VOD	150	Marconi Co. ..	600	— [43]	8 a.m. to 8 p.m. [45 125]	0.60	6.00
Estevan, British Columbia	Vancouver Island 126° 32′ 22″ W. 49° 22′ 05″ N.	VAE	500	Government, Naval	300, **600**	P G [16]	N	0.60 [39 41]	6.00 [39 41]
Fame Point	Gulf of St. Lawrence 64° 36′ 20″ W. 49° 06′ 48″ N.	VCG	250	Marconi Co. ..	300, **600**	P G [46]	N [42]	0.30 [35]	3.00 [35]
Father Point	River St. Lawrence 68° 27′ 40″ W. 48° 31′ 30″ N.	VCF	350	Marconi Co. ..	**300**, 600	P G [46 14] ..	N [42]	0.15 [35]	1.50 [35]
Fogo	53° 37′ 00″ W. 49° 40′ 00″ N.	VOJ	250	Marconi Co. ..	300, 600	— [43]	8 a.m. to 8 p.m. [45 125]	0.85	8.50
Glace Bay	Nova Scotia 59° 55′ 00″ W. 46° 08′ 00″ N.	—	3,125	Marconi Co. ..	9,000	Transatlantic service	—	—	—
Gonzales Hill	British Columbia, Victoria 123° 19′ 23″ W. 48° 24′ 50″ N.	VAK	250	Government, Naval.	300, **600**	P G [46]	N	0.60 [39 40 41]	6.00 [39 40 41]
Grady, Labrador ..	56° 23′ 00″ W. 53° 48′ 00″ N.	VOE	150	Marconi Co. ..	600	— [43]	8 a.m. to 8 p.m. [45 125]	0.60	6.00
Grindstone Island ..	Gulf of St. Lawrence, Magdalen Islands 61° 54′ 20″ W. 47° 23′ 00″ N.	VCN	200	—	300, **600**	P G [46 245] ..	8 a.m. to 6 p.m. [45]	0.30 [35]	3.00 [35]

Gross Isle, Quebec ..	Province of Quebec, River St. Lawrence 70° 40′ 05″ W. 47° 02′ 00″ N.	VCD	100	Marconi Co. ..	300, 600	P G [44 16] ..	N	0.15 [35]	1.50 [35]
Halifax Dockyard ..	Nova Scotia 63° 35′ 10″ W. 44° 39′ 30″ N.	VAA	—	Government ..	—	O	—	—	—
Harrington	Province of Quebec, Gulf of St. Lawrence 59° 27′ 45″ W. 50° 29′ 39″ N.	VCJ	150	Marconi Co. ..	300, 600	P G [46 16] ..	N [42]	0.30 [35]	3.00 [35]
Heath Point	Gulf of St. Lawrence Anticosti Island 61° 42′ 16″ W. 49° 05′ 20″ N.	VCI	250	Marconi Co. ..	300, 600	P G [46]	N [42]	0.30 [35]	3.00 [35]
Holton, Labrador ..	57° 15′ 00″ W 54° 35′ 00″ N.	VOG	150	Marconi Co. ..	600	— [43]	8 a.m. to 8 p.m. [45 125]	0.60	6.00
Ikeda Head	British Columbia, Queen Charlotte Islands, Moresby Island 131° 07′ 34″ W. 52° 17′ 11″ N.	VAI	250	Government, Naval	300, 600	P G [46]	8 a.m. to 12 p.m. [44]	0.60 [39 41]	6.00 [39 41]
Kingston, Ontario ..	Barriefield Common 76° 27′ 30″ W. 44° 14′ 04″ N.	VBH	350	Government, Naval	300, 600, 1,600	P G [46]	N	0.15 [35]	1.50 [35]
Le Pas, Manitoba ..	101° 21′ 30″ W. 53° 52′ 45″ N.	VBM	600	Government ..	900, 1,800 2,400	O [153] .. .	X	—	—
Makkovik	59° 08′ 00″ W. 55° 13′ 00″ N.	VOI	150	Marconi Co. ..	600	— [43]	8 a.m. to 8 p.m. [45 125]	0.60	6.00
Midland, Ontario	Georgian Bay 79° 51′ 35″ W. 44° 44′ 20″ N.	VBC	350	Marconi Co. ..	300, 600, 1,600	P G	N	0.15 [35]	1.50 [35]
Montreal	Province of Quebec 73° 31′ 46″ W. 45° 32′ 43″ N.	VCA	350	Marconi Co. ..	300, 600	P G [46]	N [42]	0.15 [35]	1.50 [35]
North Sydney, Nova Scotia	Cape Breton Island 60° 14′ 33″ W. 46° 13′ 27″ N.	VCO	100	Marconi Co. ..	300, 600	P G [46 16] ..	N	0.30 [35]	3.00 [35]
Pachena	Vancouver Island 125° 06′ 20″ W. 48° 43′ 40″ N.	VAD	500	Government, Naval	300, 600	P G [46]	N	0.60 [39 41]	6.00 [39 41]
Partridge Island	New Brunswick, St. John 66° 03′ 05″ W. 45° 14′ 03″ N.	VCV	250	Marconi Co. ..	300, 600	P G [46 245] ..	N	0.30 [35]	3.00 [35]
Pictou, Nova Scotia ..	Northumberland Strait 62° 42′ 21″ W. 45° 41′ 01″ N.	VCQ	100	Marconi Co. ..	300, 600	P G [46 245] ..	Dec. to April: N May to Nov.: —	0.15 [35]	1.50 [35]
Point Amour	Labrador, Strait of Belle Isle 56° 50′ 28″ W. 51° 27′ 26″ N.	VCL	150	Marconi Co. ..	300, 600	P G [46]	N	0.30 [35]	3.00 [35]

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
CANADA AND NEWFOUNDLAND—*cont.*	Meridian of Greenwich.							Francs.	Francs.
Point Edward	Ontario, to the south of Lake Huron 82° 24′ 53″ W. 43° 00′ 09″ N.	VBE	350	Marconi Co.	300, **600**, 1,600	P G	N	0.15 [35]	1.50 [35]
Point Grey	British Columbia, near Vancouver 123° 15′ 22″ W. 49° 15′ 57″ N.	VAB	150	Government, Naval	300, **600**	P G [46]	N	0.60 [39 40 41]	6.00 [39 40 41]
Point Riche	Newfoundland, Strait of Belle Isle 57° 24′ 30″ W. 50° 42′ 00″ N.	VCH	250	Marconi Co. ..	300, **600**	P G [46 16] ..	N [42]	0.30 [35]	3.00 [35]
Port Arthur, Ontario ..	Lake Superior Thunder Bay 89° 13′ 45″ W. 48°.26′ 49″ N.	VBA	350	Marconi Co. ..	300, **600**, 1,600	P G [46 96] ..	N	0.15 [35]	1.50 [35]
Port Burwell	Ontario, Lake Erie 80° 47′ 14″ W. 42° 38′ 35″ N.	VBF	350	—	600, 1,600	P G [46]	N	0.15 [35]	1.50 [35]
Port Colbourn	—	—	—	—	—	—	—	—	—
Port Nelson, Manitoba ..	Hudson Bay, mouth of Nelson River 92° 44′ 27″ W. 57° 03′ 19″ N.	VBN	150 600 [142]	Government ..	300, **600**, 1,800	P G	N	0.60	6.00
Quebec	71° 12′ 26″ W. 46° 48′ 24″ N.	VCC	100	Marconi Co. ..	300, **600**	P G [46]	N	0.15 [35]	1.50 [35]
Sable Island	Nova Scotia 60° 19′ 00″ W. 43° 56′ 18″ N.	VCT	300	Marconi Co. ..	300, **600**	P G [37 45] ..	N	0.85 [37]	8.50 [37]
Sault Ste. Marie, Ontario	84° 17′ 50″ W. 46° 31′ 05″ N.	VBB	350	Marconi Co. ..	300, **600**, 1,600	P G	N	0.15 [35]	1.50 [34]
Smokey Tickle	57° 11′ 00″ W. 54° 26′ 00″ N.	VOF	175	Marconi Co. ..	600	— [43]	8 a.m. to 8 p.m. [48 125]	0.60	6.00
Three Rivers, Quebec ..	Province of Quebec, River St. Lawrence 72° 33′ 25″ W. 46° 20′ 45″ N.	VCB	150	Marconi Co. ..	300, **600**	P G [46]	N [42]	0.15 [35]	1.50 [35]

	Georgian Bay 81° 39′ 40″ W. 45° 15′ 57″ N.							
Toronto VBG	Lake Ontario, Toronto Island 79° 22′ 53″ W. 43° 36′ 50″ N.	VBG	350	—	300, 600, 1,600	P G [46]	N	0.15	1.50
Triangle Island	British Columbia south of Hecate Strait 129° 04′ 50″ W. 50° 51′ 48″ N.	VAG	450	Government, Naval	300, 600	P G [46]	N	0.60 [39 41]	6.00 [39 42]
Venison Island	53° 14′ 00″ W. 55° 46′ 00″ N.	VOB	100	Marconi Co. ..	600	— [43]	8 a.m. to 8 p.m. [43 125]	0.60	6.00
CEYLON									
Colombo Radio	79° 53′ 00″ E. 6° 55′ 00″ N.	VPB	390	Government ..	300, 600	P G	N	0.35	—
CHILI									
Ancua	73° 52′ 00″ W. 41° 52′ 00″ S.	—	—	Government ..	—	P G	—	—	—
Antofagasta	70° 31′ 30″ W. 23° 27′ 35″ S.	CCB	400	Government ..	600, 1,300	O	N	—	—
Arica	70° 20′ 35″ W. 18° 29′ 00″ S.	CCA	400	Government ..	600, 1,300	O	N	—	—
Cape Raper	75° 38′ 00″ W. 46° 50′ 00″ S.	CCR	—	Government ..	—	P G	—	—	—
Coquimbo	71° 20′ 00″ W 29° 57′ 35″ S.	CCO	400	Government ..	600, 1,300	O	N	—	—
Evangelistas .. .	74° 50′ 00″ W. 52° 47′ 00″ S.	CCZ	—	Governmen ..	—	P G	—	—	—
Huafo	74° 39′ 00″ W. 43° 41′ 00″ S.	CCH	—	Government ..	—	P G	—	—	—
Juan Fernandez	78° 53′ 00″ W. 33° 37′ 00″ S.	CCJ	—	Government ..	—	P G	—	—	—
Llanquihue	72° 55′ 00″ W. 41° 32′ 00″ S.	CCL	—	Government ..	—	O	—	—	—
Mocha	Island of Mocha 73° 53′ 44″ W. 38° 22′ 12″ S.	CCM	300	Government ..	600	O	10 a.m. to 12 a.m.[49] 4 p.m. to 6 p.m.	—	—
Puerto Montt [13]	—	—	—	—	—	—	—	—	—
Punta Arenas	70° 50′ 00″ W. 53° 10′ 00″ S.	CCP	—	Government ..	—	O	—	—	—
Valparaiso	71° 38′ 06″ W. 33° 01′ 06″ S.	CCV	300	Government, Naval	600, 1,300	O [47]	N	—	—
CHINA									
Canton	113° 20′ 00″ E. 23° 10′ 00″ N.	XNP	By day, 650 by night, 1,300	—	600, 1,200 1,600, 2,100	P G [191]	8 a.m. to 10 p.m.[193]	0.50	5.00

Land Stations—*Continued.*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
CHINA—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Foochow	119° 18′ 00″ E. 26° 07′ 00″ N.	XOW	By day, 650; by night, 1,300	—	600, 1,200 **1,600**, 2,100	P G [191] ..	8 a.m. to 10 p.m.[192]	0.50	5.00
Peking	116° 30′ 20″ E 39° 54′ 50″ N.	NPP	150	United States Navy	600	O	N	—	—
Quang-Tchéou-Wan ..	110° 27′ 45″ E. of Greenwich 108° 07′ 31″ E. of Paris	FWA	500	French Govt. ..	**600**, 1,200	P G, O ..	Seventh time-belt east of the Greenwich belt: 7 a.m. to 11 a.m., 2 p.m. to 5 p.m.	0.25	2.00
Woosung, Kiangsu ..	21° 03′ 34″ N. 121° 25′ 00″ E. 31° 21′ 00″ N.	XSG	By day, 650; by night, 1,300	—	600, 1,20 **1,600**, 2,100	P G [193]	N	0.50	5.00
COCOS-KEELING ISLANDS									
Cocos	Indian Ocean 96° 53′ 20″ E, 12° 05′ 24″ S.	VPK	150	— [50]	**300**, 600	P G . ..	N	0.60	—
COLOMBIA									
Cartagena	—	CTG	—	Ges. Fur Drahtlose Tel.	600	—	6 a.m to 10 p.m.[38]	0.50	—
CUBA									
Guantanamo Bay ..	South coast of Cuba 75° 08′ 30″ W 19° 54′ 00″ N.	NAW	200	U.S. Navy	300, **600**, 1,800	P G	N	0.30	3.00
CURACAO (COLONY OF)									
Aruba	Dutch West Indies 70° 02′ 01″ W. 12° 31′ 05″ N.	PJA	108	—	600	— [51]	Local time. 9 am. to 11 a.m., 2 p.m. to 4 p.m. Sundays and public holidays: 11.45 a.m. to 12.45 p.m.	0.60	—

	12° 09′ 20″ N.							Sundays and public holidays: 11.45 a.m. to 12.45 p.m.		
Curaçao	Dutch West Indies 68° 56′ 35″ W. 12° 06′ 20″ N.	PJC	400	—	300, 600 1800	P G [52]	5 a.m. to 7 p.m. and 12 p.m. Sundays and public holidays: 5 a.m. to 6 a.m. and 12 a.m.,	0.60	—	
DENMARK										
Blaavandshuk	North Sea coast 8° 05′ 11″ E. 55° 33′ 29″ N.	OXB	By day 200; by night, 500	Government ..	300, 600	P G [16]	N	0.15	—	
Copenhagen	12° 34′ 40″ E 55° 41′ 13″ N.	OXA	By day, 200: by night 500	Government ..	300, 600	P G [16]	N	0.15	—	
Drogden [203]	The Sound 12° 42′ 00″ E. 55° 33′ 02″ N.	OUW	15	Government ..	300	— [54]	N	—	—	
Gedser	Falster Island 11° 55′ 52″ E. 54° 34′ 19″ N.	OXC	25	Government ..	250	— [54]	in general N	—	—	
Gedser Havn	Falster Island 11° 56′ 03″ E. 54° 32′ 01″ N.	OXD	25	Government ..	250	— [54]	in general N	—	—	
Graadyb [203]	North Sea 8° 07′ 07″ E. 55° 21′ 07″ N.	OUX	30	Government ..	200	— [54]	N	—	—	
Horns Rev [203]	North Sea 7° 19′ 05″ E. 55° 34′ 01″ N.	OUZ	30	Government ..	200	— [53]	N	—	—	
Vyl [203]	North Sea 7° 45′ 09″ E. 55° 23′ 06″ N.	OUY	30	Government ..	200	— [53]	N	—	—	
DUTCH EAST INDIES										
Amboina	Amboina Island 128° 06′ 00″ E. 3° 46′ 40″ S.	PKE	420	—	600, 1,600 2,300	P G [44]	Mean time of the Island of Java, 109° 48′ 37.05″ east of Greenwich 11.19 a.m to 11.34 a.m. Sun.: closed.	— [55]	— [55]	
Balikpapan	116° 57′ 00″ E 1° 19′ 00″ S.	—	—	Royal Dutch Petroleum Co.	—	—	—	—	—	
Koepang	Timor 123° 36′ 50″ E. 10° 00′ 30″ S.	PKD	420	—	600, 1,600, 2,300	P G [44]	Mean time of the Island of Java, 109° 48′ 37.05″ east of Greenwich: 11.19 a.m. to 11.34 a.m. Sun.: closed.	— [53]	— [55]	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge
DUTCH EAST INDIES —*contd.*								Francs.	Francs.
Sabang	Sumatra, Weh Island 95° 20′ 06″ E. 5° 54′ 00″ N.	PKA	By day, 400; by night, 800	—	450, 600	P G	N	0.40	4.00
Sitoebondo	Java 114° 05′ 30″ E. 17° 41′ 00″ S.	PKC	—	—	600, 1,600 2,300	P G [54]	Mean time of the Island of Java, 109° 48′ 37.05″ east of Greenwich: 11.19 a.m. to 11.34 a.m. Sun.: closed.	—[55]	—[55]
Tarakan	117° 30′ 00″ E. 3° 20′ 00″ N.	—	—	Royal Dutch Petroleum Co.	—	—	—	—	—
Weltevreden	Near Batavia 106° 50′ 20″ E. 6° 09′ 40″ S	PKB	270	Government Marine Dept.	600	P G, O.. ..	Mean time of the Island of Java, 109° 48′ 37.05″ east of Greenwich, week days (except Thurs.): 8 a.m. to 6 p.m. Thurs.: 8 a.m. to 9 p.m. Sundays and holidays: 9 a.m. to 1 p.m.	0.40	4.00
EGYPT									
Port Said	32° 19′ 00″ E. 31° 14′ 00″ N.	SUB	350	Lloyds	300, 600	P G	N	0.60	—
ERITREA									
Asmara	38° 30′ 00″ E. 15° 20′ 00″ N.	ICW	—	Italian Government	—	—	—	—	—
Assab	42° 30′ 00″ E. 13° 06′ 00″ N.	ICY	—	Italian Government	—	—	—	—	—
Massaua	Red Sea 39° 28′ 52″ E. 15° 36′ 30″ N	ICX	1,600	Italian Government	4,000	—[57]	X	—	—
FALKLAND ISLANDS									
Port Stanley	57° 49′ 15″ W. 51° 41′ 15″ S.	VPC	650	Colonial Govt. ..	300, 600	P G	Local time.[56] 9 a.m. to 12 a.m., 9 p.m. to 12 p.m.	0.60	—

FIJI ISLANDS									
Labasa	179° 21′ 00″ E. 16° 26′ 00″ S.	VPE	300	Colonial Govt.	600	P G [58]	Fiji Islands time.[59] — [60]	0.60 [58]	— [58]
Suva	Viti Levu 178° 27′ 30″ E. 18° 08′ 55″ S.	VPD	300	Colonial Govt.	600	P G [58]	— [60]	0.60 [58]	— [58]
Suva Suva	—	—	—	Colonial Govt.	—	P G	—	—	—
Taveuni	179° 59′ 15″ E. 16° 46′ 30″ S.	VPF	200	Colonial Govt.	600	P G [58]	— [60]	0.60 [58]	— [58]
FRANCE AND ALGERIA							Western European time.		
Aïn-el-Turck	To the west of Oran 0° 45′ 30″ W. of Greenwich 3° 05′ 30″ W. of Paris	FUO	—	Navy	—	O	9 a.m. to 12 p.m.	—	—
Ajaccio TSF	35° 45′ 00″ N. 8° 44′ 00″ E. of Greenwich 6° 24′ 00″ E. of Paris	FFA	350	Navy	600	P G [16]	7 a.m. to 10 p.m.	0.40 [61]	— [61]
Boulogne-sur-Mer TSF ..	41° 55′ 00″ N. 1° 37′ 00″ E. of Greenwich 0° 43′ 00″ W. of Paris	FFB	160	Government ..	300, 600	P G [16]	N	0.40 [62]	— [62]
Bouscat TSF	50° 43′ 00″ N. Near Bordeaux 0° 37′ 12″ W. of Greenwich 2° 57′ 26″ W. of Paris	FFX	160	Government	300, 600	P G	N	0.40	—
Brest-Arsenal	44° 52′ 27″ N. 4° 29′ 00″ W. of Greenwich 6° 49′ 00″ W. of Paris	FUB	—	Navy	—	— [63]	—	—	—
Brest-Kerlaer	48° 23′ 00″ N. 4° 33′ 20″ W. of Greenwich 6° 53′ 34″ W. of Paris	FFK	350	Navy	600	P G [16]	7 a.m. to 10 p.m.	0.40	—
Cherbourg TSF	48° 19′ 58″ N. 1° 38′ 00″ W. of Greenwich 3° 58′ 00″ W. of Paris	FFC	350	Navy	600	P G [16]	N	0.40 [62]	— [62]
Cros-de-Cagnes	49° 39′ 00″ N. To the west of Nice 7° 10′ 00″ E. of Greenwich 4° 50′ 00″ E. of Paris 43° 39′ 00″ N.	FFG	160	Government ..	300, 600	P G [16]	N	0.40 [61]	— [61]

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge	
								Per Word.	Minimum Charge.
FRANCE AND ALGERIA—*contd.*							Western European time.	Francs.	Francs.
Dieppe	1° 05′ 00″ E. of Greenwich 1° 15′ 00″ W. of Paris 49° 55′ 00″ N.	FFI	55	Railway Administration	400	P [66]	10 a.m. to 2 p.m., 8.30 p.m. to 11.30 p.m.	—	—
Dunkerque TSF	2° 22′ 00″ E. of Greenwich 0° 02′ 00″ E. of Paris 51° 02′ 00″ N.	FFD	350	Navy	600	P G [16]	7 a.m. to 10 p.m.	0.40 [61]	— [63]
Eiffel Tower, Paris ..	—	FL	—	Army	—	—	—	—	—
Fort-de-l'Eau	To the east of Algiers 3° 11′ 00″ E. of Greenwich 0° 51′ 00″ E. of Paris 36° 45′ 00″ N.	FFO	380	Government ..	300, 600	P G	N	0.40 [61]	— [61]
Havre TSF	—	FFU	—	—	—	—	—	0.40 [62]	— [63]
Lorient TSF	3° 21′ 00″ W. of Greenwich 5° 41′ 00″ W. of Paris 47° 44′ 00″ N.	FFL	350	Navy	600	P G [16]	7 a.m. to 10 p.m.	0.40	—
Ouessant	To the west of Finistère 5° 04′ 00″ W. of Greenwich 7° 24′ 00″ W. of Paris 48° 28′ 00″ N.	FFF	380	Government ..	300, 600	P G [16]	N	0.40	—
Porquerolles	Hyeres Islands 6° 12′ 00″ E. of Greenwich 3° 52′ 00″ E. of Paris 42° 59′ 00″ N.	FFP	350	Navy	600	— [63]	—	—	—
Port-Vendres	Gulf of the Lion 3° 06′ 00″ E. of Greenwich	FUV	—	Navy	—	— [63]	—	—	—

	0° 46′ 00″ E. of Paris								
Rochefort TSF	42° 31′ 00″ N. 0° 58′ 00″ W. of Greenwich 3° 18′ 00″ W. of Paris	FFR	350	Navy	600	P G [58]	7 a.m. to 10 p.m.	0.40	—
S. Maries-de-la-Mer ..	45° 57′ 00″ N. Gulf of the Lion 4° 26′ 00″ E. of Greenwich 2° 06′ 00″ E. of Paris	FFS	380	Government ..	300, 600	P G	N	0.40 [61]	— [61]
Toulon-Ecole	43° 27′ 00″ N. 5° 55′ 00″ E. of Greenwich 3° 35′ 00″ E. of Paris	FUE	—	Navy	—	— [63]	—	—	—
Toulon-Mourillon ..	43° 07′ 00″ N. 5° 55′ 00″ E. of Greenwich 3° 35′ 00″ E. of Paris 43° 07′ 00″ N.	FUT	—	Navy	—	O	9 a.m. to 12 p.m.	—	
FRENCH EQUATORIAL AFRICA									
Loango	Congo, Pointe Noire 11° 43′ 02″ E. of Greenwich 9° 22′ 48″ E. of Paris 4° 46′ 49″ S	FGO	By day, 275; by night, 550	—	300, 600, 1,800	P G [66]	One hour in advance of Greenwich time. 8 a.m. to 10.30 a.m.[66], 2 p.m. to 4.30 p.m.[66]	0.30	3.00
FRENCH INDO-CHINA									
Cap-Saint-Jacques ..	To the south-east of Saigon 107° 05′ 14″ E. of Greenwich 104° 45′ 00″ E. of Paris 10° 20′ 00″ N.	FCA	250	Governmen ..	300	P G, O ..	Hour of the seventh time-belt east of the Greenwich belt. 7 a.m. to 11 a.m., 2 p.m. to 5 p.m.	0.25	2.00
Hanoi	105° 54′ 18″ E. of Greenwich 103° 34′ 04″ E. of Paris 21° 03′ 49″ N.	FAO	1,000	Government ..	600, 2,400, 3000	P G [67] O ..	7 a.m. to 11 a.m. 2 p.m. to 5 p.m.	0.25	2.00

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
FRENCH INDO-CHINA—*contd.*									
Kien-An	Near Haïphong 106° 41′ 59″ E. of Greenwich 104° 21′ 45″ E. of Paris 20° 48′ 34″ N.	FKA	250	Government ..	600	P G, O ..	Hour of the seventh time-belt east of the Greenwich belt. 7 a.m. to 11 a.m. 2 p.m. to 5 p.m.	Francs. 0.25	Francs. 2.00
FRENCH WEST AFRICA									
Conakry	Guinea 13° 42′ 46″ W. of Greenwich 16° 03′ 00″ W. of Paris 9° 30′ 59″ N.	FCO	By day, 540; by night, 1,600	Government ..	**600**, 1,600 [68]	P G	Hour of the first time-belt west of the Greenwich belt. 6 a.m. to 10 p.m.	0.30	—
Dakar	Senegal 17° 25′ 22″ W. of Greenwich 19° 45′ 36″ W. of Paris 14° 40′ 27″ N.	FDA	By day, 250; by night, 450	Government ..	600	P G	N	0.30	—
Port-Etienne	Mauritania, Bay of Lévrier 17° 03′ 01″ W. of Greenwich 19° 23′ 15″ W. of Paris 20° 55′ 39″ N.	FPE	By day, 540; by night, 1,600	Government ..	**600**, 900 [69]	P G	from sunrise to sunset	0.30 [70]	— [70]
Rufisque	Senegal 17° 16′ 23″ W. of Greenwich 19° 36′ 37″ W. of Paris 14° 43′ 04″ N.	FRU	By day, 540; by night, 1,600	Government ..	1,600 [71]	P R [72]	from sunrise to sunset	0.30	—
Tabou	Ivory Coast 7° 22′ 27″ W. of Greenwich 9° 42′ 41″ W. of Paris 4° 25′ 19″ N.	FTA	150	Government ..	600	P G [72]	from sunrise to sunset	0.30	—

GERMANY (a) Mother-Country.	Meridian of Greenwich								
Adlergrund Lightship ..	Baltic Sea 14° 22′ 12″ E. 54° 49′ 59″ N.	KAG	55	—	300	P R [74 75] ..	Central European time. N	0.18 [74]	1.80 [74]
Amrumbank Lightship ..	North Sea 7° 53′ 12″ E. 54° 33′ 12″ N.	KAF	27	—	**300, 600**	P R [74 75] ..	N	0.18 [74]	1.80 [74]
Aussenjade Lightship ..	North Sea 7° 56′ 40″ E. 53° 51′ 30″ N.	KAU	55	—	300	P R [74 75] ..	N	0.18 [74]	1.80 [74]
Borkum New Lighthouse	North Sea 6° 40′ 12″ E. 53° 34′ 48″ N.	KBM	100	—	**300, 600**	P G [80]	N	0.18	1.80
Borkum Riff Lightship ..	North Sea 6° 03′ 30″ E. 53° 45′ 30″ N.	KBR	60	—	**300, 600**	P R [74 75] ..	N	0.18 [74]	1.80 [74]
Bremerhaven Lloydhalle	North Sea coast 8° 33′ 08″ E. 53° 33′ 04″ N.	KBH	200	Norddeutscher Lloyd Co.	300	P R [76]	N	0.18	1.80
Bülk	Kiel Bay 10° 12′ 00″ E. 54° 27′ 00″ N.	KBK	110	—	300	P G [77 80] ..	N	0.18	1.80
Cuxhaven	North Sea coast 8° 42′ 42″ E. 52° 52′ 27″ N.	KCX	By day, 110; by night, 170	—	**300, 600**	P G [78 80] ..	N	0.18	1.80
Danzig	Baltic Coast 18° 39′ 08″ E. 54° 20′ 56″ N.	KAZ	By day, 330; by night, 660	—	300, 600. 1,800	P G [80]	6 a.m. to 12 p.m. [79]	0.18	1.80
Eider Lightship	North Sea 8° 18′ 18″ E 54° 16′ 06″ N.	KAJ	30	—	**300, 600**	P R [74 75] ..	N	0.18 [74]	1.80 [74]
Eiderlotsengaliote Lightship	North Sea 8° 37′ 00″ E. 54° 13′ 30″ N.	KCL	21	—	**300, 600**	P R [74 75] ..	N	0.18 [74]	1.80 [74]
Elbe Lightship Eins ..	North Sea 8° 15′ 00″ E. 54° 00′ 30″ N.	KBF	60	—	300	P R [74 75] ..	N	0.18 [74]	1.80 [74]
Heligoland	North Sea 7° 53′ 00″ E. 54° 11′ 00″ N.	KAH	110	—	300	P R [80 88] ..	N	0.18	1.80
Norddeich	North Sea coast 7° 08′ 00″ E. 53° 36′ 00″ N.	KAV	By day, 420; by night, 830	Government ..	300, 600, 1,800	P G [82 88] ..	N	0.18	1.80
Sassnitz	Island of Rügen 13° 39′ 14″ E. 54° 30′ 52″ N.	KCV	110	Prussian Railway Administration	375	P R [88 88] ..	N	0.18	1.80
Swinemünde	Usedom Island 14° 15′ 13″ E. 53° 54′ 40″ N.	KAW	By day, 330; by night, 660	—	300, 600, 1,800	P G [89]	6 a.m. to 12 p.m. [84]	0.18	1.80

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
GERMANY—*contd.*	Meridian of Greenwich.								
Weser Lightship	North Sea 7° 49′ 03″ E 53° 54′ 18″ N.	KCW	80	—	300	P R [74 75] ..	Central European time. N	Francs. 0.18[74]	Francs. 1.80[74]
(b) Protectorates									
Angaur	Palaos Islands 134° 10′ 15″ E. 6° 50′ 15″ N.	KAN	300	Deutsche Südsee-phosphat A.G. Bremen	**600**, 850	P G [196]	Local time of Yap: 8 a.m. to 9 a.m., 2 p.m. to 3 p.m.	0.60	—
Daressalam	German East Africa 39° 17′ 27″ E. 6° 50′ 30″ S.	KAC	600	—	300, **600**, 1,800 2,500	P G	Uniform time of German East Africa [188]: 7.30 a.m. to 11.30 a.m., 4 p.m. to 6 p.m., 8 p.m. to 11 p.m. Sundays: 9 a.m. to 11 a.m., 8 p.m. to 10 p.m.	0.35	—
Duala	Cameroons 9° 40′ 50″ E. 4° 02′ 41″ N.	KBU	600	—	**600**. 1,650, 2500	P G [88]	Local time[16]: 6 a.m. to 9 a.m, 7 p.m. to 10 p.m.	0.35	—
Jap	Caroline Islands 138° 08′ 31″ E. 9° 29′ 52″ N.	KCA	By day, 325; by night, 1,100	Deutsche Südsee-Ges. für Drahtlose Telegraphie	300, **600**, 1,800	P G [197] ..	Local time of Yap: 8 a.m. to 9 a.m., 5 p.m. to 8 p.m., 1 a.m. to 3 a.m.	0.60	—
Lüderitzbucht .. .	German South-West Africa 15° 10′ 50″ E. 26° 37′ 26″ S	KCU	By day, 500: by night, 900	—	**600**, 1,650, 2500	P G	Central European time: 9 a.m. to 12 a.m., 3 p.m. to 6 p.m. Sundays: 4 p.m. to 6 p.m.	0.35	—
Lome	Togo 1° 11′ 05″ E. 6° 16′ 08″ N.	KBL	600	—	300, **600**, 1,400, 1,800, 2,500	P G	Greenwich Time: 7 a.m. to 10 a.m., 6 p.m. to 9 p.m.	0.35	—
Nauru	Marshall Islands 166° 56′ 23″ E. 0° 25′ 43″ S.	KBN	By day, 325 by night, 1,100	Deutsche Südsee-Ges für Drahtlose Telegraphie	300, **600**, 1,800	P G [196] ..	Local time of Yap: 8 a.m. to 9 a.m., 5 p.m. to 8 p.m., 1 a.m. to 3 a.m.	0.60	—
Swakopmund	German South-West Africa 14° 31′ 29″ E. 22° 40′ 37″ S.	KAK	By day, 500; by night, 900	—	**600**, 1,650, 2500	P G	Central European time: 9 a.m. to 12 a.m., 3 p.m. to 6 p.m., 9 p.m. to 12 p.m.	0.35	—

Tsingtau (Signalberg)	Shan-tung (China) 120° 19′ 27″ E. 36° 04′ 00″ N.	KBS	By day, 550; by night 2,000	—	600	P G [87]	N	0.18	1.80
GIBRALTAR									
Gibraltar (North Front) ..	5° 21′ 00″ W. 36° 09′ 00″ N.	BYW	—	—	—	O	—	—	—
Gibraltar (Windmill Hill) ..	5° 21′ 00″ W. 36° 07′ 00″ N.	BYX	—	—	—	O	—	—	—
GOLD COAST									
Accra	0° 12′ 00″ W 5° 32′ 30″ N.	VPG	250	Government ..	300, 600	P G	Greenwich time: 8 a.m. to 4 p.m., except Sundays	0.40	—
GREAT BRITAIN							Greenwich time.		
Aberdeen	2° 07′ 00″ W 57° 08′ 30″ N.	BYD	—	Admiralty ..	—	O	—	—	—
Ballycastle, Antrim ..	Ireland, North Channel 6° 12′ 00″ W. 55° 11′ 00″ N.	GSL	15	Post Office ..	250	— [91]	8.25 a.m. to 8.25 p.m.	—	—
Broomfield, Essex ..	0° 28′ 00″ E. 51° 45′ 00″ N.	MAX	—	Marconi Co. ..	—	Private ..	—	—	—
Bunbeg	North-west coast of Ireland 8° 09′ 00″ W. 55° 04′ 00″ N.	BYR	—	Admiralty ..	—	O	—	—	—
Butt of Lewis	58° 32′ 00″ N. 6° 14′ 00″ W.	—	—	Lloyds ..	—	Private ..	—	—	—
Caister-on-Sea	Near Yarmouth 1° 42′ 00″ E. 52° 37′00″ N.	GCS	150	Post Office	300, 600	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	—[92] 1.80 [93] 1.50 [94]
Calshot	Hampshire, to the south-east of Southampton 1° 18′ 30″ W. 50° 49′ 15″ N.	BZZ	—	Admiralty	—	O	—	—	—
Ceunant	4° 11′ 00″ W. 53° 07′ 00″ N.	MUU	—	Marconi Co. ..	—	—	—	—	—
Chelmsford	—	MZX	—	Marconi Co. ..	—	Private	—	—	—
Cleethorpes	South-east of Grimsby 0° 02′ 00″ W. 53° 31′ 00″ N.	BYB	—	Admiralty ..	—	O	—	—	—
Clifden	West coast of Ireland 10° 01′ 00″ W. 53° 27′ 00″ N.	MFT	—	Marconi Co. ..	—	Transatlantic service	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*	Meridian of Greenwich.						Greenwich time	Francs.	Francs.
Corkbeg	Entrance to the port of Cork 8° 15′ 00″ W. 51° 49′ 00″ N.	BYQ	—	Admiralty ..	—	O	—	—	—
Cromarty	Black Isle 4° 01′ 30″ W. 57° 41′ 45″ N.	BYP	—	Admiralty ..	—	O	—	—	—
Crookhaven	South coast of Ireland 9° 46′ 00″ W. 51° 27′ 00″ N.	GCK	250	Post Office ..	300, 600	PG	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Cross Sand Lightship ..	North-east of Yarmouth 1° 54′ 00″ E. 52° 38′ 00″ N.	GVA	15	Trinity House ..	230	Reception and transmission of distress signals	N	— [95]	— [95]
Cullercoats	Near Tynemouth 1° 26′ 00″ W 55° 02′ 00″ N.	GCC	250	Post Office ..	300, 600	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Culver Cliff	Isle of Wight 1° 06′ 00″ W. 50° 40′ 00″ N.	BYM	—	Admiralty ..	—	O	—	—	—
Dover	1° 18′ 00″ E. 51° 07′ 00″ N.	BYL	—	Admiralty ..	—	O	—	—	—
Dundee	2° 55′ 00″ W. 56° 27′ 00″ N.	BZW	—	Admiralty ..	—	O	—	—	—
Eastchurch	Isle of Sheppey 0° 51′ 00″ E. 51° 23′ 30″ N.	BZU	—	Admiralty ..	—	O	—	—	—
East Goodwin Lightship	Straits of Dover 1° 36′ 00″ E. 51° 13′ 00″ N.	GVB	15	Trinity House ..	230	Reception and transmission of distress signals	N	0— [95]	— [95]
Farnborough	Hampshire 0° 45′ 30″ W. 51° 17′ 00″ N.	BZT	—	Admiralty ..	—	O	—	—	—
Fastnet	51° 23′ 00″ N. 9° 36′ 00″ W.	—	—	Lloyd's	—	For signal duty	—	—	—
Felixstowe	Near Harwich 1° 20′ 00″ E. 51° 57′ 00″ N.	BYJ	—	Admiralty ..	—	O	—	—	—

Fishguard	Pembrokeshire 4° 58′ 00″ W. 51° 59′ 00″ N.	GRL	200	Post Office ..	500, 600	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Flannan Islands	58° 17′ 00″ N. 7° 33′ 00″ W.	—	—	Lloyd's	—	Private ..	—	—	—
ur ..	Straits of Dover 1° 11′ 30″ E. 51° 04′ 30″ N.	GUR	45	South Eastern and Chatham Railway	300, 600	P [103]	—	—	—
Fort George	Inverness Firth 4° 04′ 00″ W. 57° 35′ 00″ N.	BZV	—	Admiralty ..	—	O	—	—	—
Grimsby	0° 04′ 00″ W. 53° 35′ 00″ N.	BYV	—	Admiralty ..	—	O	—	—	—
Gull Lightship	Straits of Dover 1° 28′ 00″ E. 51° 16′ 00″ N.	GVC	15	Trinity House ..	230	Reception and transmission of distress signals	N	— [95]	— [95]
Haven, The (Pool e ..	50° 40′ 00″ N. 1° 56′ 00″ W.	MHH	—	Marconi Co ..	—	Private ..	—	—	—
Heysham Harbour ..	Morecambe Bay 2° 55′ 00″ W. 54° 02′ 00″ N.	GHH	150	Midland Railway	400	P, restricted to ships of Midland Rly Co.	N, during the crossing between Heysham and Belfast	—	—
Horsea	Near Portsmouth 1° 06′ 00″ W. 50° 50′ 30″ N.	BYC	—	Admiralty ..	—	O	—	—	—
Hunstanton	North Sea, The Wash 0° 30′ 00″ E. 52° 57′ 00″ N.	GHC	100	Post Office ..	300	Special correspondence	N	—	—
Inchkeith	Firth of Forth 3° 09′ 00″ W. 56° 02′ 00″ N.	BZA	—	Admiralty ..	—	O	—	—	—
Inishtrahull	55° 25′ 00″ N. 7° 13′ 00″ W.	—	—	Lloyd's	—	For signal duty	—	—	—
Ipswich	1° 09′ 00″ E. 52° 05′ 00″ N.	BYE	—	Admiralty ..	—	O	—	—	—
Isle of Grain	Kent, mouth of the Thames 0° 43′ 00″ E. 51° 26′ 15″ N.	BZY	—	Admiralty ..	—	O	—	—	—
Kingsnorth	0° 36′ 00″ E. 51° 25′ 00″ N.	BZS	—	Admiralty ..	—	O	—	—	—
Land's End	West coast of Cornwall 5° 40′ 10″ W. 50° 07′ 00″ N.	GLD	250	Post Office ..	300, 600	P G	N	0.69 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Leafield	1° 32′ 00″ W. 51° 50′ 00″ N.	—	—	Marconi Co. ..	—	Private ..	—	—	—
Lerwick	Shetland Islands 1° 11′ 00″ W. 60° 09′ 00″ N.	BYU	—	Admiralty ..	—	O	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
GREAT BRITAIN—*contd.*	Meridian of Greenwich.						Greenwich time.	Francs.	Francs.
Lochboisdale	Hebrides 7° 16′ 00″ W. 57° 08′ 00″ N.	GCB	150	Post Office ..	300	— [97]	8 a.m. to 8 p.m., week days only	—	—
Malin Head	North coast of Ireland 7° 21′ 00″ W. 55° 22′ 00″ N.	GMH	250	Post Office ..	300, **600**	P G	N	0.60 [92] 0.30 [92] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Marconi House	London	—	—	Marconi Co. ..	—	Private ..	—	—	—
Newhaven..	0° 04′ 00″ E. 50° 48′ 00″ N.	GNV	120	London Brighton & S.C. Railway	400	— [96]	10 a.m. to 2 p.m., 8.30 p.m. to 11.30 p.m.	—	—
Niton	Isle of Wight 1° 17′ 10″ W. 50° 34′ 30″ N.	GNI	150	Post Office ..	300, **600**	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
North Foreland	North of Ramsgate. 1° 26′ 00″ E. 51° 23′ 00″ N.	GNF	150	Post Office ..	300, **600**	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Parkeston Quay	Near Harwich 1° 15′ 00″ E. 51° 56′ 00″ N.	GPQ	130	Great Eastern Railway	450, 600 [99]	P restricted to the ships of the Great Eastern Railway Company	N, during the crossing of the ships	—	—
Pembroke	4° 58′ 00″ W. 51° 41′ 00″ N.	BYF	—	Admiralty ..	—	O	—	—	—
Poldhu	Extreme south-west of England 5° 16′ 00″ W. 50° 02′ 00″ N.	MPD	1,000	Marconi Co. ..	2,800	P R [104]	11 p.m. to 2 a.m.	3.00	—
Porthcurno	50° 07′ 00″ N. 5° 33′ 00″ W.	—	—	Eastern Telegraph Co.	—	—	—	—	—
Portland Bill	English Channel Isle of Portland 2° 27′ 00″ W. 50° 32′ 00″ N.	BYN	—	Admiralty ..	—	O	—	—	—
Portpatrick	Scotland, North Channel 5° 09′ 00″ W. 54° 50′ 00″ N.	BYS	—	Admiralty ..	—	O	—	—	—
Portsmouth (Signal School)	1° 06′ 00″ W. 50° 48′ 00″ N.	BZC	—	Admiralty ..	—	O	—	—	—

Rame Head	Entrance to the port of Plymouth 4° 13′ 00″ W. 50° 19′ 00″ N.	BYO	—	Admiralty ..	—	O	—	—	—
Rathlin Island	North Channel 6° 10′ 00″ W. 55° 17′ 00″ N.	GRN	15	Post Office ..	250	— [100]	8.25 a.m. to 8.25 p.m.	—	—
Rosyth	West of Edinburgh 3° 23′ 00″ W. 56° 01′ 00″ N.	BYH	—	Admiralty ..	—	O	—	—	—
St. Kilda	Most westerly island of Outer Hebrides, Scotland.	—	150	Marconi Co. ..	300, 600	Special ..	—	—	—
Scarborough	0° 26′ 00″ W. 54° 16′ 00″ N.	BYI	—	Admiralty ..	—	O	—	—	—
Seaforth	Liverpool 3° 01′ 00″ W. 53° 28′ 00″ N.	GLV	150	Post Office ..	300, 600	P G	N	0.60 [92] 0.30 [93] 0.15 [94]	— [92] 1.80 [93] 1.50 [94]
Sheerness	Mouth of the Thames 0° 45′ 00″ E. 51° 27′ 00″ N.	BYK	—	Admiralty ..	—	O	—	—	—
South Goodwin Lightship	Straits of Dover 1° 28′ 00″ E. 51° 09′ 00″ N.	GVD	15	Trinity House ..	230	Reception and transmission of distress signals	N	— [95]	— [95]
Stockton	Near Middlesbrough 1° 21′ 00″ W. 54° 34′ 00″ N.	BYT	—	Admiralty ..	—	O	—	—	—
Sunk Lightship	South-west of Harwich 1° 30′ 00″ E. 51° 51′ 00″ N.	GVE	30	Trinity House ..	230	Reception and transmission of distress signals	N	— [95]	— [95]
Tobermory	Isle of Mull 6° 04′ 00″ W. 56° 36′ 00″ N.	GCA	150	Post Office ..	300	— [102]	8 a.m. to 8 p.m., week days only	—	—
Tongue Lightship ..	North of Margate 1° 23′ 00″ E 51° 30′ 00″ N.	GVF	15	Trinity House ..	230	Reception and transmission of distress signals	N	— [95]	— [95]
Towyn, Merioneth	Wales	MUV	—	Marconi Co. ...	—	—	—	—	—
Valencia Island ..	South-west of County Kerry, Ireland	—	—	—	—	—	—	—	—
Whitehall (London) ..	0° 10′ 00″ W. 51° 30′ 00″ N.	BYA	—	Admiralty ..	—	O	—	—	—
Wick	North coast of Scotland 3° 06′ 00″ W. 58° 26′ 00″ N.	BYG	—	Admiralty ..	—	O	—	—	—
Yarmouth	Norfolk 1° 44′ 15″ E. 52° 34′ 45″ N.	BZX	—	Admiralty ..	—	O	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
GREECE	Meridian of Greenwich.						Greenwich time.	Francs.	Francs.
Athens	23° 43′ 13.8″ E. 37° 58′ 19.7″ N.	SXA	—	Government ..	—	O	—	—	
Salamis	Island of Salamis 23° 32′ 00″ E. 37° 58′ 15″ N.	XL	—	Government ..	—	O	—	—	
Salonica	22° 59′ 00″ E. 40° 36′ 00″ N.	SXC	—	Government ..	—	O	—	—	—
Syra	Island of Syra 24° 56′ 33″ E. 37° 25′ 43″ N.	SXS	—	Government ..	—	O	—	—	—
Thasos	Island of Thasos 24° 43′ 30″ E. 40° 46′ 00″ N.	SXT	—	Government ..	—	O	—	—	—
HOLLAND									
Amsterdam	4° 54′ 39″ E. 52° 22′ 23″ N.	PCA	—	Government ..	—	O	—	—	—
Haaks Lightship	To the west of Helder 4° 18′ 08″ E. 52° 57′ 08″ N.	PCO	40	Government ..	400	Special [105] ..	X	— [106]	— [106]
Helder	4° 46′ 38″ E. 52° 57′ 44″ N	PCB	—	Government ..	—	O	—	—	—
Hellevoetsluis	4° 08′ 00″ E. 51° 49′ 30″ N.	PCC	—	Government ..	—	O	—	—	—
Noord-Hinder Lightship	North Sea 2° 37′ 00″ E. 51° 35′ 00″ N.	PCN	40	Government ..	400	Special [105] ..	X	— [106]	— [106]
Scheveningen-Port ..	North Sea coast, near The Hague 4° 14′ 55″ E. 52° 06′ 00″ N.	PCH	1,200	Government ..	300, 500, 600, 1,800	P G [107] ..	N	0.20	2.00
INDIA See **BRITISH INDIA**									
ITALIAN SOMALILAND									
Bardera	42° 16′ 15″ E. 2° 21′ 10″ N.	ISN	200	Government ..	700–750	P G	Sunrise to sunset	0.30 [108]	— [106]

Brava	Bénadir 44° 02′ 04″ E. 1° 06′ 25″ N.	ISC	200	Government ..	700–750	P G	Sunrise to sunset	0.30 [108]	— [108]
Giumbo	Bénadir 42° 37′ 27″ E. 0° 14′ 51″ S.	ISD	200	Government ..	700–750	P G	Sunrise to sunset	0.30 [108]	— [108]
Iscia Baidoa	43° 39′ 31″ E. 3° 07′ 10″ N.	ISH	160	Government ..	300, 600, 800	P G	Sunrise to sunset	0.30 [108]	—
Itala	Bénadir 46° 19′ 43″ E. 2° 45′ 27″ N.	ISM	100	Government ..	300	P G	Sunrise to sunset	0.30 [108]	— [108]
Lugh	42° 36′ 00″ E. 3° 48′ 00″ N.	ISO	100	Government ..	300	P G	Sunrise to sunset	0.30 [108]	— [108]
Mahaddei Uen	45° 31′ 01″ E. 2° 58′ 14″ N.	ISF	160	Government ..	600	P R ..	Sunrise to sunset	0.30 [108]	— [108]
Merka	Bénadir 44° 46′ 22″ E. 1° 42′ 49″ N.	ISB	160	Government ..	300	P G	Sunrise to sunset	0.30 [108]	— [108]
Mogadiscio ISE ..	Bénadir 45° 21′ 14.5″ E 2° 02′ 13.5″ N.	ISE	160	Government ..	300	P G	Sunrise to sunset	0.30 [108]	— [108]
Mogadiscio ISG	Bénadir 45° 21′ 14.5″ E. 2° 02′ 13.5″ N.	ISG	1,600	Government ..	4,000	P G [110] ..	X	0.30	—
ITALY									
Ancona Radio	13° 31′ 29″ E. 43° 31′ 40″ N.	ICA	270	Government ..	600, 1,200	P G	N	0.30	—
Bologna	11° 20′ 00″ E. 44° 30′ 00″ N.	IGB	—	Army	—	O	—	—	—
Brindisi Radio	Coast of the Adriatic Sea, Puglie, Province of Lecce 17° 56′ 44″ E. 40° 38′ 43″ N.	ICE	270	Government ..	300, 600	P G	N	0.30	—
Cagliari Radio	Sardinia 9° 33′ 30″ E. 39° 12′ 30″ N.	ICC	270	Government ..	300, 600	P G	Sunrise to sunset	0.30	—
Cape Sperone Radio ..	Sardinia, Island of S. Antioco 8° 24′ 42″ E. 38° 57′ 59″ N.	ICR	270	Government ..	300, 600	P G	N	0.30	—
Centopozzi Radio ..	Puglie, Province of Foggia 15° 36′ 45″ E. 41° 42′ 00″ N.	ICM	160	Government ..	300, 600	P G	Sunrise to sunset	0.30	—
Coltano	43° 38′ 00″ N. 10° 24′ 00″ E.	ICI	—	Government ..	—	—	Private	—	—
Firenze	11° 10′ 25″ E. 43° 40′ 36″ N.	IGF	—	Army	—	O	—	—	—
Genoa Radio	8° 56′ 02″ E. 44° 25′ 44″ N.	ICB	160	Government ..	300, 600	P G	N	0.30	—

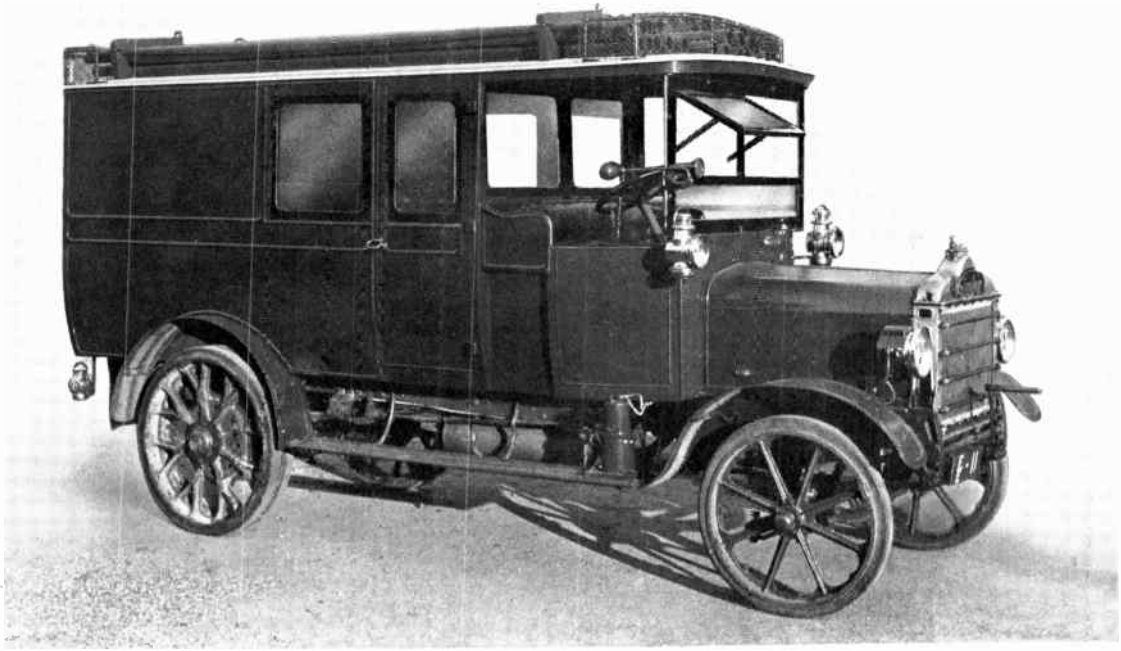
Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
ITALY—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Maddalena Radio ..	Strait of Bonifacio Maddalena Island 9° 25′ 10″ E. 41° 12′ 50″ N.	ICH	215	Government ..	300, **600**	P G	Greenwich Time. N	0.30	—
Messina IFM	15° 37′ 27″ E. 38° 15′ 00″ N.	IFM	27	Government (State Railways)	50	O [109]	—	—	—
Milan	9° 10′ 05″ E. 45° 20′ 40″ N.	IGM	—	Army	—	O	—	—	—
Naples Radio	14° 15′ 36.5″ E. 40° 50′ 14″ N.	ICN	270	Government ..	300, **600**	P G	N	0.30	—
Palermo Radio	13° 16′ 40″ E. 38° 11′ 48″ N.	ICP	270	Government ..	300, **600**	P G	Sunrise to sunset	0.30	—
Reggio Calabria	15° 38′ 30″ E. 38° 08′ 00″ N.	IFR	27	Government (State Railways)	50	O [109]	—	—	—
Roma	—	ICD	—	Government ..	—	O	—	—	—
San Cataldo Radio ..	16° 52′ 00″ E. 41° 08′ 00″ N.	ICQ	160	Government ..	600	Special [16] ..	Central European time. 8 a.m. to 12 p.m.	0.30	—
Spezia	12° 22′ 00″ E. 41° 53′ 00″ N.	ICS	—	Government ..	—	O	—	—	—
Taranto	17° 15′ 05″ E. 40° 28′ 05″ N.	ICT	—	Government ..	—	O	—	—	—
Torino	7° 40′ 10″ E. 45° 00′ 20″ N.	IGT	—	Army	—	O	—	—	
Treviso	12° 10′ 26″ E. 45° 30′ 53″ N.	IGV	—	Army	—	O	—	—	—
Venezia	12° 21′ 15″ E. 45° 29′ 00″ N.	ICZ	—	—	—	O	—	—	—
Villa San Giovanni ..	Calabria, Strait of Messina 15° 38′ 00″ E. 38° 10′ 00″ N.	IFV	27	Government (State Railways)	50	O [109]	—	—	—
Vittoria Radio	Sicily, Province of Syracuse 14° 31′ 50.7″ E. 36° 56′ 50.7″ N.	ICV	270	Government ..	300, **600**	P G	N	0.30	—
JAPAN									
Choshi .. .. [m]	Hondo, Inuboye Point 140° 51′ 12″ E. 35° 44′ 08″ N.	JCS	By day, 450; by night, 1,500	Ministry of Communications	300, **600**	P G [113]	N	0.60 [114]	— [114]

Dairenwan	Peninsula of Kwan-tung 121° 53′ 15″ E. 38° 57′ 50″ N.	JDA	By day, 350; by night, 1,200	—	300, 600	P G	N	0.60 [114]	— [114]
Fukkikaku	Island of Formosa, Formosa Strait 121° 32′ 00″ E. 25° 18′ 00″ N.	JFK	By day, 400; by night, 1,200	Ministry of Communications	300, 600	P G	N	0.60 [114]	— [114]
Komonto [205]	Chosen, Island Komonto 126° 36′ 12″ E. 34° 05′ 55″ N.	JKM	By day, 200; by night, 300	—	—	—[194]	N	—	—
Mokpo [205]	Chosen, port of Mokpo 126° 23′ 05″ E. 34° 47′ 03″ N.	JMP	By day, 200; by night, 300	—	—	—[194]	N	—	—
Osezaki	Kyushyu, Goto Islands 128° 37′ 08″ E. 32° 37′ 20″ N.	JOS	By day, 450; by night, 1,500	Ministry of Communications	300, 600	P G	N	0.60 [114]	— [114]
Otchishi	Hokkaido, Pacific coast 145° 30′ 20″ E. 43° 10′ 17″ N.	JOC	By day, 450; by night, 1,500	Ministry of Communications	300, 600	P G	N	0.60 [114]	— [114]
Shiomisaki	Hondo, Kii Channel 135° 46′ 08″ E. 33° 25′ 32″ N.	JSM	By day, 250; by night, 1,000	Ministry of Communications	300, 600	P G	N	0.60 [114]	— [114]
Shogetsubito [205]	Chosen, port of Chemulpo 126° 36′ 20″ E. 37° 28′ 19″ N.	JSB	By day, 200; by night, 300	—	—	—[194]	N	—	—
Shoseito [205]	Chosen, Island of Shoseito 124° 43′ 45″ E. 37° 45′ 36″ N.	JSS	By day, 300; by night, 400	—	—	—[194]	N	—	—
Tsunoshima	Hondo, near Shimonoseki 130° 50′ 00″ E. 34° 21′ 00″ N.	JTS	By day, 200; by night, 800	Ministry of Communications	300, 600	P G	N	0.60 [114]	— [114]
LIBERIA (REPUBLIC OF)									
Monrovia FMA	10° 49′ 36″ W. of Greenwich 13° 09′ 50″ W. of Paris 6° 16′ 40″ N.	FMA	By day, 280; by night, 550	French Government	600	P G	Sunrise to sunset	—	—
Monrovia KAB	10° 48′ 42″ W. 6° 18′ 26″ N.	KAB	By day, 320; by night, 650	Deutsch-Südamerikanische Telegraphengesellschaft, Cologne	600	P G	Greenwich time 7 a.m. to 12 a.m., 11 p.m. to 1 a.m.	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
MADAGASCAR									
Diégo-Suarez	Meridian of Greenwich. North of Madagascar 49° 22′ 45″ E. of Greenwich 47° 02′ 31″ E. of Paris 12° 15′ 04″ S.	FDG	By day, 325; by night, 650	—	600	P G [115 193], O ..	Third time-belt east of Greenwich belt 7 a.m. to 11 a.m. 1.30 p.m. to 5.30 p.m.	Francs. 0.50	Francs. —
Dzaoudzi	Mayotta Island (Comoro Islands) 45° 16′ 20″ E. of Greenwich 42° 56′ 15″ E. of Paris 12° 46′ 55″ S.	FDO	430	French Government	600	P G [116 195] ..	7 a.m. to 11 a.m., 2 p.m. to 5 p.m.	0.50	—
Majunga	Mozambique Channel 46° 20′ 14″ E. of Greenwich 44° 00′ 00″ E. of Paris 15° 43′ 00″ S.	FJA	430	French Government	600	P G [115 196] ..	7 a.m. to 11 a.m., 2 p.m. to 5 p.m.	0.50	—
MALTA									
Malta Island	14° 29′ 24″ E. 35° 55′ 17″ N.	VPT	200	Eastern Telegraph Co.	300, 600	P G	N [182]	0.30	—
Malta (Rinella Bay) ..	14° 32′ 00″ E. 36° 53′ 00″ N.	BYZ	—	British Navy ..	—	O	—	—	—
Malta (S. Angelo) ..	14° 31′ 00″ E. 36° 53′ 00″ N.	BYY	—	British Navy ..	—	O	—	—	—
MARIANNE ISLANDS									
Guam	144° 44′ 08″ E. 13° 27′ 12″ N.	NPN	100	U.S. Navy ..	300, 600, 1,800	P G	N	0.25	2.50
MEXICO									
Campeche	90° 34′ 36″ W. of Greenwich	XAB	300	—	600, 750, 900, 1,180	P G [119 120] ..	Time of the meridian of Tacubaya [121] 8 a.m. to 10 p.m.	0.30	3.00



Marconi 1½ kw. Automobile Station.
Mounted on Daimler Lorry-type Chassis.

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	8° 35′ 24″ E. of Tacubaya								
Guaymas	19° 51′ 40″ N. Sonora 110° 58′ 00″ W. of Greenwich	XAH	300	—	600, 750, 900, 1,180	P G	8 a.m. to 7 p.m.	0.30	3.00
	11° 48′ 00″ W. of Tacubaya								
Isla Maria Madre.. ..	27° 55′ 30″ N. 106° 35′ 25″ W. of Greenwich	XAD	300	—	600, 750, 900, 1,180	P G [118] ..	8 a.m. to 7 p.m.	0.30	3.00
	7° 25′ 25″ W. of Tacubaya								
Mazatlán de Sinaloa ..	21° 37′ 11″ N. Sinaloa 106° 29′ 00″ W. of Greenwich	XAE	180	—	600, 900	P G [118] [120] ..	8 a.m. to 7 p.m.	0.30	3.00
	7° 19′ 00″ W. of Tacubaya								
Payo Obispo	23° 16′ 00″ N. Quintana Roo 88° 25′ 00″ W. of Greenwich	XAC	300	—	600, 750, 900, 1,180	P G	8 a.m. to 10 p.m.	0.30	3.00
	10° 15′ 00″ W. of Tacubaya								
S. José del Cabo	18° 33′ 00″ N. South coast of Lower California 109° 42′ 00″ W. of Greenwich	XAF	180	—	600. 900	P G [118] ..	8 a.m. to 7 p.m.	0.30	3.00
	10° 32′ 00″ W. of Tacubaya								
S. Rosalia de la Baja, California	23° 03′ 00″ N. Lower California 112° 20′ 00″ W. of Greenwich	XAG	80	—	600	P G [118] ..	8 a.m. to 7 p.m.	0.30	3.00
	13° 10′ 00″ W. of Tacubaya								
Tuxpam de Veracruz ..	27° 24′ 00″ N. 97° 21′ 05″ W. of Greenwich	XA1	320	—	600, 750, 900, 1,180	P G	8 a.m. to 10 p.m.	0.30	3.00
	1° 48′ 55″ E. of Tacubaya								
Veracruz de Veracruz	20° 57′ 16″ N. 96° 07′ 16″ W. of Greenwich	XAA	300	—	600, 750, 900. 1,180	P G [119] [124] ..	8 a.m. to 10 p.m.	0.30	3.00
	3° 02′ 44″ E. of Tacubaya								
	19° 10′ 50″ N.								
MONTENEGRO									
Antivari	42° 08′ 00″ N. 19° 07′ 00″ E.	—	—	Compagnia di Antivari	—	—	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
MOROCCO	Meridian of Greenwich.						Greenwich time	Francs.	Francs.
Casablanca	7° 37′ 00″ W. of Greenwich 9° 57′ 00″ W. of Paris	CNP	430	—	600	P G	6 a.m. to 12 p.m.	0.25	—
Mogador	33° 36′ 30″ N. 9° 46′ 00″ W. of Greenwich 12° 06′ 00″ W. of Paris	CNY	430	—	600	P G	6 a.m. to 12 p.m.	0.25	—
Rabat	31° 31′ 00″ N. 6° 50′ 30″ W. of Greenwich 9° 10′ 30″ W. of Paris	CNF	110	—	450	O	6 a.m. to 7 a.m., 6 p.m. to 7 p.m.	—	—
Tangier	34° 02′ 15″ N. 5° 49′ 00″ W. of Greenwich 8° 09′ 00″ W. of Paris 35° 47′ 15″ N.	CNW	430	—	600	P G	6 a.m. to 12 p.m.	0.25	—
NEW ZEALAND									
Auckland Radio	174° 46′ 08.33″ E. 36° 50′ 36.78″ S.	VLD	325	Government ..	300, 600	P G [122] ..	Mean time of New Zealand [122] 8 a.m. to 6 p.m.	0.57.8 [117 122 200] 0.26.3 [123 199 200]	—
Awanui Radio	Auckland, Mongonui 137° 18′ 00″ E. 34° 54′ 00″ S.	VLA	By day, 300; by night, 600	Government ..	300, 600, 1,800, 2,500, 3,500	P G [122] ..	6.30 p.m. to 12 p.m. [201]	0.57.8 [117 122 200] 0.26.3 [123 199 200]	—
Awarua Radio	Otago, near Bluff Harbour 168° 23′ 00″ E. 46° 30′ 00″ S.	VLB	By day, 300; by night, 600	Government ..	300, 600, 2,000, 2,500 3,500	P G [122] ..	5.30 p.m. to 12 p.m. [201]	0.57.8 [117 122 200] 0.26.3 [123 199 200]	—
Chatham Islands ..	176° 57′ 00″ W. 43° 57′ 00″ S.	VLC	300	Government ..	600	P G [122]	9 a.m. to 1 p.m., 3 p.m. to 5 p.m., 7 p.m. to 12 p.m.	0.57.8 [117 122 200 202] 0.26.3 [123 199 200 202]	—
Wellington Radio ..	174° 46′ 39″ E. 41° 17′ 05″ S.	VLW	325	Government ..	300, 600	P G [122]	N	0.57.8 [117 122 200] 0.26.3 [123 199 200]	—

NIGERIA								
Lagos	3° 23′ 55″ E. 6° 26′ 35″ N.	VPY	250	African Direct Telegraph Co., Ltd.	300, 600	P G	Greenwich time: 7 a.m. to 9 p.m.; Sundays: 8 a.m. to 10 a.m., 4 p.m. to 6 p.m.	0.60	—
NORTH BORNEO								
Sandakan	118° 07′ 00″ E. 5° 50′ 00″ N.	VQB	400	—	300, 600	P G [103] ..	8 a.m. to 11 a.m., 2 p.m. to 5 p.m. (8 p.m. to 10 p.m.)[804]	0.60	—
NORWAY							Central European time		
Bergen Radio	North Sea coast 5° 22′ 00″ E. 60° 24′ 30″ N.	LGN	By day, 270; by night, 800	—	600	P G	N	0.14	1.40
Flekkerö	Skager Rak, near Christiansand 7° 59′ 00″ E. 58° 04′ 05″ N.	LDF	By day, 160; by night, 50	—	600	P G	N [126]	0.14	1.40
Ingö Radio	To the west of North Cape 24° 09′ 20″ E. 71° 04′ 25″ N.	LEI	480	—	600	P G	N,[127] 8 a.m. to 9 p.m. [128]	0.20	2.00
Karljohansvern	Christiania Fiord	LBZ	—	—	—	O	—	—	—
Röst	Lofoden Islands 12° 04′ 45″ E. 67° 30′ 24″ N.	LFR	35	—	600	P G [131] ..	9 a.m. to 1 p.m., 4 p.m. to 7.30 p.m. Holidays: 8 a.m. to 10 a.m.	0.14	1.40
Sörvaagen..	Lofoden Islands 13° 02′ 00″ E. 67° 53′ 30″ N.	LEN	35	—	600	P G [131] ..	9 a.m. to 1 p.m., 4 p.m. to 7.30 p.m. Holidays: 8 a.m. to 10 a.m.	0.14	1.40
Spitsbergen	Green Harbour 14° 14′ 27″ E. 78° 02′ 26″ N.	LFG	480	—	600	P G	N,[129] 8 a.m. to 9 p.m.[130]	0.20	2.00
Stavanger [13]	5° 45′ 00″ E. 58° 58′ 00″ N.	—	—	—	—	—	—	—	—
Tjömö	Christiania Fiord 10° 24′ 05″ E. 59° 03′ 05″ N.	LET	By day, 160; by night, 50	—	600	P G	N [126]	0.14	1.40
PORTUGAL									
Corvo	Azores 31° 07′ 35″ W. 39° 40′ 10″ N.	CRE	65	Government ..	300, 600	P G [132] ..	— [121]	0.60	—
Faial	Azores 28° 44′ 10″ W. 38° 38′ 00″ N.	CRC	130	Government ..	300, 600	P G [132] ..	N	0.60	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
PORTUGAL—*contd.*	Meridian of Greenwich.								
Flores	Azores 31° 08′ 10″ W. 39° 27′ 35″ N.	CRD	130	Government ..	300, **600**	P G [132] ..	Greenwich time. N	Francs. 0.60	Francs. —
Lisbon CRF	9° 08′ 20″ W. 38° 42′ 18″ N.	CRF	190	Government ..	300, 450, **600**	P G	N	0.40	—
Lisbon	—	—	—	—	—	Long-distance service	—	—	—
Madeira Island	—	—	—	Government ..	—	—	—	—	—
Oporto	—	—	—	Government ..	—	—	—	—	—
Santa Maria	Azores 25° 08′ 20″ W. 36° 59′ 55″ N.	CRB	65	Government ..	300, **600**	P G [134] ..	N	0.60	—
San Miguel	Azores 25° 42′ 50″ W. 37° 44′ 30″ N.	CRA	65	Government ..	300, **600**	P G [130] ..	N	0.60	—
St. Vincent Island ..	—	—	—	Government ..	—	—	—	—	—
ROUMANIA									
Constantza-Tunnel ..	28° 39′ 03″ E. of Greenwich 26° 19′ 10″ E. of Paris 44° 10′ 32″ N.	CVS	240	State Maritime Service	600	P R [133] ..	N. during the voyages of the Roumanian ships	0.15	1.50
RUSSIA							Time of Petrograd, 2 hours in advance of Greenwich time		
Anadyr	Behring Sea 175° 35′ 00″ E. 64° 34′ 00″ N.	RNR	130	—	300, 420, **600**	P G	11 a.m. to 7 p.m.	0.60	—
Arkhangel	Mouth of the Dwina 40° 30′ 00″ E. 64° 32′ 00″ N.	RQA	250	—	300, 420, **600**	P G	8 a.m. to 10 a.m., 12 a.m. to 2 p.m., 8 p.m. to 12 p.m.	0.60 [139]	—[139]
Batoum	Black Sea 41° 40′ 00″ E. 41° 36′ 00″ N.	REI	—	—	—	O	—	—	—

Fort d'Alexandrovsk ..	Coast of the Caspian Sea 50° 16′ 40″ E. 44° 30′ 14″ N.	RNF	160	—	300. 420, 600	P G	5,50 a.m. to 9.50 a.m., 11.50 a.m. to 3.50 p.m.	0.60	—
Hapsal	Esthonia 23° 48′ 00″ E. 59° 00′ 00″ N.	REC	—	—	—	O	—	—	—
Helsingfors	24° 57′ 00″ E. 60° 27′ 00″ N.	REB	—	—	60	O	—	—	—
Kerbinskaïa	River Amgoun. a tributary of the Amur 136° 34′ 18″ E. 52° 20′ 07.3″ N.	RPN	170	—	—	—[116]	X	—	—
Kerch	Crimea 36° 27′ 00″ E. 45° 18′ 00″ N.	REH	—	—	—	O	—	—	—
Kronstadt..	29° 47′ 00″ E. 59° 59′ 00″ N.	REA	—	—	360	O	—	—	—
Libau RED	21° 05′ 00″ E. 56° 30′ 00″ N.	RED	—	—	360	O	—	—	—
Libau ROL	Baltic Sea 20° 50′ 00″ E. 56° 31′ 40″ N.	ROL	170	—	300, 420. 600	P G	6 a.m. to 10 p.m.	0.60	—
Mare-Sale	Kara Sea, Yamal Peninsula 66° 48′ 38″ E. 69° 42′ 59″ N.	RTM	150	—	300, 420, 600	P G	8 a.m. to 10 a.m., 12 a.m. to 2 p.m., 8 p.m. to 12 p.m.	0.60[139]	—[139]
Naïakhan	Sea of Okhotsk 159° 59′ 00″ E. 61° 33′ 00″ N.	RNN	130	—	300, 420, 600	P G	11 a.m. to 7 p.m.	0.60	—
Nicolaiewsk RAU ..	On the Amur	RAU	—	—	—	O	—	—	—
Nicolaiewsk RNL ..	Mouth of the Amur 140° 42′ 54.4″ E. 53° 08′ 19.3″ N.	RNL	240	—	300, 600	P G[135] ..	N	0.60	—
Odessa	—	RAR	—	—	—	O	—	—	—
Okhotsk	Sea of Okhotsk 143° 20′ 00″ E. 59° 22′ 00″ N.	ROT	130	—	300, 420, 600	P G	5 a.m. to 9 p.m.	0.60	—
Pétropavlovsk	Kamtchatka 158° 38′ 45″ E. 53° 00′ 10″ N.	RPK	240	—	300, 600	P G	N	0.60	—
Pétrowsk Daghestan ..	Coast of the Caspian Sea 7° 30′ 00″ E. 42° 59′ 20″ N.	ROK	160	—	300, 420, 600	P G	5.50 a.m. to 9.50 a.m., 11.50 a.m. to 3.50 p.m.	0.60	—
Presté	Aland Islands 20° 21′ 00″ E. 60° 16′ 00″ N.	REF	—	—	360	O	—	—	—
Rade d'Astrakhan ..	Caspian Sea 47° 25′ 00″ E. 45° 15′ 00″ N.	RQT	110	—	300, 420 600	P G	5.50 a.m. to 9.50 a.m., 11.50 a.m. to 3.50 p.m.[138]	0.13	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
RUSSIA—*contd.*	Meridian of Greenwich.						Time of Petrograd, 2 hours in advance of Greenwich time	Francs.	Francs.
Rade de Taganrog ..	Sea of Azov 38° 14′ 10″ E. 46° 59′ 50″ N.	ROE	110	—	300, 420, 600	P G [140]	6 a.m. to 10 p.m.	0.60 [139 140]	— [139 140]
Reval	24° 15′ 00″ E. 59° 20′ 00″ N.	ROR	170	—	300, 420, 600	P G	6 a.m. to 10 p.m.	0.60	—
Riga	24° 06′ 15″ E. 56° 59′ 53″ N.	RRG	160	—	300 420, 600	P G [137]	6 a.m. to 10 p.m.	0.60	—
Rouno	Gulf of Riga 23° 15′ 40″ E. 57° 48′ 00″ N.	RRN	70	—	300, 420, 600	P G	8 a.m. to 12 a.m., 2 p.m. to 5 p.m., 8 p.m. to 9 p.m.	0.60	—
Sébastopol	33° 33′ 00″ E. 44° 37′ 00″ N.	REG	—	—	360	O	—	—	—
Taganrog	Sea of Azov 38° 48′ 00″ E. 47° 12′ 00″ N.	RRT	170	—	300, 420, 600	P G [140] ..	6 a.m. to 10 p.m.	0.60 [139 140]	— [139 140]
Vaigatch	Vaigatz Island Kara Strait 58° 48′ 00″ E. 70° 23′ 46″ N.	RTV	150	—	300, 420, 600	P G	8 a.m. to 10 a.m., 12 a.m. to 2 p.m., 8 p.m. to 12 p.m.	0.60 [139]	— [139]
Vladivostok RAS ..	131° 54′ 00″ E. 43° 06′ 00″ N.	RAS	—	—	1,200 approximately	O	—	—	—
Vladivostok REJ ..	131° 53′ 22.5″ E. 43° 06′ 49.2″ N.	REJ	—	—	360	O	—	—	—
Wiborg	28° 49′ 00″ E. 61° 00′ 00″ N.	RAW	—	—	1,200 approximately	O	—	—	—
Yougorski-Char	Kara Sea, Jugor Strait 60° 45′ 42″ E. 69° 49′ 07″ N.	RTU	150	—	300, 420, 600	P G	8 a.m. to 10 a.m., 12 a.m. to 2 p.m., 8 p.m. to 12 p.m.	0.60 [139]	— [139]
SAN DOMINGO (REPUBLIC OF)									
La Romana	—	HIB	—	—	600	P G [206]	Local time: 8 a.m. to 12 a.m., 2 p.m. to 5 p.m.	0.60 [207] 0.30 [208]	— —
San Domingo	—	HIA	—	—	600	P G [206]	Local time: 8 a.m. to 12 a.m., 2 p.m. to 5 p.m.	0.60 [207] 0.30 [208]	— —

SIAM									
Bangkok	100° 32′ 00″ E. 13° 44′ 30″ N.	HGA	By day, 300; by night, 600	—	300, 600, 1,600, 1,800	O	—	0.40	4.00
Singora	Gulf of Siam, Malay Peninsula	HGB	By day, 300; by night, 600	—	300, 600, 1,600, 1,800	O	—	0.40	4.00
SIERRA LEONE									
Sierra Leone	13° 14′ 00″ W. 8° 30′ 00″ N.	VPU	250	African Direct Telegraph Co., Ltd. ..	300, 600	P G	Greenwich time 7 a.m. to 9 p.m. Sundays: 8 a.m. to 10 a.m., 4 p.m. to 6 p.m.	0.60	—
SOUTH AFRICA (UNION OF)									
Capetown	18° 19′ 00″ E. 34° 09′ 00″ S.	VNC	350	Government ..	300, 600	P G [141 111] ..	N	0.60	—
Durban	31° 03′ 50″ E. 29° 52′ 40″ S.	VND	250	Government ..	300, 600	P G [141]	N	0.60	—
Pretoria	—	—	—	—	—	—	—	—	—
SPAIN									
(a) Mother-Country									
Almeria	2° 31′ 15″ W. 36° 51′ 00″ N.	EGA	220	Army	600, 900	O	N	—	—
Aranjuez	3° 40′ 32″ W. 40° 01′ 48″ N.	EAA	430	Compania Nacional de T.S.H.	300, 600, 2,130	P G	N	0.45	4.50
Barcelona EAB	2° 06′ 28″ E. 41° 18′ 42″ N.	EAB	430	Compania Nacional de T.S.H.	300, 600, 2,300	P G	N	0.45	4.50
Barcelona EGE	2° 03′ 52″ E. 41° 23′ 08″ N.	EGE	430	Army	600, 1,000, 1,600	O	N	—	—
Bilbao	2° 55′ 34″ W. 43° 23′ 53″ N.	EGH	320	Army	600, 1,200, 1,600	O	N	—	—
Cabo de Palos	0° 40′ 00″ E. 37° 38′ 00″ N.	EAP	202	Compania Nacional de T.S.H.	300, 600, 1,800	P G	N	0.45	4.50
Cabo Finisterre [145] ..	9° 16′ 18″ E. 42° 52′ 40″ N.	EAF	210	Compania Nacional de T.S.H.	300, 600, 1,800	P G	N	0.45	4.50
Cabo Mayor	Santander 3° 48′ 30″ W. 43° 30′ 00″ N.	EAS	108	Compania Nacional de T.S.H.	300, 600, 1,800	P G	N	0.45	4.50
Cádiz	6° 17′ 42″ W. 36° 31′ 30″ N.	—	6	—	70	P [143]	—	—	—
Cádiz EAC	6° 16′ 14″ W. 36° 29′ 45″ N.	EAC	860	Compania Nacional de T.S.H.	300, 600, 2,540	P G	N	0.45	4.50
Coruña	8° 24′ 13″ W 43° 24′ 29″ N.	EGJ	430	Army	600, 1,200, 1,600	O	N	—	—
Guadalajara	3° 10′ 09″ W. 40° 37′ 54″ N.	EGZ	54	Army	900	O	N	—	—

Land Stations—*Continued.*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
SPAIN—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Huelva	—	—	—	Compania Nacional de T.S.H.	—	—	—	—	—
Las Palmas	15° 22′ 10″ W. 28° 00′ 00″ N.	EAL	860	Compania Nacional de T.S.H.	300, **600**, 2,540	P G	N	0.45	4.50
Madrid EBZ	3° 43′ 00″ W. 40° 25′ 00″ N.	EBZ	15	Navy	225, 300	O	N	—	—
Madrid EGC	3° 50′ 30″ W. 40° 24′ 30″ N.	EGC	540	Army	600, 900, 1,600, 2,000, 2,500	O	N	—	—
Mahon	Minorca 4° 22′ 39″ E. 39° 52′ 29″ N.	EGI	320	Army	600, 1,200, 1,600	O	N	—	—
Malaga	—	—	—	Compania Nacional de T.S.H.	—	P G	—	—	—
Matagorda	Gulf of Cadiz 6° 14′ 54″ W. 36° 31′ 30″ N.	—	6	—	70	P [113]	—	—	—
San Fernando (Cádiz) ..	—	EBY	—	—	—	O	N	—	—
Sóller	Majorca 2° 45′ 40″ E. 39° 45′ 15″ N.	EAO	270	Compania Nacional de T.S.H.	300, **600**	P G	N	0.45	4.50
Teneriffe	16° 15′ 00″ W. 28° 28′ 30″ N.	EAT	860	Compania Nacional de T.S.H.	300, **600**, 2,540	P G	N	0.45	4.50
Valencia	0° 22′ 46″ W. 39° 27′ 10″ N.	EGG	320	Army	600, 1,200 1,600	O	N	—	—
Vigo	8° 40′ 00″ W. 42° 15′ 00″ N.	EAV	430	Compania Nacional de T.S.H.	300, **600**, 2,900	P G	N	0.45	0.50
(b) Morocco									
Ceuta	5° 16′ 24″ W. 35° 48′ 40″ N.	EGD	320	Army	600,1,200,1,500	O	N	—	—
Larache	6° 12′ 00″ W. 35° 12′ 00″ N.	EGF	220	Army	600, 900, 1,200	O	N	—	—
Melilla	2° 56′ 25″ W. 35° 18′ 15″ N.	EGB	320	Army	600,1,200,1,600	O	N	—	—
(c) In the Gulf of Guinea.									
Santa Isabel de Fernando Póo	8° 48′ 40″ E. 3° 46′ 00″ N.	EAY	130	Government ..	**600**, 750, 900	P G [146]	Local time 6 a.m. to 9 a.m. 7 a.m. to 10 p.m.	0.55 [147]	5.50 [147]

SWEDEN									
Gothenburg (Göteborg) ...	11° 53′ 46″ E. 57° 41′ 05″ N.	SAB	350	Government ..	300 600	P G	N	0.14	1.40
Karlskrona	15° 35′ 30 E. 56° 09′ 10″ N	SAA	420	Marine Dept. ..	600	P G	N	0.14	1.40
Oscar-Fredriksborg ..	Near Stockholm 18° 26′ 42″ E. 59° 23′ 48″ N.	SAD	50	Marine Dept. ..	600	P G	—	0.14	1.40
Tingstäde	Gothland 18° 35′ 30″ E. 57° 43′ 50″ N.	SAE	420	Marine Dept. ..	600	P G	—	0.14	1.40
Trälleborg..	13° 09′ 45″ E. 55° 22′ 10″ N.	SAC	250	State Railways ..	300, 375, 600	P R [148] O [149] ..	N	0.14	1.40
Vaxholm	—	SAF	—	—	600	P G ..	N Central European time	0.14	1.40
TUNIS									
Bizerte	In Sidi Abdallah 9° 49′ 00″ E. of Greenwich 7° 29′ 00″ E. of Paris 37° 16′ 00″ N.	FUA	—	French Navy ..	—	O	9 a.m. to 12 p.m.	—	—
Cap Bon	11° 02′ 23″ E. of Greenwich 8° 42′ 23″ E., of Paris 37° 04′ 48″ N.	FFT	100	French Navy ..	300, 600	P G	7 a.m. to 10 p.m.	0.40 [150]	— [150]
TURKEY									
Constantinople (Ok Meiddan)	—	—	—	—	—	—	—	—	—
UNITED STATES OF AMERICA									
Annapolis, Maryland ..	Chesapeake Bay 76° 29′ 12″ W. 38° 59′ 00″ N.	NAK	100	U.S. Navy ..	600	O [140]	Time of the meridian 75° west of Greenwich : 8 a.m. to 10.0 p.m.	—	—
Arlington Radio	Virginia, near Washington, D.C. 77° 04′ 47.20″ W. 38° 52′ 05.20″ N.	NAA	1,000	U.S. Navy ..	2,500	O [137 140 189] ..	N	—	—
Ashtabula	Ohio 80° 40′ 00″ W. 41° 52′ 00″ N.	WSA	—	Marconi Co. ..	300, 600	P G	Time of the meridian 90° west of Greenwich : 6.30 a.m. to 6.30 p.m.	0.15	1.50
Astoria, Oregon	124° 00′ 00″ W. 46° 10′ 00″ N.	KPC	300	Marconi Co. ..	300, 600	P G	N	0.15 [185] 0.60 [159]	1.50 [186] 6.00 [189]
Avalon, California ..	S. Catalina Island 118° 20′ 00″ W. 33° 21′ 00″ N.	KPI	75	Marconi Co. ..	300, 600	P R [144]	Time of the meridian 120° west of Greenwich : 7 a.m. to 8 p.m.	0.10 [218 219]	1.00 [218 219]

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Baltimore, Maryland ..	76° 36′ 41″ W. 39° 17′ 22″ N.	WBS	150	Marconi Co. ..	300, 550, **600**	P G	Time of the meridian 75° west of Greenwich: 6 a.m. to 12 p.m.	0.30	3.00
Beaufort, North Carolina	76° 40′ 21″ W. 34° 43′ 12″ N.	NAN	100	U.S. Navy ..	300, **600**	O [160 161] ..	N	—[161]	—
—— Belmar	New Jersey 74° 02′ 00″ W. 40° 10′ 45″ N.	WII	—	Marconi Co. ..	—	—	—	—	—
—— Benton Harbour	Michigan 86° 27′ 23″ W. 42° 06′ 58″ N.	WBN	—	Marconi Co. ..	—	—	—	—	—
Binghamton	New York 75° 55′ 00″ W. 42° 08′ 00″ N.	WBT	150	— [220]	1,610	— [221]	X	—	—
Bolinas, California ..	122° 40′ 45″ W. 37° 54′ 30″ N.	KET	—	Marconi Co. ..	—	—	—	—	—
Boston NAD	Massachusetts 71° 03′ 24″ W. 42° 22′ 24″ N.	NAD	200	U.S. Navy ..	600, 1,000	O [160]	N	—	—
Boston WBF	Massachusetts 71° 03′ 40″ W. 42° 21′ 19″ N.	WBF	175	Marconi Co. ..	300, **600**	P G	N	0.30 [158] 0.60 [159]	3.00 [158] 6.00 [159]
Boston WCH	Massachusetts 71° 03′ 18″ W. 42° 21′ 33″ N.	WCH	300.450	National Electric Signalling Co.	300, **600**, 1,610, 2,000, 2,400, 2,800	P [161]	X	—	—
Brooklyn, New York ..	74° 00′ 23″ W. 40° 39′ 23″ N.	WCG	500, 600	National Electric Signalling Co.	300, **600**, 1,620, 2,000, 2,400, 2,800	P R [209]	Time of the meridian 75° west of Greenwich: 4 a.m. to 9 p.m.	0.15	1.50
—— Buffalo, New York State	78° 52′ 36″ W. 42° 52′ 49″ N.	WBL	125	Marconi Co. ..	300, **600**	P G [216]	—	0.15	1.50
Burrwood	Louisiana 89° 22′ 45″ W. 28° 58′ 04″ N.	WBW	—	Tropical Radio Tel. Co.	—	—	—	—	—
—— Calumet, Michigan ..	88° 27′ 12″ W. 47° 15′ 12″ N.	WCM	—	Marconi Co. ..	—	— [211]	—	—	—
Cape Blanco	Oregon 124° 33′ 30″ W. 42° 50′ 22″ N.	NPF	100	U.S. Navy ..	300, **600**	P G [200]	N	0.30	3.00

— Cape Cod	Massachusetts 70° 03′ 54″ W. 42° 02′ 22″ N.	NAE	100	U.S. Navy ..	300, 600	O [163] [172] ..	N	—[161]	—[161]
— Cape Hatteras	Buxton, N.C. 75° 31′ 21″ W. 35° 15′ 58″ N.	WHA	300	Marconi Co. ..	300, 600	P G	N	0.30	3.00
— Cape May	New Jersey entrance to Delaware Bay 74° 55′ 46″ W. 38° 55′ 50″ N.	WCY	250	Marconi Co. ..	300, 600	P G	N	0.30 [158] 0.60 [159]	3.00 [188] 6.00 [189]
— Charleston, South Carolina	79° 57′ 42″ W. 32° 51′ 38″ N.	NAO	200	U.S.Navy ..	300, 600. 1,000 1,800	P G [180] [188] ..	N	0.30	3.00
— Chicago	Illinois 87° 37′ 30″ W. 41° 52′ 30″ N. 41° 52′ 30″ N.	WGO	125	Marconi Co. ..	300, 600	P G [213]	Time of the meridian 90° west of Greenwich, Apl. 15th to Dec. 15th [138]: 12.30 a.m. to 7 a.m., 8 a.m. to 11.30 a.m., 12.30 p.m. to 7 p.m. 8 p.m. to 11.30 p.m.	0.15	1.50
— Cleveland, Ohio	81° 41′ 13″ W. 41° 29′ 59″ N	WCX	175	Marconi Co. ..	300, 600	P G	N [189]	0.15	1.50
— Detroit, Michigan ..	83° 04′ 52″ W. 42° 18′ 42″ N.	WDR	150	Marconi Co. ..	300, 600	P G	N	0.15	1.50
Diamond Shoals Lightship	Off Cape Hatteras 75° 18′ 38″ W. 35° 05′ 08″ N.	NLB	60	U S. Navy ..	300, 600	O [160] [164] [165] ..	Time of the meridian 75° west of Greenwich: 8 a.m. to 10 p.m.[166]	—	—
Douglas, Arizona.. ..	109° 22′ 24″ W. 31° 20′ 41″ N.	KDC	75	Copper Queen Consolidated Mining Co.	300, 600	P	Time of the meridian 120°west of Greenwich: 10 a.m. to 11 a.m., 4 p.m. to 5 p.m.	—	—
Dover, New Jersey ..	74° 33′ 00″ W. 40° 53′ 00″ N.	WBX	—	—[230]	—	—	—	—	—
— Duluth, Minnesota ..	92° 07′ 10″ W. 46° 47′ 06″ N.	WDM	190	Marconi Co. ..	300, 600	P G [214] ..	—[167]	0.15	1.50
East San Pedro, California	118° 17′ 00″ W. 33° 44′ 00″ N.	KPJ	350	Marconi Co. ..	300, 600	P G	N	0.30 [158] 0.60 [159]	3.00 [188] 6.00 [189]
El Paso, Texas	106 29′ 00″ W. 31° 48′ 06″ N.	WEP	—	Federal Telegraph Co.	2,000, 2,500. 2,900, 3,500	—[146]	Time of the meridian 90° west of Greenwich: 4 a.m. to 7 p.m.	—	—
Eureka, California KPM	124° 11′ 00″ W. 40° 47′ 30″ N.	KPM	—	Marconi Co. ..	—	—	—	—	—
Eureka, California NPW	Table Bluff 124° 16′ 22″ W. 40° 41′ 44″ N.	NPW	200	U.S. Navy ..	300, 600, 1,000, 1,800	P G [180] [188] ..	N	0.30	3.00
Farallons	California, to the west of S. Francisco 123° 00′ 04″ W. 37° 41′ 58″ N.	NPI	100	U.S. Navy ..	300, 600	O [160]	N	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Fire Island	New York, south coast of Long Island 73° 13′ 08″ W. 40° 37′ 57″ N.	NAG	100	U.S. Navy ..	300, 600	O [140]	N	—	—
Fort Andrews	Massachusetts	WUA	—	U.S. Army ..	—	O	—	—	—
Fort Hancock, New Jersey	—	WUB	—	U.S. Army ..	—	O	—	—	—
Fort H. G. Wright ..	New York	WUC	—	U.S. Army ..	—	O	—	—	—
Fort Leavenworth WUD	Kansas 94° 55′ 31″ W. 39° 21′ 00″ N.	WUD	—	U.S. Army ..	1,800	O	—	—	—
Fort Leavenworth WUV [169]	Kansas	WUV	—	U.S. Army ..	—	O	—	—	—
Fort Levett	Maine	WUE	—	U.S. Army ..	—	O	—	—	—
Fort Monroe WUF ..	Virginia	WUF	—	U.S. Army ..	—	O	—	—	—
Fort Monroe WUG [170] ..	Virginia	WUG	—	U.S. Army ..	—	O	—	—	—
Fort Morgan, Alabama ..	88° 01′ 23″ W. 30° 13′ 42″ N.	WFM	—	Marconi Co. ..	300, 600	P G	Time of the meridian 90° west of Greenwich : 7 a.m. to 7 p.m. [222]	—	—
Fort Omaha	Nebraska 95° 57′ 35″ W. 41° 18′ 50″ N.	WUH	—	U.S. Army ..	1,500	O	—	—	—
Fort Riley, Kansas ..	96° 47′ 01″ W. 39° 04′ 35″ N.	WUI	—	U.S. Army ..	1,200	O	—	—	—
Fort Sam Houston ..	Texas 98° 27′ 31″ W. 29° 27′ 04″ N.	WUJ	—	U.S. Army ..	—	O	—	—	—
Fort Stevens	Oregon	WUK	—	U.S. Army ..	—	O	—	—	—
Fort Terry, New York ..	—	WUW	—	U.S. Army ..	300	—	—	—	—
Fort Totten	New York	WUL	—	U.S. Army ..	—	O	—	—	—
Fort Winfield Scott ..	California	WUO	—	U.S. Army ..	—	O	—	—	—
Fort Wood	New York	WUM	—	U.S. Army ..	—	O	—	—	—
Fort Worden	Washington	WUN	—	U.S. Army ..	—	O	—	—	—
Fort Worth	Texas 97° 22′ 10″ W. 32° 42′ 33″ N.	WFF	—	Federal Telegraph Co.	2,000, 2,500, 2,900, 3,500	— [171]	Time of the meridian 90° west of Greenwich : 6 a.m to 6 p.m.	— [124]	—
——Frankfort, Michigan ..	86° 14′ 17″ W. 44° 37′ 46″ N.	WFK	150	Marconi Co. ..	300, 600	— [222]	N	—	—

Friday Harbor	Washington, Washington Sonnd 123° 00′ 00″ W. 48° 30′ 00″ N.	KPD	200	Marconi Co. ..	300 600	P G	Time of the meridian 120° west of Greenwich : 7 a.m. to 2.30 a.m.	0.15 [158] 0.60 [159]	1.50 [158] 6.00 [158]
Frying Pan Shoals Lightship	North Carolina, off Cape Fear 77° 48′ 20″ W. 33° 33′ 30″ N.	NLC	60	U.S. Navy ..	300, 600	O [160 165 173] ..	Time of the meridian 75° west of Greenwich : 8 a.m. to 10 p.m. [166]	—	—
Galveston	Texas 94° 46′ 52″ W. 29° 18′ 54″ N.	WGV	200	Marconi Co. ..	300, 600	P G	N	0.30	3.00
Grand Haven	Michigan 86° 14′ 51″ W. 43° 03′ 17″ N.	WGH	125	Marconi Co. ..	300, 600	P R [224]	Time of the meridian 90° west of Greenwich : 3 p.m. to 6 a.m.	0.15	1.50
Grand Marais	Minnesota 90° 20′ 00″ W. 47° 45′ 00″ N.	WGM	120	Marconi Co.	300, 600	P R [225]	Time of the meridian 90° west of Greenwich : 7 a.m. to 11.45 a.m., 1 p.m. to 5.45 p.m., 6.15 p.m. to 7 p.m.	0.15	1.50
Hillcrest, Daly City ..	California 122° 30′ 00″ W. 37° 48′ 00″ N.	KPH	400	Marconi Co. ..	300, 600	P G	N	0.15 [158] 0.60 [159]	1.50 [158] 6.00 [159]
Hoboken, New Jersey ..	74° 02′ 00″ W 40° 43′ 00″ N.	WBU	—	—	—	O	—	—	—
Hollister, California ..	121° 24′ 00″ W. 36° 55′ 43″ N.	KGH	200	Geo. Hewlett Incorp.	300, 600 1,700	— [226]	X	—	—
Isle Royal	Michigan 89° 13′ 45″ W. 47° 52′ 36″ N.	WRO	—	Marconi Co. .	300, 600	—	—	—	—
Jacksonville, Florida ..	Mouth of St. John's River 81° 38′ 56″ W. 30° 18′ 25″ N.	WJX	200	Marconi Co. ..	300, 600	P G	Time of the meridian 90° west of Greenwich : 5.30 a.m. to 12 p.m.	0.30	3.00
Jupiter	East coast of Florida 80° 04′ 55″ W. 26° 56′ 52″ N.	NAQ	200	U.S. Navy ..	300, 600, 1,800	P G [160] ..	N	0.30	3.00
Key West, Florida ..	81° 48′ 26″ W. 24° 33′ 28″ N.	NAR	400	U.S. Navy ..	300, 600, 1,000, 1,800	P G [160 163] ..	N	0.30	3.00
Los Angeles, California KEX	118° 15′ 00″ W. 34° 03′ 00″ N.	KEX	200	Marconi Co. ..	300, 600	P [156]	Time of the meridian 120° west of Greenwich : 9 a.m. to 5 p.m.	0.15 [158] 0.60 [159]	1.50 [151] 6.00 [151]
Los Angeles, California KLS	118° 15′ 00″ W. 34° 04′ 00″ N.	KLS	—	Federal Telegraph Co.	—	—	—	—	—
Ludington, Michigan ..	86° 26′ 19″ W. 43° 56′ 47″ N.	WLD	125	Marconi Co. ..	300, 600	P G [212] ..	Time of the meridian 90° west of Greenwich : April 15th to Dec. 15th, [220] 7 a.m. to 6 p.m., 7 p.m. to 6 a.m.	0.15	1.50
Mackinac Island	Michigan	WHQ	—	Marconi Co. ..	—	—	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich							Francs.	Francs
Manistique	Michigan 86° 15′ 36″ W. 45° 57′ 36″ N.	WMX	—	Marconi Co. ..	—	— [333]	—	—	—
Manitowoc	Wisconsin 87° 39′ 17″ W. 44° 05′ 18″ N.	WMW	150	Marconi Co. ..	300, **600**	P G [313]	Time of the meridian 90° west of Greenwich: 8 a.m. to 11.30 a.m., 2.30 p.m. to 6 p.m., 7.30 p.m. to 9 p.m.	0.15	1.50
Mare Island	California 122° 15′ 56″ W. 38° 05′ 03″ N.	NPH	200	U.S. Navy ..	600, 1,000	O [160 168] ..	N	—	—
Marshfield, Oregon ..	124° 12′ 50″ W. 43° 22′ 26″ N.	KPX	150	Marconi Co. ..	300, **600**	P G	Time of the meridian 120° west of Greenwich: 8 a.m. to 6 p.m.	0.15 [138] 0.60 [139]	1.50 [138] 6.00 [138]
Miami, Florida	South-east coast of Florida 80° 07′ 15″ W. 25° 48′ 21″ N.	WST	—	Marconi Co. ..	300, **600**, 1,800	P G [338]	N	0.30	3.00
Milwaukee	Wisconsin 87° 55′ 27″ W. 43° 02′ 49″ N.	WME	150	Marconi Co. ..	300, **600**	P G [313]	Time of the meridian 90° west of Greenwich: 1.30 a.m. to 6 a.m., 7 a.m. to 12.30 p.m., 1.30 p.m. to 6 p.m., 7 p.m. to 12.30 a.m.	0.15	1.50
Mobile, Alabama ..	88° 02′ 27″ W. 30° 41′ 34″ N.	WMB	200	Marconi Co. ..	300, **600**	P G	Time of the meridian 90° west of Greenwich: 7 a.m. to 7 p.m.	0.30	3.00
Nantucket Shoals Lightship	To the east of Newport, R.I., south end of shoals 69° 36′ 33″ W. 40° 37′ 05″ N.	NLA	60	U.S. Navy ..	300, **600**	O [160 165 178] ..	Time of the meridian 75° west of Greenwich: 1 a.m. to 12 p.m. [166]	—	—

New London, Connecticut	72° 05′ 25″ W. 41° 19′ 00″ N.	WLC	—	T. A. Scott Co. Incorp.	300, 510, 600, 1,610, 1,700, 1,800, 1,900, 2,000	P G	Time of the meridian 75° west of Greenwich : 8 p.m. to 4 a.m.	0.15 [147] 0.30 [158] 0.60 [159]	1.50 [147] 3.00 [158] 6.00 [159]
New Orleans NAT ..	Louisiana, Algiers 90° 02′ 18″ W. 29° 56′ 50″ N.	NAT	100	U S. Navy ..	600, 1,000	O [160 161] ..	Time of the meridian 90° west of Greenwich : 8 a.m. to 10 p.m. [161]	—	—
New Orleans WHK ..	Louisiana 90° 04′ 18″ W. 29° 57′ 19″ N.	WHK	150	Marconi Co. ..	300, 600	P G	N	0.30	3.00
New Orleans WNU [18] ..	Louisiana 90° 06′ 20″ W. 30° 00′ 20″ N.	WNU	—	Tropical Radio Telegraph Co.	—	— [226]	—	—	—
Newton, Massachusetts ..	71° 10′ 51″ W. 42° 21′ 14″ N.	WLN	100	R.C. Emery ..	300, 600, 1,650, 2,000	P [229]	X	—	—
Newport, Rhode Island NAF	71° 19′ 44″ W. 41° 29′ 17″ N.	NAF	200	U.S. Navy ..	600, 1,000	O [160 189] ..	N	—	—
Newport, Rhode Island, WCI	71° 18′ 58″ W. 41° 29′ 15″ N.	WCI	50	National Electric Signalling Co.	300, 400, 500, 600	P G	Time of the meridian 75° west of Greenwich : 7 p.m. to 5 a.m	0.15 [229] 0.30 [227] 0.60 [159]	1.50 [226] 3.00 [227] 6.00 [159]
New York City WHD ..	74° 00′ 00″ W. 40° 45′ 00″ N.	WHD	—	New York City Fire Department	—	—	—	—	—
New York WHI [187] ..	73° 59′ 31″ W. 40° 53′ 50″ N.	WHI	—	Marconi Co. ..	300, 600	P G	N	0.30 [155] 0.60 [160]	3.00 [156] 6.00 [160]
New York NAH ..	Brooklyn 73° 58′ 51″ W. 40° 41′ 58″ N.	NAH	150	U.S. Navy ..	600, 1,000	O [160 189] ..	N	—	—
New York WHB ..	74° 00′ 50″ W. 40° 42′ 02″ N.	WHB	300	New York Herald Co.	300, 600, 1,610	P G [174] ..	N	0.60	6.00
New York WNT ..	74° 00′ 00″ W. 40° 42′ 00″ N.	WNT	350	Atlantic Communication Co.	300, 600, 1,800 [178]	P G	N	0.30 [158] 0.60 [159]	3.00 [158] 6.00 [159]
Norfolk, Virginia ..	76° 17′ 41″ W. 36° 49′ 39″ N.	NAM	200	U.S. Navy ..	600, 1,000	O [1-0 189] ..	N	—	—
North Head	Washington, Estuary of Columbia River 124° 04′ 34″ W. 46° 17′ 42″ N.	NPE	400	U.S. Na ..	300, 600, 1,000, 1,800	P G [160 168] ..	N	0.30	3.00
Pensacola, Florida ..	Gulf of Mexico 87° 16′ 13″ W. 30° 20′ 54″ N.	NAS	100	U.S. Navy ..	300, 600, 1,800	P G [160] ..	N	0.30	3.00
Philadelphia NAI ..	Pennsylvania 75° 10′ 46″ W. 39° 53′ 18″ N.	NAI	150	U.S. Navy ..	600	O [160]	N	—	—
Philadelphia WHE [187] ..	Pennsylvania 75° 09′ 44″ W. 39° 57′ 06″ N.	WHE	250	Marconi Co. ..	300, 600, 1,610 [179]	P G	N	0.30 [158] 0.60 [159]	3.00 [158] 6.00 [159]
Phœnix, Arizona ..	112° 05′ 30″ W. 33° 26′ 30″ N.	KHQ	—	Federal Telegraph Co.	—	—	—	—	—
Point Arguello	California 120° 38′ 48″ W. 34° 34′ 35″ N.	NPK	100	U.S. Navy ..	300, 600	P G [168 168] ..	N	0.30	3.00

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich							Francs.	Francs.
Port Arthur, Texas ..	93° 56′ 02″ W. 29° 52′ 01″ N.	WRU	200	Marconi Co. ..	300, **600**	P G	Time of the meridian 90° west of Greenwich : 7 a.m. to 12 p.m.	0.30	3.00
Portland, Maine	70° 12′ 03″ W. 43° 33′ 42″ N.	NAB	100	U.S. Navy ..	300, **600**	O [160] [161] ..	Time of the meridian 75° west of Greenwich : 8 a.m. to 10 p.m.[160]	— [161]	—
Portsmouth, New Hampshire	70° 44′ 00″ W. 43° 04′ 33″ N.	NAC	150	U.S. Navy ..	600	O [160]	N	—	—
Puget Sound	Washington, 122° 38′ 19″ W. 47° 33′ 47″ N.	NPC	200	U.S. Navy ..	600	O	N	—	—
Sagaponack	New York 17° 72′ 02″ W. 40° 54′ 44″ N.	WSK	—	Marconi Co. ..	300, **600**	P G	N	0.30 [158] 0.60 [159]	3.00 [158] 6.00 [159]
St. Augustine, Florida ..	North-east coast of Florida 81° 17′ 05″ W. 29° 53′ 20″ N.	NAP	100	U.S. Navy ..	300, **600**	P G [160] ..	N	0.30	3.00
San Diego, California KSD	117° 09′ 37″ W. 32° 41′ 30″ N.	KSD	—	Federal Telegraph Co.	—	—	—	—	—
— San Diego, California NPL	117° 15′ 00″ W. 32° 42′ 26″ N.	NPL	200	U.S. Navy ..	300, **600**, 1,000, 1,800	P G [160] [168] ..	N	0.30	3.00
San Francisco	California 122° 30′ 06″ W. 37° 49′ 36″ N.	KFS	750	Federal Telegraph Co.	300, 600, 3,000 3,500, 5,000 10,000, 12,000	— [232]	N	—	—
San Luis Obispo, California	120° 45′ 00″ W. 35° 10′ 00″ N.	KDN	—	Marconi Co. ..	300, **600**	P G	Time of the meridian 120° west of Greenwich : 8.30 a.m. to 12 a.m., 1.30 p.m. to 5 p.m., 7.30 p.m. to 10 p.m.	0.15 [168] 0.60 [159]	1.50 [168] 6.00 [155]
— Sault Ste. Marie, Michigan	84° 21′ 55″ W. 46° 30′ 04″ N.	WSI	—	Marconi Co. ..	—	—	—	—	—
Savannah	Georgia 81° 06′ 15″ W. 32° 05′ 15″ N.	WSV	300	Marconi Co. ..	300, **600**	P G	Time of the meridian 90° west of Greenwich : 6 a.m. to 12 p.m.	0.30	3.00

	Long Island 73° 06′ 12″ W. 40° 44′ 36″ N.			cation Co.	2,480, 2,800, 2,900, 3,600, 4,800 [179]			0.60 [180] 1.50 [181]	0.60 [180] 15.00 [181]
Scranton, Pennsylvania	75° 42′ 00″ W. 41° 24′ 00″ N.	WTP	—	—[220]	1,610	— [220]	X	—	—
Sea Gate, New York ..	74° 00′ 12″ W. 40° 34′ 23″ N.	WSE	150	Marconi Co. ..	300, 600	P G	N	0.30 [188] 0.60 [189]	3.00 [188] 6.00 [189]
Seattle	Washington 122° 20′ 00″ W. 47° 38′ 00″ N.	KPA	300	Marconi Co. ..	300, 600	P G [216] ..	N	0.15 [188] 0.60 [189]	1.50 [188] 6.00 [189]
Siasconset	Massachusetts, Nantucket Island 69° 58′ 19″ W. 41° 15′ 50″ N.	WSC	165	Marconi Co. ..	300, 600	P G	N	0.30 [188] 0.75 [189]	3.00 [188] 7.50 [189]
South San Francisco ..	California 122° 24′ 20″ W. 37° 44′ 40″ N.	KSS	2,500	Federal Telegraph Co.	300, 600 3,000, 3,500, 5,000, 8,000, 10,000, 12,000	—[221]	N	—	—
South Wellfleet [8]	Massachusetts, Cape Cod 69° 58′ 18″ W. 41° 54′ 51″ N.	WCC	600	Marconi Co. ..	300, 600, 2,040 [222]	P G	N	0.30 [188] 0.60 [189] 1.50 [181]	3.00 [188] 6.00 [189] 15.00 [181]
Tampa, Florida	82° 25′ 36″ W. 27° 56′ 54″ N.	WPD	200	Marconi Co. ..	300, 600	P G	Time of the meridian 90° west of Greenwich: 7 a.m. to 1 a.m.	0.30	3.00
Tatoosh	Washington, off Cape Flattery 124° 44′ 06″ W. 48° 23′ 30″ N.	NPD	100	U.S. Navy ..	300, 600, 1,000	P G [160]	N	0.30	3.00
Tuckerton, New Jersey ..	74° 20′ 00″ W. 39° 34′ 45″ N.	WGG	—	—	—	—	—	—	—
Virginia Beach	Virginia, entrance of Chesapeake Bay 75° 58′ 58″ W. 36° 50′ 36″ N.	WSY	150	Marconi Co. ..	300, 600	P G [163]	N	0.30	3.00
Washington NAL ..	District of Columbia 77° 00′ 11″ W. 38° 52′ 21″ N.	NAL	150	U.S. Navy ..	600	O [160]	N	—	—
Washington NZY ..	District of Columbia 77° 00′ 32″ W. 38° 53′ 12″ N.	NZY	500	Supt., U.S. Capitol Building and Grounds	250, 600, 1,000	O	X	—	—
Washington WUP [164] ..	District of Columbia	WUP	—	U.S. Army ..	—	O	—	—	—
Washington WUQ [165] ..	District of Columbia	WUQ	—	U.S. Bureau of Standards	—	O ..	—	—	—
Alaska									
Chignik	Alaska Peninsula 158° 31′ 30″ W. 56° 17′ 30″ N.	KHC	—	Marconi Co. ..	—	—	—	—	—

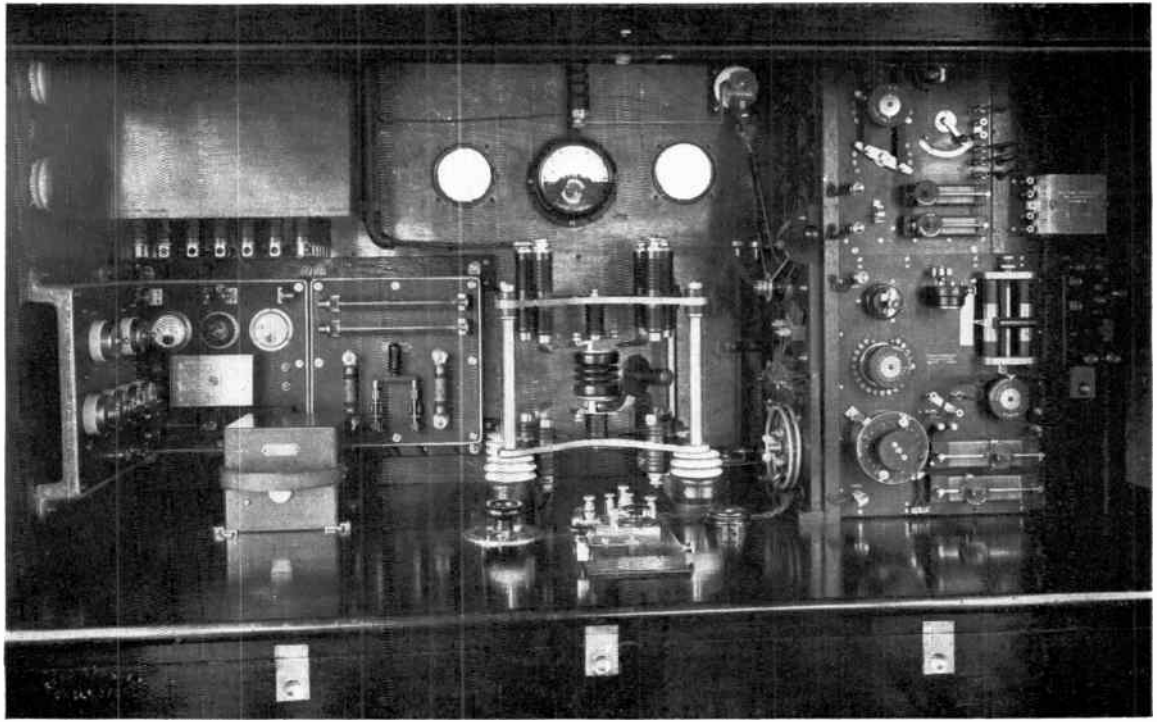
Land Stations—*Continued*

Name.	Geographical Position	Call Signal	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Alaska—*contd.*									
Circle City [192]	144° 04′ 18″ W. 65° 49′ 12″ N.	WVA	450	U.S. Army ..	**600**, 1,400.	O	—	—	—
Clarks Point	Bristol Bay 158° 31′ 30″ W. 58° 50′ 45″ N.	KHG	—	Marconi Co. ..	—	—	—	—	—
Cordova, Alaska	Prince William Sound 145° 58′ 55″ W. 60° 27′ 45″ N.	NPA	400	U.S. Navy ..	300, **600**, 1,800	P G [160]	N	0.25	2.50
Dutch Harbor	Aleutian Islands, Unalaska 166° 32′ 08″ W. 53° 53′ 14″ N.	NPR	150	U.S. Navy ..	300, **600**, 1,800	P G [160]	N	0.25	2.50
Fairbanks, Alaska [192] ..	147° 42′ 21″ W. 64° 50′ 17″ N.	WVB	200	U.S. Army ..	**600**, 1,400	O	—	—	—
Fort Egbert [192]	Eagle 141° 13′ 48″ W. 64° 46′ 19″ N.	WVC	200	U.S. Army ..	**600**, 1,400	O	—	—	—
Fort Gibbon, Alaska [192] ..	Tanana 152° 05′ 21″ W. 65° 10′ 16″ N.	WVD	200	U.S. Army ..	**1,600**, 2,000	O	—	—	—
Fort St. Michael	St. Michael Island 162° 00′ 18″ W. 63° 29′ 15″ N.	WVE	220	U.S. Army ..	**600**, 1,200 [190]	P G	Local time: 9 a.m. to 9 p.m.	0.25	2.50
Jualin	—	KJA	—	Marconi Co. ..	—	—	—	—	—
Juneau, Alaska	—	KDU	—	Marconi Co. ..	—	—	—	—	—
Karluk	Kodiak Island 153° 59′ 40″ W. 57° 32′ 04″ N.	KHA	—	Marconi Co. ..	—	—	—	—	—
Ketchikan	Revillagigedo Island 131° 38′ 51″ W. 55° 20′ 45″ N.	KPB	—	Marconi Co. ..	—	—	—	—	—
Kodiak	Hood Island, near the town of Kodiak 152° 21′ 52″ W. 57° 46′ 42″ N.	NPS	200	U.S. Navy ..	300, **600**, 1,800	P G [160]	N	0.25	2.50
Kogiung	Bristol Bay 156° 43′ 00″ W.	KHB	—	Marconi Co. ..	—	—	—	—	—

	63° 02′ 30″ N.						to 9 p.m.		
Naknek	Bristol Bay 157° 00′ 00″ W. 58° 43′ 30″ N.	KHT	—	Marconi Co. ..	—	—	—	—	—
Nome, Alaska	165° 23′ 38″ W. 64° 30′ 20″ N.	WVG	260	U.S. Army ..	600, 1,400 [190]	P G	Local time: 9 a.m. to 9 p.m.	0.25	2.50
Nulato	158° 06′ 48″ W. 64° 43′ 30″ N.	WVH	950	U.S. Army ..	2,000 [190]	O	—	—	—
Nushagak	Bristol Bay 158° 27′ 15″ W. 59° 02′ 30″ N.	KHF	—	Marconi Co. ..	—	—	—	—	—
Petersburg, Alaska ..	133° 57′ 06″ W. 56° 48′ 44″ N.	WVI	40	U.S. Army ..	600	P G	Local time: 9 a.m. to 9 p.m.	0.25	2.50
St. George, Alaska ..	Pribilof Islands 169° 43′ 00″ W. 56° 36′ 00″ N.	NPY	40	U.S. Navy ..	300	O [166]	X	—	—
St. Paul, Alaska	Pribilof Islands 170° 16′ 20″ W. 57° 07′ 20″ N.	NPQ	200	U.S. Navy ..	300, 600, 1,800	P G [160]	N	0.25	2.50
Sitka, Alaska	135° 20′ 55″ W. 57° 02′ 58″ N.	NPB	150	U.S. Navy ..	300, 600, 1,800	P G [160]	N	0.25	2.50
Unalga	Aleutian Islands 166° 05′ 25″ W. 53° 57′ 55″ N.	NPV	400	U.S. Navy ..	300, 600, 1,800	P G [160]	N	0.25	2.50
Wrangell	132° 23′ 12″ W. 56° 28′ 19″ N.	WVJ	40	U.S. Army ..	300, 600	P G	Local time: 9 a.m. to 9 p.m.	0.25	2.50
Hawaiian Islands									
Fort de Russy	Honolulu	WZG	300	U.S. Army ..	—	O	—	—	—
Fort Shafter	Honolulu	WZH	55	U.S. Army ..	300	O [217]	—	—	—
Heeia Point	Island of Oahu 157° 48′ 20″ W. 21° 16′ 00″ N.	KHX	2,500	Federal Telegraph Co.	3,000, 3,500 5,500, 8,000, 10,000, 12,000	— [238]	N	— [238]	— [238]
Honolulu	Island of Oahu 157° 51′ 43″ W. 21° 17′ 54″ N.	NPM	100	U.S. Navy ..	600	O	N	—	—
Kahuku	Island of Oahu 157° 59′ 00″ W. 21° 42′ 45″ N.	KHK	500	Mutual Telephone Co., Ltd.	300, 600	P G	N	0.50 [241] 0.30 [242]	3.00 [241] 3.00 [242]
Kaunakakai	Island of Molokai 157° 01′ 29″ W. 21° 05′ 21″ N.	KHO	50	Mutual Telephone Co., Ltd.	300, 450	— [229]	X	—	—
Kawaihae	Island of Hawaii 155° 50′ 05″ W. 20° 02′ 38″ N.	KHN	300	Mutual Telephone Co., Ltd. ..	300, 600	P G	Time of the meridian 150° west of Greenwich: 7 a.m. to 12 a.m., 1 p.m. to 5.30 p.m.	0.50 [241] 0.30 [242]	5.00 [241] 3.00 [242]
Koko Head KHJ ..	Island of Oahu 157° 42′ 00″ W. 21° 17′ 00″ N.	KHJ	—	Marconi Co. ..	300, 2,100	— [240]	Time of the meridian 150° west of Greenwich: 1 a.m. to 12 p.m.	—	—
Koko Head KIE ..	Island of Oahu 157° 42′ 30″ W. 21° 16′ 00″ N.	KIE	—	Marconi Co. ..	—	—	—	—	—

Land Stations—*Continued*

Name.	Geographical Position	Call Signal.	Normal Range in Nautical Miles.	Station Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type.	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*									
Hawaiian Islands—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Lahaina	Island of Maui 156° 40′ 50″ W. 20° 52′ 29″ N.	KHL	300	Mutual Telephone Co., Ltd.	250, 300, 500, **600**	P G [243]	Time of the meridian 150° west of Greenwich : 7 a.m. to 12 a.m., 1 p.m. to 5.30 p.m.	0.50 [241] 0.30 [242]	5.00 [241] 3.00 [243]
Lihue	Island of Kauai 159° 22′ 16″ W. 21° 57′ 58″ N.	KH	300	Mutual Telephone Co., Ltd.	300, **600**	P G	Time of the meridian 150° west of Greenwich : 7 a.m. to 12 a.m., 1 p.m. to 5.30 p.m.	0.50 [241] 0.30 [242]	5.00 [241] 3.00 [243]
Panama									
Balboa	Pacific Entrance of the Panama Canal 79° 33′ 30″ W. 8° 57′ 00″ N.	NPJ	200	U.S. Navy ..	300 **600**, 1,800	P G	N	0.30	3.00
Colon	Atlantic Entrance of the Panama Canal 79° 54′ 07″ W. 9° 22′ 08″ N.	NAX	400	U.S. Navy ..	300, **600**, 1,800	P G	N	0.30	3.00
Porto Bello, Panama ..	79° 40′ 00″ W. 9° 33′ 45″ N.	NAY	100	U.S. Navy ..	300 **600**	O	X	—	—
Philippine Islands									
Cavite	120° 55′ 00″ E. 14° 28′ 55″ N.	NPO	150	U.S. Navy ..	600	O	N	—	—
Cuyo	121° 00′ 20″ E. 10° 51′ 25″ N.	WVX	150	Government (Bureau of Posts)	**600**, 1,200	O	7 a.m. to 6.15 p.m.	—	—
Davao	Mindanao 125° 36′ 20″ E. 7° 04′ 00″ N.	WVO	200	Government (Bureau of Posts)	**600**, 1,200	O	7 a.m. to 6 p.m.	—	—
Fort Drum	Manila Bay, El Fraile Island 120° 37′ 43″ E. 14° 18′ 23″ N.	WVP	50	U.S. Army ..	—	O	—	—	—
Fort Frank	Manila Bay, Carabao Island 120° 36′ 45″ E. 14° 16′ 20″ N.	WVL	50	U.S. Army ..	—	O	—	—	—
Fort Hughes	Manila Bay,	WVM	50	U.S. Army ..	—	O			



Interior of Marconi 1½ kw. Automobile Station.

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Fort Mills	Caballo Island Manila Bay, Corregidor Island 120° 34′ 40″ E. 14° 22′ 52″ N.	WVN	1,000	U.S. Army ..	600, 1,200	O	—	—	—
Fort Wint..	Manila Bay, Grande Island 120° 13′ 25″ E. 14° 46′ 15″ N.	WVR	—	U.S. Army ..	—	O	—	—	—
Fort Wm. McKinley ..	Luzon 121° 03′ 00″ E. 14° 33′ 40″ N.	WVQ	50	U.S. Army ..	600	O	—	—	—
Jolo	Jolo Island 121° 00′ 00″ E. 6° 02′ 40″ N.	WVS	200	Government (Bureau of Posts)	600	P G	7 a.m. to 5.15 p.m.	—	—
Malabang	Mindanao 124° 04′ 10″ E. 7° 35′ 20″ N.	WVT	200	Government (Bureau of Posts)	600, 1,200	P G	7 a.m. to 7.30 p.m.	—	—
Manila	Luzon 120° 58′ 47″ E. 14° 35′ 48″ N.	WVU	200	U.S. Army ..		O	—	—	—
Olongapo	120° 16′ 57″ E. 14° 49′ 26″ N.	NPT	200	U.S. Navy ..	600	O	N	—	—
Puerto Princesa	Paragua 118° 42′ 40″ E. 9° 44′ 00″ N.	WVV	150	Government (Bureau of Posts)	600, 1,200	P G	7 a.m. to 6 p.m.	—	—
San José, Mindoro ..	121° 03′ 00″ E. 12° 27′ 30″ N.	WVY	200	Government (Bureau of Posts)	600	P G	7 a.m. to 6.15 p.m.	—	—
Zamboanga	Mindanao 122° 02′ 19″ E. 6° 55′ 10″ N.	WVW	400	Government (Bureau of Posts)	600, 1,200	P G	7 a.m. to 7.30 p.m.	—	—
Porto Rico									
Ensenada, Porto Rico ..	66° 54′ 30″ W. 18° 00′ 00″ N.	WPR	300	Guanica Centrale	300, 600	P G	Time of the meridian 75° west of Greenwich: 10 a.m. to 10 p.m.	0.30	3.00
San Juan de Puerto Rico	66° 05′ 38″ W. 18° 25′ 04″ N.	NAU	200	U.S. Navy ..	300, 600, 1,800	P G	N	0.30	3.00
URUGUAY									
Banco Ingles	To the south-east of Montevideo 55° 53′ 30″ W. 35° 06′ 30″ S.	CWC	100	—	450, 600	—	—	—	—
Cerrito	Near Montevideo 56° 10′ 10″ W. 34° 51′ 20″ S.	CWA	1,000	—	600, 1,000, 1,250	P G	N	0.53	5.30
Isla de Lobos	54° 53′ 01″ W. 35° 01′ 39″ S.	CWB	100	—	450, 600	—	—	—	—
ZANZIBAR									
Pemba, Zanzibar.. ..	39° 45′ 00″ E. 5° 14′ 00″ S.	VQE	85	—	600	P G [184]	Local time of Zanzibar 8 a.m. to 12 a.m., 2 p.m. to 4 p.m.	0.20	1.60
Zanzibar	39° 11′ 00″ E. 6° 10′ 03″ S.	VPZ	85	—	600	P G [185]	8 a.m. to 12 a.m., 2 p.m. to 4 p.m.	0.20	1.60

NOTES

Land Stations

1. Meteorological forecasts are transmitted free of charge by coast stations to vessels at the following hours (Melbourne time) :—Adelaide Radio, 7 p.m. and 8.30 p.m.; Melbourne Radio, 7.30 p.m. and 9 p.m.; Sydney Radio, 8 p.m. and 9.30 p.m.; Hobart Radio, 10 p.m.; Brisbane Radio, 10.30 p.m. and 11 p.m.

2. The station transmits time signals at 10 a.m. and 10 p.m.

3. For long-range communication.

4. 4 hours 17 minutes later than Greenwich time.

5. The hours are extended on the dates of arrival and departure of the regular steamers of the Compagnie Belge Maritime du Congo.

6. Station open for public correspondence in the inland service of the Belgian Congo.

7. The station also communicates by radiotelegraphy with Loango.

8. For correspondence with the Belgian Government steamers on the voyage between Dover and Ostend. No special coast charge. The total wireless charge is fixed at fr. 1.50 per radiotelegram of 10 words or less, with fr. 0.10 additional for each word over ten.

9. In the case of radiotelegrams originating at or intended for Bahia (San Salvador), the charge for transmission between the coast station and Bahia is included in the coast charge.

10. In the case of radiotelegrams originating at or intended for Rio de Janeiro, the charge for transmission between the coast station and Rio de Janeiro is included in the coast charge.

11. In the case of radiotelegrams originating at or intended for Campos or Rio de Janeiro, the charge for transmission between the coast station and Campos or Rio de Janeiro is included in the coast charge.

12. In the case of radiotelegrams originating at or intended for Fernando de Noronha or Recife (Pernambuco), the charge for transmission between the coast station and Fernando de Noronha or Recife is included in the coast charge.

13. Under construction.

14. In the case of radiotelegrams originating at or intended for Pelotas or Rio Grande do Sul, the charge for transmission between the coast station and Pelotas or Rio Grande do Sul is included in the coast charge.

15. In the case of radiotelegrams originating at or intended for Florianopolis (Desterro, Santa Catharina), the charge for transmission between the coast station and Florianopolis is included in the coast charge.

16. The handling of public correspondence has been suspended.

17. In the case of radiotelegrams originating at or intended for Santos, the charge for transmission between the coast station and Santos is included in the coast charge.

18. The hours of service are extended when necessary.

19. In the case of radiotelegrams originating at or intended for Olinda or Recife (Pernambuco), the charge for transmission between the coast station and Olinda or Recife is included in the coast charge.

20. The station also exchanges public and official correspondence with Trinidad.

21. The station is open primarily for the ordinary telegraph service; and communicates with ships only in case of distress.

22. Burmese time; 6 hours 30 minutes in advance of Greenwich time.

23. During the day-time the station is largely occupied with inland communication.

24. The station receives from the Director-General of Observatories daily at about 1 p.m. a concise telegram concerning atmospheric conditions over the Arabian Sea, for communication to ships at their request. The charge for these radiotelegrams—viz., fr. 0.40 per word—is debited to the ships. When there is nothing special to communicate, these radiotelegrams contain simply the word "Normal." In stormy weather the Meteorological Department gives due warning.

25. The station receives from the Director-General of Observatories daily at about 1 p.m. a concise telegram concerning the atmospheric conditions over the Bay of Bengal for communication to ships at their request. The charge for these radiotelegrams—namely, fr. 0.40 per word—is debited to the ships. These radiotelegrams contain the word "Flags," followed by four code letters indicating the predominant atmospheric conditions over the four quarters of the Bay of Bengal. In stormy weather the Meteorological Department adds a short notice in plain language.

26. In advance of Greenwich time by 3 hours 51 minutes.

27. Time of British India; 5 hours 30 minutes in advance of Greenwich time.

28. The station also exchanges public and official correspondence with Berbera Radio.

29. The station also exchanges public and official correspondence with Aden Radio.

30. In the case of radiotelegrams neither originating at nor intended for Berbera itself, the coast charge is included in the charge for transmission between Aden Radio and Berbera Radio.

31. 5 hours 7 minutes 10.65 seconds west of Greenwich.

32. The station also communicates by radiotelegraphy with Miami, Florida.

33. In the case of radiotelegrams originating at or intended for Port of Spain (Trinidad) or Scarborough (Tobago), the charge for transmission between the coast station and either of these places is included in the coast charge. The charges applicable to the transmission of radiotelegrams to other places will be notified to ship stations by the coast station.

34. The station also exchanges public and official correspondence with Tobago.

35. Accounts should be rendered to the Marconi Wireless Telegraph Company of Canada, Montreal.

36. This charge is reduced to fr. 0.15 for press radiotelegrams.

37. Cape Sable and Sable Island communicate with the land telegraph system through Camperdown. Radiotelegrams exchanged between Cape Sable or Sable Island and Camperdown are subject to a

retransmission charge of fr. 0.30 per word, with a minimum of fr. 3.00 per radiotelegram. This charge should be credited to the Marconi Wireless Telegraph Company of Canada, Montreal. *All* accounts should be rendered to this Company.

38. In the case of radiotelegrams originating at or intended for Nassau, the charge for transmission between the coast station and Nassau is included in the coast charge.

39. For radiotelegrams sent by or addressed to the commander of a ship and relating to the service of the ship, the coast charge is 25 centimes per word, with a minimum of fr. 2.50 per radiotelegram. The preamble of such radiotelegrams should contain the service instruction S B.

40. For radiotelegrams sent from or addressed to ships engaged in the local service between Victoria, Vancouver and Seattle, the coast charge is fr. 0.15 per word, with a minimum of fr. 1.50 per radiotelegram. The preamble of such radiotelegrams should contain the service instruction F B.

41. Accounts should be rendered to the District Superintendent, B. C. Division, Government Wireless Service, Victoria, B.C.

42. The station is open only during the season of navigation, approximately April to December.

43. The station is open for public correspondence in the inland service.

44. Pacific time; 8 hours later than Greenwich time.

45. 4 hours later than Greenwich time.

46. The station receives weather forecasts from the Canadian Meteorological Service at 10 p.m. These advices will be transmitted free to any ship station on request. In addition, the station transmits without coast charge radiotelegrams of the following kinds:—

1. Any message concerning the navigation of a vessel sent by the captain of the vessel and intended for any department of the Government, any officer of the Government, or the officer in charge of the coast station.

2. Messages exchanged between the captain of any vessel and any person whatsoever concerning the state of the weather, the condition of tide or ice, or reports on aids to navigation.

47. Public correspondence is admitted, without any coast charge, when the station is for the time being not engaged with official correspondence.

48. Small auxiliary station of the Radiotelegraph School.

49. Five hours later than Greenwich time.

50. Station belonging to the Marconi International Marine Communication Company, London, and the Eastern Extension Australasia and China Telegraph Company, London; the station is operated and controlled by the latter company.

51. The station exchanges public correspondence with Curaçao.

52. The station also exchanges public correspondence with Aruba and Bonaire.

53. Radiotelegraphic communication with ships at sea only in case of distress.

54. Radiotelegrams are accepted only at sender's risk.

55. For the present no coast charge is made.

56. Later than Greenwich time by 3 hours 55 minutes.

57. The station accepts only messages received from Mogadiscio I S G.

58. This station also communicates by radiotelegraphy with the other stations in the Fiji Islands. The charge for the transmission of radiotelegrams between two coast stations in the Fiji Islands is fr. 0.30 per word. In addition, the station exchanges meteorological telegrams with ships in stormy weather.

59. Twelve hours in advance of Greenwich time.

60. From Monday to Friday, 9 a.m. to 1 p.m., 2 p.m. to 3 p.m., or until the completion of the work, and at 7 p.m. until the completion of the work; Saturday, 9 a.m. to 1 p.m., or until the completion of the work; Sunday and public holidays, 8 a.m. to 8.30 a.m., and at 7 p.m. until the completion of the work.

61. The coast charge is reduced to fr. 0.15 per word for correspondence with ships engaged in a regular service between France on the one hand and Corsica, Algeria and Tunis on the other.

62. The coast charge is reduced to fr. 0.15 per word for correspondence with ships whose home ports are on the coast of the English Channel and the Straits of Dover, and which are engaged in a regular service between France and England.

63. Experimental station, also open for distress calls.

64. Station of the State Railway Administration used to conduct the marine business of the ships employed on the service between Dieppe and Newhaven.

65. The station also communicates by radiotelegraphy with Boma and Brazzaville.

66. Continuous service during the voyages of the regular steamers.

67. Meteorological telegrams are transmitted at 9.30 a.m.

68. The wave-length of 1,600 metres is used for communication with Rufisque. The station also listens on the wave-length of 300 metres.

69. The station also listens on the wave-length of 300 metres. The wave-length of 900 metres is used in particular for communication with Rufisque.

70. The station connects with the inland telegraph system through the Rufisque station. The charge applicable to transmission in either direction between Port-Etienne and Rufisque is fr. 0.30 per word.

71. The station also listens on the wave-length of 300 metres. The wave-length of 1,600 metres is used for transmission and for all communications with Port-Etienne and Conakry.

72. The station exchanges radiotelegrams with Port-Etienne and Dakar and only communicates with ships as substitute for Dakar.

73. The working of the station is temporarily suspended.

74. For telegrams of which the only wireless transmission takes place between the lightship and the shore, a fixed charge of fr. 1.00 per telegram only is collected, in addition to the ordinary charges for transmission over the land lines.

75. Public correspondence restricted to urgent messages relating to navigation.

76. The station communicates only with the ships of the Norddeutscher Lloyd Company and only as regards the reception of radiotelegrams.

77. Storm-warnings directed to the German Baltic coast are transmitted three times on the wave-length of 450 metres, as soon as the station has the information. They are repeated once at 1 p.m. and 11 p.m. (Central European time). For other warnings of storms, see Cuxhaven and Norddeich.

78. When the working of the Norddeich station is interrupted, storm-warnings are transmitted three times, as required, on the wave length of 1,650 metres, as soon as the station has the information. They are repeated once at 1 p.m. and 11 p.m. (Central European time). Storm-warnings directed only to the German Baltic coast are sent out by the Bülk station.

79. The station is prepared to receive calls chiefly during the first 15 minutes of each of its hours of service.

80. The station communicates only with fishing and coasting vessels.

81. The station transmits on the wave-length of 1,650 metres:

a. Time-signals: noon and midnight (Greenwich mean time). Method of transmission:

From 11.53 to 11.55, preparatory signals v v v v . . . . .
at 11.57′ 47″ —.—.— (call)
—.— .— . . .— (call signal of Norddeich)
—— ——. ——. . (Greenwich mean time)
at 11.58′ 38″ —.—.— (call)
From 11.58′ 46″ to 11.58′ 50″
,, 11.58′ 56″ ,, 11.59′ 00″
,, 11.59′ 06″ ,, 11.59′ 10″
,, 11.59′ 36″ ,, 11.59′ 40″
,, 11.59′ 46″ ,, 11.59′ 50″
,, 11.59′ 56″ ,, 12.00′ 00″
} a dash lasting ⅓ second at the end of each second precisely.
at 12.00′ 06″ .—.—. (end)

b. Notices of importance intended for navigators (displacement of lights, etc.) transmitted as required, and repeated three times, as soon as received. These messages are repeated three times immediately after the time-signals, at noon and midnight (Greenwich mean time).

c. Meteorological telegrams, daily at 1 p.m. (Central European time).

d. Storm-warnings intended for the German North Sea coast, transmitted as required, and repeated three times, as soon as received. These warnings are repeated once at 1 p.m. or 11 p.m. (Central European time). When the working of the Norddeich

station is interrupted, the storm-warnings are sent out in the same manner by the Cuxhaven station. Storm-warnings intended only for the German Baltic coast are sent out from Bülk.

82. Official correspondence with Trälleborg and with the ferry-boats of the Sassnitz-Trälleborg line, concerning the railway traffic.

83. Public correspondence with the ferry-boats of the Sassnitz-Trälleborg line.

84. The station is prepared to receive calls chiefly during the first fifteen minutes of the second half of each of its hours of service.

85. The station also communicates by radio-telegraphy with Santa Isabel de Fernando Poo.

86. Twenty minutes later than Central European time.

87. *a*. Time-signals automatically regulated, on the wave-length of 1,250 metres, daily at noon and 8 p.m. (time of the east coast of China, eight hours in advance of Greenwich mean time).

Method of transmission:

57′ 00″—50″ x x x . . . . . for tuning.

57′ 55″—56″	dash	59′ 08″—09″	dash
57″—58″	dash	10″	dot
59″—60″	dash	16″—17″	dash
58′ 08″—09″	dash	18″—19″	dash
10″	dot	20″	dot
18″—19″	dash	26″—27″	dash
20″	dot	28″—29″	dash
28″—29″	dash	30″	dot
30″	dot	36″—37″	dash
38″—39″	dash	38″—39″	dash
40″	dot	40″	dot
48″—49″	dash	46″—47″	dash
50″	dot	48″—49″	dash
55″—56″	dash	50″	dot
57″—58″	dash	55″—56″	dash
59″—60″	dash	57″—58″	dash
59′ 06″—07″	dash	59″—60″	dash

A dash lasts 1 second.

A dot lasts ¼ second.

b. Signals giving warnings of typhoons, storm-warnings, and urgent notices of importance intended for navigators (displacement of lights, etc.) transmitted on the wave-length of 600 metres as soon as received.

c. Meteorological telegrams concerning the prevailing conditions at 6 a.m. (time of the east coast of China), and, where necessary, a repetition of the storm-warnings immediately after the second transmission of the news messages of the Ostasiatischer Lloyd on the wave-length of 1,250 metres.

The news messages are transmitted on the wave-length of 1,250 metres at 2 a.m. and 3 p.m. (time of the east coast of China); between the first and the second transmission there is a break of fifteen minutes.

88. At the request of ships, and on payment of the charges, transmission of meteorological reports (not more than twenty words), giving the following information:

a. A general summary of the atmospheric conditions of the morning of the day of transmission of the report;

b. A forecast of the weather—strength and direction of the wind—applicable to the German North Sea coast for the day (midnight to midnight) following the transmission of the forecast;

c. A storm-warning, if required.
Charge per word: fr. 0.18, without minimum.

89. At the request of ships, and on payment of the charges, transmission of meteorological reports (not more than twenty words), giving the following information:

a. A general summary of the atmospheric conditions of the morning of the day of transmission of the report;

b. A forecast of the weather—strength and direction of the wind—applicable to the west part of the German Baltic coast for the day (midnight to midnight) following the transmission of the forecast;

c. A storm-warning, if required.
Charge per word: fr. 0.18, without minimum.

90. At the request of ships, and on payment of the charges, transmission of meteorological reports (not more than twenty words), giving the following information:

a. A general summary of the atmospheric conditions of the morning of the day of transmission of the report;

b. A forecast of the weather—strength and direction of the wind—applicable to the east part of the German Baltic coast for the day (midnight to midnight) following the transmission of the forecast;

c. A storm-warning, if required.
Charge per word: fr. 0.18, without minimum.

91. Special correspondence, including official and ordinary telegrams exchanged with Rathlin Island.

92. For radiotelegrams exchanged with all ships except those making regular voyages not exceeding 1,000 miles to or from a port in the United Kingdom. In the case of radiotelegrams originating in or destined for the United Kingdom, the charge is fr. 0.67 per word, including the coast charge and the charge for transmission over the telegraph lines of the United Kingdom.

93. For radiotelegrams exchanged with ships making regular voyages of more than 200 miles but not more than 1,000 miles to or from a port in the United Kingdom. In the case of radiotelegrams originating in or destined for the United Kingdom the charge is fr. 0.37 per word, with a minimum of fr. 2.22 per radiotelegram, including the coast charge and the charge for transmission over the telegraph lines of the United Kingdom.

94. For radiotelegrams exchanged with ships making regular voyages of 200 miles or less to or from a port in the United Kingdom. In the case of radiotelegrams originating in or destined for the United Kingdom the charge is fr. 0.20 per word, with a minimum of fr. 2,00 per radiotelegram, including the coast charge and the charge for transmission over the telegraph lines.

95. A fixed charge of fr. 1.00 per radiotelegram is made, in addition to the ordinary telegraph charges.

96. The station also communicates with Grand Marais (United States).

97. Special correspondence, including official and ordinary telegrams exchanged with Tobermory.

98. Special correspondence with the Dieppe coast station.

99. The wave length of 600 metres is used solely for communication with Scheveningen-Port. Such communication takes place only in case of urgent need.

100. Special correspondence, including official and ordinary telegrams exchanged with Ballycastle, Antrim.

101. Special correspondence, including official and ordinary telegrams exchanged with Hunstanton.

102. Special correspondence, including official and ordinary telegrams exchanged with Lochboisdale.

103. Correspondence restricted to messages exchanged with the steamers of the South Eastern and Chatham Railway Company.

104. Correspondence restricted to the transmission of radiotelegrams to ships at sea when they are out of range of any other British station.

105. The station is intended for: (*a*) the transmission to the Scheveningen-Port coast station of telegrams received by means of flag signals from ships passing within sight, or the retransmission by means of these signals, to such ships, of telegrams sent to it through the Scheveningen-Port coast station; (*b*) meteorological services.

106. Telegrams originating on or intended for ships and forwarded through Scheveningen-Port are subject to the coast charge of Scheveningen-Port, the charge for transmission over the inland telegraph lines, and a fixed charge of fr. 1.00 per telegram.

107. The station transmits on a wave length of 1,800 metres two messages, one at 11.15 a.m., the other at 11.15 p.m. (Greenwich time), which are made up as follows:—

(*a*) Daily, except on Sundays and holidays, a meteorological telegram preceded by the letters K.N.M.I.

(*b*) The storm signal, when there is one, in Dutch and English.

As the station does not send out the meteorological telegram on Sundays and holidays, the storm signal, when there is one, is on those days preceded by the letters K.N.M.I.

(*c*) Advice to navigators (alterations of lighthouses, lightships, and lightbuoys, the presence of derelicts, and the disappearance or displacement of lightships, lightbuoys, or important buoys) sent out in Dutch as well as English; the advice in Dutch will be preceded by the letters N.B.A.Z.

If there is no advice to navigators, the message will consist only of the meteorological telegram preceded by the letters K.N.M.I., completed where necessary by the storm signal.

If there is no storm signal, but only an advice to navigators, the latter will be preceded by the letters N.B.A.Z. On Sundays and holidays, if there is no signal of either kind, no message will be sent out.

The messages will be transmitted three times in succession. The first time they will be transmitted quickly, and the second and third times slowly.

On request, the messages or a part of them will be transmitted to ships by means of the normal wave length at other times, in return for a charge which may not exceed that for a radiotelegram of 20 words, and which will be debited to the ships.

108. The charge applicable to the transmission of radiotelegrams between the stations of Italian Somaliland is fixed at fr. 2.52 per radiotelegram of ten words or less, with fr. 0.25.20 additional for each word over ten.

109. Exclusively for the service of the steam ferry-boats of the Strait of Messina.

110. The station also transmits messages to the coast station Massaua. Charge per word: fr. 0.60 for private telegrams; fr. 0.30 for press telegrams.

111. The station transmits each day a time signal for the use of shipping in South African waters. This signal is actuated from the Royal Observatory at the Cape and preceded by the usual warning signal from Capetown. The time signal proper consists of twelve dashes divided into five groups, the commencement of the separate dashes corresponding exactly with the following Greenwich mean times:

GROUP I.	GROUP II.	GROUP III.	GROUP IV.	GROUP V.
8.59′ 30″	8.59′ 38″	8.59′ 44″	8.59′ 48″	8.59′ 54″
8.59′ 32″	8.59′ 40″		8.59′ 50″	8.59′ 56″
8.59′ 34″				8.59′ 58″
				9.00′ 00″

112. The station only transmits ordinary telegrams originating in or intended for Montenegro.

113. The station transmits on the wave length of 600 metres each night, except Sunday, the mean time of Central Japan (time of the meridian 135° E.).

Form of transmission:

From 8.59′ 00″ to 8.59′ 55″	— — — — — — — — — —, etc.
,, 9.00′ 00″ ,, 9.00′ 01″	—
,, 9.00′ 30″ ,, 9.00′ 55″	— . — . — . — . — . — . —, etc.
,, 9.01′ 00″ ,, 9.01′ 01″	—
,, 9.01′ 30″ ,, 9.01′ 55″	— .. — .. — .. — .. — .., etc.
,, 9.02′ 00″ ,, 9.02′ 01″	—
,, 9.02′ 30″ ,, 9.02′ 55″	— ... — ... — ... — ..., etc.
,, 9.03′ 00″ ,, 9.03′ 01″	—
,, 9.03′ 30″ ,, 9.03′ 55″	— .... — .... — .... —, etc.
,, 9.04′ 00″ ,, 9.04′ 01″	—

114. This charge includes the charge applicable to the transmission over the lines of the Japanese telegraph service of radiotelegrams originating in or intended for the Empire of Japan and Southern Manchuria; but for urgent radiotelegrams there is an additional charge of fr. 0.25 per word.

115. The station also communicates by radiotelegraphy with Dzaoudzi. In case of interruption of the inland telegraph lines, the Diégo-Suarez and Majunga stations exchange by radiotelegraphy the inland and international correspondence.

116. The station also communicates by radiotelegraphy with Majunga.

117. Rate applicable to radiotelegrams to or from vessels trading to ports outside Australasia.

118. The station also exchanges ordinary telegrams originating in or intended for Lower California.

119. The station also exchanges ordinary telegrams originating in or intended for the peninsula of Yucatan.

120. The station transmits the time of the meridian of Tacubaya daily at noon in the following manner:

From 11.55 a.m. to noon: repeated transmission of the inquiry signal "CQ"; then repeated transmission of the signal "XH" (time of Tacubaya);

At noon: transmission of the word "noon," always followed by a free announcement of the state of the weather.

On request, this announcement will also be transmitted to ships at other times, in return for a charge which must not exceed that for a radiotelegram of twenty words and which will be debited to the ships.

During the transmission of the time-signals and of the meteorological announcement at noon, all other transmission will be stopped, except distress calls. Special warnings necessitated by sudden changes in the state of the atmosphere, by accidents at sea, and by the derangement or displacement of signs intended as aids to navigation (buoys, sea-marks, etc.), will also be transmitted free.

121. Six hours 36 minutes 46.67 seconds later than Greenwich time.

122. In advance of Greenwich time by 11 hours 30 minutes.

123. Meteorological radiotelegrams are sent free of charge and as opportunity offers.

124. Western European time: October—March, 8 a.m. to 5 p.m.; Sundays and holidays, 8 a.m. to 1 p.m. April—September, 8 a.m. to 2 p.m., 3 p.m. to 7 p.m.; Sundays and holidays, 8 a.m. to 1 p.m.

125. The station is open for a few months only during the year, approximately from July to October.

126. The night service is performed alternately by the Flekkerö and Tjömö stations. Flekkerö is open during the nights of Tuesday, Thursday, and Saturday. Tjömö is open during the nights of Monday, Wednesday, and Sunday. The service between 8 a.m. Sunday and 8 a.m. Monday is performed alternately by the two stations.

127. During the months from May to September.

128. During the months from October to April.

129. From the 15th of June to the 30th of September.

130. From the 1st of October to the 14th of June.

131. Röst and Sörvaagen intercommunicate by means of wireless telegraphy.

132. The station also exchanges radiotelegrams with the other coast stations situated in the Azores, within its radius of operation.

133. Public correspondence limited to the ships *Dacia CVD, Imparatul Traian, Principesa Maria, Regele Carol I* and *România*.

134. The station applies special rates; they vary according to the zone.

135. The station communicates only with Nicolaiewsk RNL.

136. The station also communicates by radiotelegraphy with Kerbinskaïa.

137. Station reserved for the Service of the Gulf of Riga.

138. The station is open only during the season of navigation.

139. The coast charge is reduced to fr. 0.13 per word for correspondence with Russian ship stations.

140. For radiotelegrams exchanged between the stations Rade de Taganrog and Taganrog, there is an additional charge of fr. 0.40 per radiotelegram, plus fr. 0.025 per word.

141. The station transmits each day, at 1 p.m., a report in plain language containing information concerning the meteorological conditions prevailing on the whole of the coast of the Union of South Africa.

142. With the wave length of 1,800 metres.

143. The station transmits only correspondence of the Compañia Trasatlantica.

144. The station communicates only with the steam ferries *Cabrillo* and *Hermosa*, and with the coast stations Los Angeles California KEX, and East San Pedro California.

145. Opened provisionally.

146. The station also communicates by radiotelegraphy with Duala. For correspondence with the Cameroons the coast charge is reduced to fr. 0.35 per word, without minimum.

147. In the case of radiotelegrams addressed to the island of Fernando Po, the charge for delivery to destination is included in the coast charge. Moreover, there is no minimum charge for this class of message.

148. Correspondence with the ferry-boats of the Trälleborg-Sassnitz line.

149. Official correspondence with Sassnitz and with the ferry-boats of the Trälleborg-Sassnitz line, concerning the railway traffic.

150. The coast charge is reduced to fr. 0.15 per word for correspondence with ships engaged in a regular service between France on the one hand, and Corsica, Algeria, and Tunis on the other.

151. The station also communicates with Brooklyn, New York.

152. The reception and despatch of messages may be suspended for short periods, and the station is subject to be closed at short notice.

153. Acts as a retransmitting station for Port Nelson, Manitoba.

154. The station also exchanges public and official correspondence with Zanzibar.

155. The station also exchanges public and official correspondence with Pemba, Zanzibar.

156. Station reserved for Marconi service radiotelegrams; general

public correspondence is accepted only in case of accident to the station East San Pedro, California. The station also communicates with Avalon, California.

157. The station sends time-signals for five minutes on wave length of 2,500 metres commencing at 11.55 a.m. and 9.55 p.m. every day, Sundays and holidays included. Final signals at noon and 10 p.m. (time of the meridian 75° west of Greenwich). Every tick of the standard clock of the Naval Observatory, Washington, is transmitted as a dot, omitting the 29th second of each minute, the last five seconds of each of the first four minutes, and finally the last ten seconds of the last minute. The noon and 10 p.m. signal is a dash. Immediately after transmitting these signals at 10 p.m., the station transmits on the same wavelength information received from the Hydrographic Office during the preceding 24 hours relating to matters of navigation.

158. For radiotelegrams exchanged with ships performing voyages between two ports of the American continent.

159. For radiotelegrams exchanged with ships in transoceanic service.

160. Each naval coast station situated within the continental limits of the United States of America and of Alaska, as soon as it is advised of any danger to navigation (the presence of derelicts, displacement of lightships, etc., etc.), will immediately transmit the information on wavelengths of 600 and 1,000 metres. Such information will be repeated at 8 a.m., noon, 4 p.m., and 8 p.m. (local time). Naval coast stations of the Atlantic receiving information of this kind will forward it by radiotelegraphy to Arlington Radio, and it will be re-transmitted by that station daily at 10 p.m. on the wavelength of 2,500 metres. All radiotelegraph stations will broadcast these messages in their turn on wavelengths of 600 and 1,000 metres at 8 a.m., noon, 4 p.m., and 8 p.m. The foregoing procedure will also obtain on the Pacific Coast, with the difference that the reports of coast stations will be transmitted to Mare Island, and will be re-transmitted by that station (for the present) to all other coast stations of the Pacific.

161. The station handles public correspondence in cases of distress, when the coast rate will be furnished on request.

162. The station sends time-signals daily at noon (time of the meridian 75° west of Greenwich), Sundays and holidays excluded, on the wave length of 1,000 metres. The manner in which these time signals are transmitted is the same as that indicated in Note 157.

163. The station sends time signals daily at 11.55 a.m. and 9.55 p.m. The final signal is sent at noon and 10 p.m. respectively (time of the

meridian 120° west of Greenwich). The manner in which these time signals are transmitted is the same as that indicated in Note 157. The time is furnished by the Observatory at Navy Yard, Mare Island, California.

164. The station communicates with the coast through Beaufort, North Carolina.

165. The station furnishes free information of interest to ships on request.

166. The operator is generally at the receiver at the beginning of each hour.

167. 15th April—15th December: 7 a.m.—noon, 1 p.m.—6 p.m. and 7 p.m.—8 p.m.; 15 December—15th April: 7 a.m.—noon, 1 p.m.—7 p.m. (time of the meridian 90° west of Greenwich).

168. The station sends time-signals daily at noon (time of the meridian 120° west of Greenwich), Sundays and holidays excluded. The manner in which these time signals are transmitted is the same as that indicated in Note 157. Time furnished by Observatory at Navy Yard, Mare Island, California.

169. Army Signal School.

170. Coast Artillery School.

171. The station exchanges public correspondence with El Paso Texas, Phœnix Arizona, and Los Angeles California KLS.

172. The station communicates with the coast through Charleston South Carolina, and Beaufort North Carolina.

173. The station communicates with the coast through Newport, Rhode Island NAF.

174. The station transmits daily news without charge, using the wave length of 1,610 metres.

175. The wave length of 1,800 metres is used for special correspondence.

176. The wave length of 1,610 metres is used for special correspondence with New York WHI.

177. On Mondays and Thursdays the station closes at midnight.

178. Long-range station.

179. The wave lengths exceeding 1,600 metres are used for long-range and special correspondence.

180. A daily bulletin is transmitted from 9.05 p.m. to 11 p.m. (time of the meridian 75° west of Greenwich).

181. For radiotelegrams transmitted a distance exceeding 400 miles.

182. The wave length of 2,040 metres is employed for long-range correspondence.

183. The station transmits weather reports daily at 8 a.m. (time of the meridian 75° west of Greenwich).

184. Signal Corps Laboratory (experimental).

185. Bureau of Standards (experimental).

186. The station is reserved for general public service overland with Fort Worth, Los Angeles California KLS, and South San Francisco.

187. Wanamaker.

188. For radiotelegrams exchanged with ships performing voyages between two ports of the American continent: fr. 0.15 per word, minimum fr. 1.50; for radiotelegrams exchanged with ships on trans-oceanic service: fr. 0.60 per word, minimum fr. 6; for radiotelegrams exchanged with the ships *Hermosa* and *Cabrillo*: fr. 0.10 per word, minimum fr. 1. (Address and signature free of charge.) For radio-telegrams exchanged with Avalon, California: fr. 1.50 for the first ten words and fr. 0.10 for each additional word. (Address and signature free of charge.)

189. On occasions when, for any reason whatever, the working of the Arlington Radio station is suspended, time signals are transmitted daily (Sundays and holidays excepted) at noon by the stations Newport Rhode Island NAF, New York NAH, Norfolk Virginia, and Charleston South Carolina.

190. The long wave length is used for inland communication.

191. The station also communicates with the other coast stations in China.

192. Interior station.

193. Time of the east coast of China, eight hours in advance of Greenwich time.

194. Correspondence restricted to the exchange of radiotelegrams with the other lighthouses in Chosen, with the ship *Kosai Maru* belonging to the Chosen Government and with Japanese warships.

195. A service giving warning of the passage of cyclones has been organised, as an experiment, on the east, north-west, and west coasts of Madagascar.

The warning telegram, originating at the Observatory at Antananarivo, will be sent out at the even hours (except between midnight and 6 a.m.) during the probable continuance of the cyclone in the zone within range of the stations. The warning will be sent out alternately by the Dzaoudzi and Majunga stations in the case of a cyclone affecting the region to the north-west of Madagascar or the Mozambique Channel, and alternately by the Dzaoudzi and Diégo-Suarez stations in the case of a cyclone affecting the regions to the north-east and east of Madagascar.

This telegram will be preceded and followed by the warning signal ————..———— repeated at short intervals. If the warning signal only is sent out it will indicate, in the absence of precise information, that there is reason to expect the passage of a cyclone.

During the whole of this service the Dzaoudzi, Majunga, and Diégo-Suarez stations will remain on the watch, outside the regular hours of working, during the first quarter of each hour, except between 12.15 p.m. and 6 a.m.

196. The station also communicates by radiotelegraphy with Jap.

197. The station also communicates by radiotelegraphy with Angaur and Nauru.

198. Meridian 37° 30′ east of Greenwich, 1 hour 30 minutes in advance of central European time.

199. Rate applicable to radiotelegrams to or from vessels trading exclusively (*a*) between New Zealand and Australia, and (*b*) on the New Zealand coast.

200. For press radiotelegrams the coast station rate is fr. 2.52 per 100 words or fraction thereof.

201. In addition, a continuous listening service for distress signals will be maintained.

202. The relaying rate is fr. 0.42 per word.

203. The station also communicates by radiotelegraphy with other stations in North Borneo.

204. If necessary.

205. Lighthouse.

206. La Romana and San Domingo also communicate with each other by radiotelegraphy. Charge per word : fr. 0.40 without a minimum. This charge is reduced to fr. 0.20 for telegrams sent on the service of the San Domingo Government.

207. For ordinary radiotelegrams.

208. For radiotelegrams sent on the service of the San Domingo Government.

209. The station communicates only with the ships of the New England Navigation Company, the Colonial Navigation Company, the T. A. Scott Company, and with Boston WCH.

210. 3rd June—15th September, N; 15th April—3rd June, 7 a.m. to 7 p.m. (time of the meridian 75° west of Greenwich); station closed during remainder of the year.

211. The station communicates with Grand Marais.

212. The station also communicates with Frankfort, Michigan.

213. The station also communicates with Grand Haven.

214. The station also communicates with Grand Marais.

215. The station also communicates with Avalon, California.

216. The station also communicates with Koko Head KHJ (Hawaiian Islands).

217. The station transmits weather reports to vessels on request.

218. Address and signature free of charge.

219. For correspondence exchanged with Los Angeles California KEX, and East San Pedro California, the charge is fr. 0.10 per word with a minimum of fr. 1.50 per telegram. Address and signature free of charge.

220. Operated by the Delaware, Lackawanna, and Western Railroad Company.

221. The station communicates only with Scranton Pennsylvania, and with stations on moving trains between Hoboken New Jersey, and Buffalo New York State.

222. The station operates on the hour and half-hour.

223. The station communicates only with Manitowoc, Ludington Michigan, and Manistique. Charge per word, fr. 0.15; minimum per telegram, fr. 1.50.

224. The station communicates only with the ships of the Grand Trunk Railway Company and with Chicago and Milwaukee.

225. The station communicates only with the ships navigating the Great Lakes and with Duluth Minnesota, Calumet Michigan, and Port Arthur Ontario.

226. Station limited to private correspondence with San Francisco.

227. For radiotelegrams exchanged with ships plying between New York City and points less than 200 miles distant by water.

228. Operated by the United Fruit Company.

229. Station limited to private correspondence with the ships of the New York and Porto Rico Steamship Company, the New York and Cuba Mail Steamship Company, and the Clyde Steamship Company.

230. The station communicates only with Binghamton and with stations on moving trains between Hoboken New Jersey, and Buffalo New York State.

231. Station reserved for correspondence with El Paso Texas, and Heeia Point (Hawaiian Islands).

232. Station reserved for correspandence with El Paso Texas, Hollister California, and Los Angeles California KLS.

233. The station communicates with Frankfort, Michigan.

234. With the wavelength of 600 metres.

235. The station also exchanges correspondence with Nassau (Bahamas). Charge, fr. 0.30 per word, without a minimum.

236. For radiotelegrams exchanged with ships making voyages between Newport (Rhode Island) and ports not exceeding 200 miles distant.

237. For radiotelegrams exchanged with ships making voyages between ports on the American continent more than 200 miles distant from Newport (Rhode Island).

238. The station communicates only with South San Francisco. Charge per word, fr. 0.37.5; minimum per telegram, fr. 3.75.

239. Station limited to private correspondence with Lahaina.

240. The station communicates only with Seattle (United States of America).

241. For ordinary radiotelegrams.

242. For press radiotelegrams.

243. The station also exchanges private correspondence with Kaunakakai.

244. The handling of public correspondence is temporarily suspended, with the exception that messages in plain language may be sent between officials or passengers of vessels and the agencies of such vessels, provided that they contain only matter relating to the affairs of the senders or addressees.

245. Commercial correspondence is temporarily limited. It is also subject to censor regulations and certain Government restrictions.

246. With the wavelength of 2,500 metres.

247. For radiotelegrams exchanged with ships subject to the administration of Australia or of New Zealand.

248. Meteorological radiotelegrams are exchanged with vessels free of charge.

249. For radiotelegrams exchanged with ships other than those subject to the administration of Australia or of New Zealand.

250. When necessary, or when requested by vessels, the station transmits weather forecasts.

SHIP STATIONS

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
ARGENTINE (REPUBLIC)							Francs.	Francs.
Alferez Mackinlay	LNB	—	Warship	450, **600**	O	N	0.40	4.00
Almirante Brown	LKA	—	Warship	450, **600**	O	N	0.40	4.00
Andes (Los) LKR	LKR	—	Warship	450, **600**	O	N	0.40	4.00
Argentino LMS	LMS	260	S.A. Impta. y Expta. de la Patagonia	600	P G	N	0.40	4.00
Asturiano	LMT	260	S.A. Impta. y Expta. de la Patagonia	600	P G	N	0.40	4.00
Avellaneda	LMK	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Belgrano LKB	LKB	—	Warship	450, **600**	O	N	0.40	4.00
Berlin LLM	LLM	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Berna	LLN	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Bruselas	LLO	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Buenos Aires LKC	LKC	—	Warship	450, **600**	O	N	0.40	4.00
Buenos Aires LLP	LLP	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Cabo Corrientes [80]	LMO	300	A. M. Delfino y Hermano, Buenos Aires	300, **600**	P G	N	0.40	4.00
Cabo Santa Maria [80]	LMN	300	A. M. Delfino y Hermano	300, **600**	P G	N	0.40	4.00
Camarones	LME	600	A. M. Delfino y Hermano	300, 450, **600**	P G	N	0.40	4.00
Catamarca	LKD	—	Warship	450, **600**	O	N	0.40	4.00
Chaco	LKE	—	Warship	450, **600**	O	N	0.40	4.00
Colonia LLQ	LLQ	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Cordóba LKF	LKF	—	Warship	450, **600**	O	N	0.40	4.00
Draga 16.C	LMQ	100	Government	450	O	9 a.m. to 11 a.m., 3 p.m. to 5 p.m.	0.40	4.00
Draga 209	LLH	—	Government	500	O	N	0.40	4.00
Draga 210	LLI	—	Government	500	O	N	0.40	4.00
Draga 211	LLJ	—	Government	500	O	N	0.40	4.00
Draga 212. C	LMW	216	Government	2,000, **3,000**	O	9 a.m. to 11 a.m., 3 p.m. to 5 p.m.	0.40	4.00
Entre Ríos LKH	LKH	—	Warship	450, **600**	O	N	0.40	4.00
Eolo	LLR	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Espora	LKI	—	Warship	450, **600**	O	N	0.40	4.00
Formosa LMU [80]	LMU	150	Domingo Barthe	300, **600**	P G	N	0.40	4.00
Fragata Sarmiento	LKJ	—	Warship	450, **600**	O	N	0.40	4.00
Garibaldi LKK	LKK	—	Warship	450, **600**	O	N	0.40	4.00
Gaviota	LKL	—	Warship	450, **600**	O	N	0.40	4.00
Guarany	LLS	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00
Guardia Nacional	LKM	—	Warship	450, **600**	O	N	0.40	4.00
Helios LLT	LLT	135	Co. Nicolás Mihanovich	300, **600**	P G	N	0.40	4.00

Humaitá [80]	LMV	150	Domingo Barbieri	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Independencia	LKN	—	Warship	450, 600	O	N	0.40	4.00
Jujuy	LKO	—	Warship	450, 600	O	N	0.40	4.00
Juanita	LMX	500	S.A. de Navigation Sud Atlantica	300, 600	P G ..	7 a.m. to 11 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Labrador	LLU	80	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Lambaré	LLV	135	Co. Nicolás Mihanovich	300, 600	O	N	0.40	4.00
Libertad	LKQ	—	Warship	450, 600	O	N	0.40	4.00
Londres	LLW	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Luna	LLX	80	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Madrid	LLY	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Maipú	LKS	—	Warship	450, 600	O	N	0.40	4.00
Mendoza	LMF	600	A. M. Delfino y Hermano ..	300, 450, 600	P G ..	N	0.40	4.00
Ministro Escurra	LNA	—	Warship	450, 600	O	N	0.40	4.00
Moreno	LKT	—	Warship	450, 600	O	N	0.40	4.00
9 de Julio	LKU	—	Warship	450, 600	O	N	0.40	4.00
Ona	LNC	—	Warship	450, 600	O	N	0.40	4.00
Pampa LKV	LKV	—	Warship	450, 600	O	N	0.40	4.00
Pampero	LLK	—	Government	300	O	N	0.40	4.00
Paraná LKW	LKW	—	Warship	450, 600	O	N	0.40	4.00
Paris LLZ	LLZ	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Patagonia LKX	LKX	—	Warship	450, 600	O	N	0.40	4.00
Patria LKY	LKY	—	Warship	450, 600	O	N	0.40	4.00
Piedrabuena	LKZ	—	Warship	450, 600	O	N	0.40	4.00
Plata LKG (El)	LKG	—	Warship	450, 600	O	N	0.40	4.00
Plata LKP (La)	LKP	—	Warship	450, 600	O	N	0.40	4.00
Pomona	LMY	500	S.A. de Navigation Sud Atlantica	300, 600	P G ..	7 a.m. to 11 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Presidente Mitre	LMG	600	A. M. Delfino y Hermano ..	300, 450, 600	P G ..	N	0.40	4.00
Presidente Quintana ..	LMH	600	A. M. Delfino y Hermano ..	300, 450, 600	P G ..	N	0.40	4.00
1° de Mayo	LLA	—	Warship	450, 600	O	N	0.40	4.00
Pueyrredón	LLB	—	Warship	450, 600	O	N	0.40	4.00
Querandi	LND	—	Warship	450, 600	O	N	0.40	4.00
Rawson	LML	135	Co. Nicolás Mihanovich	300, 600	O	N	0.40	4.00
Rio de la Plata LMI	LMI	150	Santiago Lambruschini	300, 600	O	N	0.40	4.00
Rio Uruguay	LMJ	150	Santiago Lambruschini	300, 600	O	N	0.40	4.00
Rivadavia	LLC	—	Warship	450, 600	O	N	0.40	4.00
Roma LMA	LMA	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Rosario LLD	LLD	—	Warship	450, 600	O	N	0.40	4.00
S. Martin LLE	LLE	—	Warship	450, 600	O	N	0.40	4.00
S. Martin LMM	LMM	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Toro LMP [80]	LMP	500	S.A. de Navigation Sud Atlántica	300, 600	P G ..	7 a.m. to 11 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Tritón LMB	LMB	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Uruguay LLF	LLF	—	Warship	450, 600	O	N	0.40	4.00
Vapor 118.B.	LLL	—	Government	500	O	N	0.40	4.00
25 de Mayo	LLG	—	Warship	450, 600	O	N	0.40	4.00
Venus LMC	LMC	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
Vicente Fidel Lopez	LMR	80	Warship	350, 450, 600	O	X	0.40	4.00
Viena	LMD	135	Co. Nicolás Mihanovich	300, 600	P G ..	N	0.40	4.00
AUSTRALIAN COMMONWEALTH								
Australia VKA	VKA	—	Government	600	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
AUSTRALIAN COMMONWEALTH—*cont'd.*							Francs.	Francs.
Bombala [81]	VHF	250	Howard, Smith Co.	300, **600**	P G	Limited	0.20	—
Brisbane VKB	VKB	—	Government	600	O		—	—
Canberra [81]	VHO	250	Howard, Smith Co.	300, **600**	—	Limited	0.20	—
Cerberus	VKO	—	Government	600	O		—	—
Cockburn Sound Base	VKR	—	Government	600	O		—	—
Cooma [81]	VHE	250	Howard, Smith Co.	300, **600**	P G	Limited	0.20	—
Derwent VKK	VKK	—	Government	600	O		—	—
Dimboola [81]	VHL	240	Melbourne S.S. Co.	300, **600**	P G	Limited	0.20	—
Encounter	VKE	—	Government	600	O		—	—
Fiona [81]	VHO	240	Colonial Sugar Refining Co.	300, **600**	P G		0.20	—
Flinders Island Base	VKP	—	Government	600	O		—	—
Garden Island Base	VKQ	—	Government	600	O		—	—
Grantala [81]	VHJ	240	Adelaide S.S. Co.	300, **600**	P G	Limited	0.20	—
Indarra [81]	VHP	240	Australasian United S.N. Co.	300, **600**	P G	Limited	0.20	—
Kanowna [81]	VHD	250	Australasian United S.N. Co.	300, **600**	P G	Limited	0.20	—
Kapunda [81]	VHM	240	Melbourne S.S. Co.	300, **600**	P G	Limited	0.20	—
Karoola [81]	VHE	240	MacIlwraith, McEacharn & Co.	300, **600**	P G	Limited	0.20	—
Katoomba [81]	VHN	300	MacIlwraith, McEacharn & Co.	300, **600**	P G	Limited	0.20	—
Kulambangra [81]	VHA	300	Lever's Pacific Plantations	300, **600**	P G	Limited	0.20	—
Kyarra [81]	VHC	250	Australasian United S.N. Co.	300, **600**	P G	Limited	0.20	—
Levuka [81]	VHB	250	Australasian United S.N. Co.	300, **600**	P G	Limited	0.20	—
Mataram [81]	VHU	240	Burns, Philp & Co.	300, **600**	P G	Limited	0.20	—
Matunga [81]	VHV	240	Burns, Philp & Co.	300, **600**	P G	Limited	0.20	—
Melbourne VKC	VKC	—	Government	600	O		—	—
Montoro [81]	VHT	240	Burns, Philp & Co.	300, **600**	P G	Limited	0.20	—
Morinda [81]	VHF	240	Burns, Philp & Co.	300, **600**	P G	Limited	0.20	—
Navy Office	VKN	—	Government	600	O		—	—
Parramatta	VKJ	—	Government	600	O		—	—
Pioneer VKF	VKF	—	Government	600	O		—	—
Port Stevens Base	VKS	—	Government	600	O		—	—
Protector	VKG	—	Government	600	O		—	—
Riverina [81]	VJA	250	Huddart Parker, Ltd.	300, **600**	P G		0.20	—
St. Albans [81]	VJD	—	Eastern and Australian S.S. Co.	—	—		—	—
Stuart	VHS	Day, 100; night, 300	Government	300	O		—	—
Suva [81]	VIJ	200	Australasian United S.N. Co.	300, **600**	P G	Limited	0.20	—
Swan	VKM	—	Government	600	O		—	—
Sydney VKD	VKD	—	Government	600	O		—	—
Torrens	VKL	—	Government	600	O		—	—

Uli naroa [81]	VHY	250	Huddart Parker, Ltd.	300, 600	P G	Limited	0.20	—
Victoria VHX [81]	VHX	250	Huddart Parker, Ltd.	300, 600	P G	Limited	0.20	—
Wandilla [81]	VHI	240	Adelaide S.S. Co.	300, 600	P G	Limited	0.20	—
Warilda [81]	VHH	240	Adelaide S.S. Co.	300, 600	P G	Limited	0.20	—
Warrego	VKH	—	Government	600	O	—	—	—
Western Australia [80]	VHK	240	West Australia Government	300, 600	P G	Limited	0.20	—
Westralia	VJB	250	Huddart Parker, Ltd.	300, 600	P G	Limited	0.20	—
Willochra [81]	VHG	240	Adelaide S.S. Co.	300, 600	P G	Limited	0.20	—
Wimmera [81]	VHZ	250	Huddart Parker, Ltd.	300, 600	P G	Limited	0.20	—
Wyandra [81]	VHW	240	Australasian United S.N. Co.	300, 600	P G	Limited	0.20	—
Wyreema [81]	VJG	200	Australasian United S.N. Co.	300, 600	P G	Limited	0.20	—
Yarra VKI	VKI	—	Government	600	O	—	—	—
Zealandia VJC [81]	VJC	240	Huddart Parker, Ltd.	300, 600	—	Limited	0.20	—

AUSTRIA [120]

Africa OLA [1]	OLA	Day, 400; night, 700	Austrian Lloyd [7]	300, 450, 600	P G	X	0.30	3.00
Alice [1]	OKI	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft [8]	300, 450, 600	P G	N [2] X [3]	0.30	3.00
Argentina [1]	OKG	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft [8]	300, 450, 600	P G	N [2] X [3]	0.30	3.00
Atlanta [1]	OKA	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft [8]	300, 450, 600	P G	N [2] X [3]	0.30	3.00
Austria [1]	OLU	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, 600	P G	X	0.30	3.00
Belvedere [1]	OKB	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft [8]	300, 450, 600	P G	N [2] X [3]	0.30	3.00
Bohemia OLB [1]	OLB	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, 600	P G	X	0.30	3.00
Chilia OLC [1]	OLC	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, 600	P G	X	0.30	3.00
Cleopatra [1]	OLL	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, 600	P G	X	0.30	3.00
Columbia OKC [1]	OKC	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft [8]	300, 450, 600	P G	N [2] X [3]	0.30	3.00
Erzherzog Franz Ferdinand OLE [1]	OLE	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, 600	P G	X	0.30	3.00
Eugenia [1]	OKE	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft [8]	300, 600	P G	N [2] X [3]	0.30	3.00
Francesca [1]	OKF	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts-Aktiengesellschaft [8]	300, 450, 600	P G	N [2] X [3]	0.30	3.00
Gablonz [1]	OLG	Day, 400; night, 700	Austrian Lloyd [6]	300, 450, 600	P G	X	0.30	3.00
Habsburg OLR [1]	OLR	Day. 150; night, 250	Austrian Lloyd [7]	300, 450, 600	P G	X	0.30	3.00
Helouan [1]	OLH	Day, 150; night, 250	Austrian Lloyd [6]	300, 450, 600	P G	X	0.30	3.00
Kaiser Franz Joseph I. OKK [1]	OKK	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts Aktiengesellschaft [8]	300, 450, 600	P G	N	0.30	3.00
Körber [1]	OLK	Day, 400; night, 700	Austrian Lloyd [7]	300, 450, 600	P G	X	0.30	3.00
Laura [1]	OKL	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts Aktiengesellschaft [8]	300, 450, 600	P G	N [2] X [3]	0.30	3.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
AUSTRIA [130]—*contd.*							Francs.	Francs.
Marienbad [1]	OLM	Day, 400; night, 700	Austrian Lloyd [6]	300, 450, **600**	P G ..	X	0.30	3.00
Martha Washington [1] ..	OKM	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts Aktiengesellschaft [8]	300, 450, **600**	P G ..	N [2] X [3]	0.30	3.00
Mercédès II. [6 bis]	OMA	Day, 150; night, 250	M. E. Jellinek Mercédès	300	P	X	—	—
Nippon [1]	OLN	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, **600**	P G ..	X	0.30	3.00
Oceania [1]	OKO	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts Aktiengesellschaft [8]	300, 450, **600**	P G ..	N [2] X [3]	0.30	3.00
Oesterreich [1]	OMC	Day, 150; night, 250	Austrian Antarctic Expedition ship	300, 450, **600** [32]	P G ..	X	0.30	3.00
Persia OLP [1]	OLP	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, **600**	P G ..	X	0.30	3.00
Semiramis [1]	OLS	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, **600**	P G ..	X	0.30	3.00
Silesia OLJ [1]	OLJ	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, **600**	P G ..	X	0.30	3.00
Sofia Hohenberg [1]	OKH	Day, 400; night, 700	Vereinigte Oesterreichische Schiffahrts Aktiengesellschaft [8]	300, 450, **600**	P G ..	N [2] X [3]	0.30	3.00
Thalia	OLI	Day, 150; night, 250	Austrian Lloyd [6]	300, 450, **600**	P G ..	X	0.30	3.00
Trieste [1]	OLT	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, **600**	P G ..	X	0.30	3.00
Venezia OMB [1]	OMB	Day, 100	Schiff. Schlepp und Bergungs A.G., D. Tripcovich	300, **600**	P G ..	8 a.m. to 12 a.m., 2 p.m. to 6 p.m.	0.10	1.00
Vorwärts [1]	OLV	Day, 150; night, 250	Austrian Lloyd [7]	300, 450, **600**	P G ..	X	0.30	3.00
Wien OLW [1]	OLW	Day, 150; night, 250	Austrian Lloyd [6]	300, 450, **600**	P G ..	X	0.30	3.00
AUSTRIA-HUNGARY [131]								
Admiral Spaun	UOB	—	Warship	600	O	N	—	—
Arpád	UOD	—	Warship	600	O	N	—	—
Aspern	UOI	—	Warship	600	O	N	—	—
Babenberg	UOQ	—	Warship	600	O	N	—	—
Balaton	UOV	—	Warship	300, **600**	O	N	—	—
Bodrog	UOY	—	Warship	—	—	—	—	—
Budapest	UPB	—	Warship	300, **600**	O	N	—	—

Csikós	UPO	—	Warship	300, **600**	O	N	—	—
Dinara	UPR	—	Warship	300, **600**	O	N	—	—
Erzherzog Ferdinand Max	UPZ	—	Warship	600	O	N	—	—
Erzherzog Franz Ferdinand UPW	UPW	—	Warship	600	O	N	—	—
Erzherzog Friedrich	UQF	—	Warship	600	O	N	—	—
Erzherzog Karl	UQK	—	Warship	600	O	N	—	—
Gäa	UQX	—	Warship	600	O	N	—	—
Habsburg URN	URN	—	Warship	600	O	N	—	—
Helgoland URM	URM	—	Warship	600	O	N	—	—
Herkules	URR	—	Warship	300, **600**	O	N	—	—
Huszar	URU	—	Warship	300, **600**	O	N	—	—
Kaiser Franz Joseph I. USJ	USJ	—	Warship	600	O	N	—	—
Kaiserin Elisabeth	USN	—	Warship	600	O	N	—	—
Kaiserin und Königin Maria Theresia	USQ	—	Warship	600	O	N	—	—
Kaiser Karl VI.	USC	—	Warship	600	O	N	—	—
Lacroma	USW	—	Warship	300, **600**	O	N	—	—
Lika	USY	—	Warship	300, **600**	O	N	—	—
Lussin	UTC	—	Warship	300, **600**	O	N	—	—
Magnet UTG	UTG	—	Warship	300, **600**	O	N	—	—
Miramar UTM	UTM	—	Warship	300, **600**	O	N	—	—
Monarch UTO	UT O	—	Warship	300, **600**	O	N	—	—
Novara UTV	UTV	—	Warship	600	O	N	—	—
Orjen	UTX	—	Warship	300, **600**	O	N	—	—
Pandur	UUB	—	Warship	300, **600**	O	N	—	—
Panther UUD	UUD	—	Warship	300, **600**	O	N	—	—
Pelikan UUK	UUK	—	Warship	300, **600**	O	N	—	—
Pola UUL	UUL	—	Warship	300, **600**		N	—	—
Prinz Eugen	UUN	—	Warship	600	O	N	—	—
Radetzky	UUS	—	Warship	600	O	N	—	—
Réka	UUW	—	Warship	300, **600**	O	N	—	—
Saida	UVA	—	Warship	600	O	N	—	—
Satellit	UVD	—	Warship	300, **600**	O	N	—	—
Scharfschütze	UVH	—	Warship	300, **600**	O	N	—	—
S. Georg	UVG	—	Warship	600	O	N	—	—
Streiter	UVJ	—	Warship	300, **600**	O	N	—	—
Szigetvár	UVO	—	Warship	600	O	N	—	—
Tátra	UVW	—	Warship	300, **600**	O	N	—	—
Taurus	UVY	—	Warship	300, **600**	O	N	—	—
Tegetthoff	UWB	—	Warship	600	O	N	—	—
Teodo	UWJ	—	Warship	300, **600**	O	N	—	—
Temes	UWH	—	Warship	—	—	—	—	—
Trabant	UWK	—	Warship	300, **600**	O	N	—	—
Triglav	UWL	—	Warship	300, **600**	O	N	—	—
Turul	UWP	—	Warship	300, **600**	O	N	—	—
Ulan	UWU	—	Warship	300, **600**	O	N	—	—
Uskoke	UWZ	—	Warship	300, **600**	O	N	—	—
Velebit	UXL	—	Warship	300, **600**	O	N	—	—
Vesta UXS	UXS	—	Warship	—	O	N	—	—
Viribus unitis	UXV	—	Warship	600	O	N	—	—
Wien UYA	UYA	—	Warship	300, **600**	O	N	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
AUSTRIA-HUNGARY[121]—*contd.*							Francs.	Francs.
Wildfang	UYF	—	Warship	300, **600**	O	N	—	—
Zenta	UYT	—	Warship	600	O	N	—	—
Zrinyi	UYY	—	Warship	600	O	N	—	—
BELGIUM								
Albertville [11]	OTV	200	Cie Belge Maritime du Congo	300, 450, **600**	P G	N	0.40	4.00
Anversville [11]	ONV	200	Cie Belge Maritime du Congo	300, 450, **600**	P G	N	0.40	4.00
Avenir (L') [24 11]	ONE	170	Association Maritime Belge	300, 450, **600**	P G	N	0.40	4.00
Elbruz [11]	OOE	—	S.A. d'Armement d'Industrie et de Com.	—	—	—	—	—
Elisabethville [11]	OSV	200	Cie Belge Maritime du Congo	300, 450, **600**	P G	N	0.40	4.00
Gothland [11]	ORG	—	Red Star Line	300, **600**	P G	—	0.40	4.00
Jan Breydel	ONJ	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Leda OSY [4 11]	OSY	75–150	G. L. Carels (Ghent)	300, 450, **600**	P	X	—	—
Léopold II. [12]	OPD	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Marie-Henriette [12]	ONM	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Pieter De Coninck [12]	OPK	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Princesse Clémentine [12]	OPC	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Princesse Elisabeth [12]	OPE	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Princesse Henriette [12]	OPH	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Rapide (Le) [12]	OPR	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Sumland [11]	ORS	—	Red Star Line	300, **600**	P G	—	0.40	4.00
Stad Antwerpen [12]	OPA	60	Government	300	P R [13]	—[14]	—[15]	—[15]
Ville de Liège [12]	OPL	60	Government	300	P R [13]	—[14]	—[15]	—[15]
BRAZIL								
Acre [44]	SRF	190	Lloyd Brazileiro	300, 600	—	—	—	—
Alagôas SNA	SNA	50	Warship	300	O	—	—	—
Alagôas SRV	SRV	—	Lloyd Brazileiro	300, 600	—	—	—	—
Amazonas	SOA	50	Warship	300	O	—	—	—
Andrada	—	80	Warship	300	O	—	—	—
Anna [83]	PUA	270	Hoepcke Carl, Junr.	300, **600**	P G	N	0.40	—
Aymoré [44]	SRJ	—	Government	—	—	—	—	—
Bahia SNB	SNB	110	Warship	400–1,200	O	—	—	—
Bahia SRE [44]	SRE		Government					

Benjamin Constant	SOC	110	Warship	400–1,000	O	—	—	—	—	—	—	—
Brazil [44]	SRM	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Cannavieiras [83]	PUO	—	Navegacao Bahiana	300, 600	P G	—	—	—	—	0.40	—	—
Carioca	SOW	—	Government	—	O	—	—	—	—	—	—	—
Carlos Gomes	SOE	80	Warship	350	O	—	—	—	—	—	—	—
Ceará SNC	SNC	—	Warship	—	O	—	—	—	—	—	—	—
Ceará SRD [44]	SRD	240	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Commandatuba [83]	PUQ	—	Navegacao Bahiana	300, 600	P G	—	—	—	—	0.40	—	—
Deodoro	SND	—	Warship	—	O	—	—	—	—	—	—	—
Floriano	SNF	—	Warship	—	O	—	—	—	—	—	—	—
Goyaz SNG	SNG	—	Warship	—	O	—	—	—	—	—	—	—
Goyaz SRZ [44]	SRZ	—	Lloyd Brazileiro	300, 600	P G	—	—	—	—	—	—	—
Guararapes [83]	PUT	—	Navegacao Bahiana	300, 600	P G	—	—	—	—	0.40	—	—
Ilheos [83]	PUN	—	Navegacao Bahiana	300, 600	P G	—	—	—	—	0.40	—	—
Iris SRU [44]	SRU	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Itagiba [80]	STF	—	Cia Nac. de Navegacao Costeira	—	—	—	—	—	—	—	—	—
Itapuhy [80]	STD	190	Cia Nac. de Navegacao Costeira	300, 600	—	—	—	—	—	—	—	—
Itapura [80]	STA	190	Cia Nac. de Navegacao Costeira	300, 600	—	—	—	—	—	—	—	—
Itaquera [80]	STE	190	Cia Nac. de Navegacao Costeira	300, 600	—	—	—	—	—	—	—	—
Itassucé, [80]	STC	190	Cia Nac. de Navegacao Costeira	300, 600	—	—	—	—	—	—	—	—
Itatinga [80]	STB	190	Cia Nac. de Navegacao Costeira	300, 600	—	—	—	—	—	—	—	—
Jaguarão	SOJ	50	Warship	300	O	—	—	—	—	—	—	—
Jequitinhonha [83]	PUP	—	Navegacao Bahiana	300, 600	P G	—	—	—	—	0.40	—	—
Jupiter SRT [44]	SRT	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Ladario [44]	SRN	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Laurindo Pita	SNL	50	Warship	300	O	—	—	—	—	—	—	—
Madeira	SOM	—	Warship	—	O	—	—	—	—	—	—	—
Manáos [44]	SRS	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Marahu [83]	PUR	—	Navegacao Bahiana	300, 600	P G	—	—	—	—	0.40	—	—
Maranhão SOK	SOK	—	Warship	—	O	—	—	—	—	—	—	—
Maranhão SRK [44]	SRK	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Matto Grosso	SOG	50	Warship	300	O	—	—	—	—	—	—	—
Mercédes SRO	SRO	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Minas Geraes SNM	SNM	270	Warship	300–2,100	O	—	—	—	—	—	—	—
Minas Geraes SRB [44]	SRB	240	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Orion SRI [44]	SRI	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Oyapock [44]	SRX	—	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Pará SNE	SNE	50	Warship	300	O	—	—	—	—	—	—	—
Pará SRQ [41]	SRQ	190	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Parahyba	SOP	50	Warship	300	O	—	—	—	—	—	—	—
Paraná SNH	SNH	50	Warship	300	O	—	—	—	—	—	—	—
Pernambuco SON	SON	—	Warship	—	O	—	—	—	—	—	—	—
Piauhy	SOY	50	Warship	300	O	—	—	—	—	—	—	—
Porto Seguro [83]	PUS	—	Navegacao Bahiana	300, 600	P G	—	—	—	—	0.40	—	—
Prudente de Moraes [83]	SRV	—	Lloyd Brazileiro	—	—	—	—	—	—	—	—	—
Republica	SOV	—	Warship	—	O	—	—	—	—	—	—	—
Rio de Janeiro SRA [44]	SRA	240	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
Rio Grande do Norte	SNS	50	Warship	300	O	—	—	—	—	—	—	—
Rio Grande do Sul	SOR	110	Warship	400–1,200	O	—	—	—	—	—	—	—
S. Paulo SNP	SNP	270	Warship	300, 1,200	O	—	—	—	—	—	—	—
S. Paulo SRC [44]	SRC	240	Lloyd Brazileiro	300, 600	—	—	—	—	—	—	—	—
St. Catharina	SNK	50	Warship	300	O	—	—	—	—	—	—	—
Satellite SRG [44]	SRG	190	Lloyd Brazileiro	300 600	—	—	—	—	—	—	—	—

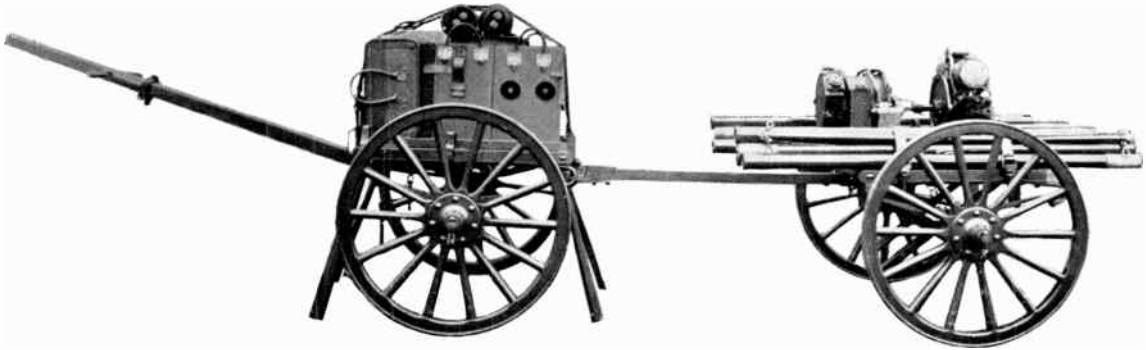
Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
BRAZIL—*contd.*							Francs.	Francs.
Saturno [44]	SRR	190	Lloyd Brazileiro	300, 600	—	—	—	—
Sergipe SNO	SNO	50	Warship	300	O	—	—	—
Sergipe SRH [44]	SRH	190	Lloyd Brazileiro	300, 600	—	—	—	—
Sirio [44]	SRW	190	Lloyd Brazileiro	300, 600	—	—	—	—
Solimoes	SOL	—	Warship	—	O	—	—	—
Tamandaré	—	50	Warship	300	O	—	—	—
Tamoyo	SNT	110	Warship	350	O	—	—	—
Tiradentes	SOT	50	Warship	300	O	—	—	—
Tupy	SNV	80	Warship	300	O	—	—	—
Tymbira	SNY	110	Warship	300	O	—	—	—
Venus SRP [44]	SRP	190	Lloyd Brazileiro	300, 600	—	—	—	—
BRITISH BAHAMAS								
Energie [84]	VRH	—	Scottish Mexican Oil Co.	—	—	—	—	—
BRITISH INDIA								
Dufferin [80]	VUR	250	Government	300, **600**, 1,000	P G	N	0.40	—
Hardinge [80]	VUC	250	Government	300, **600**, 1,000	P G	N	0.40	—
Northbrook [80]	VUD	200	Government	300, 430, **600**, 1,000	P G	N	0.40	—
CANADA AND NEWFOUNDLAND								
Aberdeen [38]	VDG	100	Government	300	O	N	—	—
Acadia [36]	VDT	200	Government	300, **600**	O	X	—	—
Adventure VOK [17]	VOK	150	Harvey & Co.	300, **600**	P G	X	0.40	4.00
Alberta VFQ [17]	VFQ	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Algerine [17]	VOL	150	—	300, **600**	P G	X	0.40	4.00
Aquilo [4]	VFU	80	B. J. Rogers, Vancouver	300	P	X	—	—
Aranmore VDQ [18]	VDQ	200	Government	300, **600**	O	X	—	—
Assiniboia [17]	VGI	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Athabasca [17]	VGG	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
[illegible] [17]	VFW	200	Canada Atlantic & Plant Line	[illegible] **600**	P G	N		

Beothic [17]	VON	150	Job Bros.	300, 600	P G	X	0.40	4.00	
Bessie Dollar [17]	VFO	200	Dollar S.S. Lines, Ltd.	300, 600	P G	N	—	—	
Bonaventure VOO [17]	VOO	150	Harvey & Co.	300, 600	P G	X	0.40	4.00	
Boston VFS [17]	VFS	200	Boston & Yarmouth S.S. Co.	300, 600	P G	N	0.40	4.00	
Bruce [80]	VOP	120	Reid Newfoundland Co.	300, 600	P G	X	0.40	4.00	
Camosun [80]	VFZ	200	Union S.S. Co. of B.C.	300, 600	P G	N	0.40	4.00	
Canada VDC [16]	VDC	150	Government	300, 600	O	N	—	—	
Cascopedia [17]	VEO	200	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Cayuga [17]	VEL	100	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Chelohsin [80]	VGN	200	Union S.S. Co. of B.C.	—	—	—	—	—	
Chicora [17]	VEJ	100	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Chippewa VEH [17]	VEH	100	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Corona [17]	VEB	100	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Dalhousie City [17]	VEA	100	Niagara, St. Catherines and Toronto Nav. Co.	300, 600	P G	N	0.40	4.00	
Deliverance [80]	VFF	100	Southern Salvage Co.	300, 600	P	X	—	—	
Desola [85]	VEP	—	Reid Donald S.S. Co.	—	—	—	—	—	
Dollard [16]	VDO	150	Government	300	O	X	—	—	
Douglas H. Thomas [17]	VGR	125	Dominion Coal Co.	300, 600	P G	N	0.40	4.00	
Druid VDH [16]	VDH	100	Government	300	O	X	—	—	
Durley Chine [19]	VDY	200	Government	300, 600	O	X	—	—	
Eagle VOU [17]	VOU	150	Bowring Bros.	300, 600	P G	X	0.40	4.00	
Earl Grey [16]	VDI	200	Government	300, 600	O	N	—	—	
Empire [17]	VFP	200	Canadian Towing & Wrecking Co.	300, 600	P G	N	0.40	4.00	
Estevan [16]	VDN	200	Government	300, 600	O	X	—	—	
Evangeline [17]	VGO	200	Canada Atlantic & Plant Line	300, 600	P G	N	0.40	4.00	
Everett G. Griggs [80]	VGQ	100	Everett G. Griggs Ship Co.	300, 600	P G	X	0.40	4.00	
Florence VFT [80]	VFT	150	T. Eaton, Toronto	300, 600	P	X	—	—	
Galiano [16]	VDV	200	Government	300, 600	O	X	—	—	
Garden City [17]	VEI	100	Niagara, St. Catherines and Toronto Nav. Co.	300, 600	P G	N	0.40	4.00	
Halifax [17]	VGP	200	Canada Atlantic & Plant Line	300, 600	P G	N	0.40	4.00	
Hamonic [17]	VGD	200	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Hazel Dollar [17]	VEE	200	Dollar S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Huronic [17]	VGE	200	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Keewatin [17]	VGC	200	Canadian Pacific Railway Co.	300, 600	P G	N	0.40	4.00	
Kingston [17]	VEC	100	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Kyle [80]	VOR	150	Reid Newfoundland Co.	300, 600	P G	X	0.40	4.00	
Lady Evelyn [54]	VDX	100	Government	300, 600	O	X	—	—	
Lady Grey [18]	VDL	100	Government	300	O	X	—	—	
Lady Laurier [19]	VDF	150	Government	300	O	N	—	—	
Lintrose [80]	VOS	150	Reid Newfoundland Co.	300, 600	P G	X	0.40	4.00	
Lord Strathcona [17]	VFX	80	Quebec Salvage & Wrecking Co.	300	P G	X	0.40	4.00	
Lorne	—	—	Vancouver Tugboat Co.	—	—	—	—	—	
Macassa [17]	VEK	100	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Majestic VEM	VEM	100	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00	
Malaspina [16]	VDU	200	Government	300, 600	O	X	—	—	
Manitoba [17]	VGH	200	Canadian Pacific Railway Co.	300, 600	P G	N	0.40	4.00	
Margaret [20]	VDW	200	Government	300, 600	O	X	—	—	
Minto [18]	VDD	150	Government	300, 600	O	X	—	—	
Montcalm VDJ [19]	VDJ	150	Government	300, 600	O	X	—	—	
Montmagny [19]	VDK	200	Government	300, 600	O	X	—	—	
Morwenna [17]	VFN	200	St. Laurence Shipping Co.	300, 600	P G	N	0.40	4.00	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
CANADA AND NEWFOUNDLAND—*contd.*							Francs.	Francs.
Nascopie [17]	VOT	150	Job Bros.	300, **600**	P G	X	0.40	4.00
Neptune [17]	VOX	—	Job Bros.	300, **600**	P G	X	0.40	4.00
Newfoundland [17]	VOW	—	Harvey & Co.	—	—	—	—	—
Newington [18]	VDP	100	Government	300	O	—	—	—
Niobe VDA [16]	VDA	—	Government	—	O	—	—	—
Noronic [17]	VGW	200	Canada S.S. Lines, Ltd.	300, **600**	P G	N	0.40	4.00
Ontario No. 1 [80]	VGU	300	—	300, **600**	P G	N	0.10	1.00
Prince Arthur [17]	VGJ	200	Boston & Yarmouth S.S. Co.	300, **600**	P G	N	0.40	4.00
Prince George VGK [17]	VGK	200	Boston & Yarmouth S.S. Co.	300, **600**	P G	N	0.40	4.00
Prince John [80]	VFM	200	Grand Trunk S.S. Co.	300, **600**	P G	N	0.40	4.00
Princess Adelaide [17]	VFA	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Alice VFD [17]	VFD	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Beatrice [17]	VFC	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Charlotte [17]	VFE	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Ena [17]	VFJ	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Maquinna [17]	VGT	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Margaret [17]	—	—	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Mary [17]	VFB	200	Canadian Pacific Railway Co.	300, **600**	P G	N	—	—
Princess May [17]	VFH	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Patricia [80]	VGZ	100	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Royal VFG [17]	**VFG**	**200**	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Princess Sophia [17]	**VFI**	**200**	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	4.00
Province [17]	**VFR**	**200**	Canadian Towing & Wrecking Co.	300, **600**	P G	N	0.40	4.00
Quadra [18]	VDM	100	Government	300	O	—	—	—
Rainbow VDB [16]	VDB	—	Government	—	O	—	—	—
Rapids King [80]	VEG	200	Canada S.S. Lines, Ltd.	300, **600**	P G	N	0.10	1.00
Royal Edward [17]	VGB	200	Canadian Northern S.S. Co.	300, **600**	P G	N	0.40	4.00
Royal George [17]	VGA	200	Canadian Northern S.S. Co.	300, **600**	P G	N	0.40	4.00
Salvor [80]	VFV	200	B.C. Salvage Co.	300, **600**	P G	—	—	—
Saronic [17]	VGF	200	Northern Navigation Co.	300, **600**	P G	N	0.40	4.00
Seal [17]	VGV	200	Halifax Trading & Sealing Co.	300, **600**	P G	N	0.40	4.00
Sharon [19]	VAQ	200	Government	300, **600**	O	X	—	—
Sheba [18]	VDZ	**200**	Government	300, **600**	O	X	—	—
Simcoe [18]	VDS	100	Government	300, **600**	O	X	—	—
Solgar [4]	VGS	125	J. P. Grant	300, **600**	P G	X	0.40	4.00
St. Ignace [17]	VGL	125	Canadian Towing & Wrecking Co.	300, **600**	P G	X	0.40	4.00
Stanley [18]	VDE	150	Government	300, **600**	O	X	—	—
Syracuse [86]	VEF	200	Canada S.S. Lines, Ltd.	300, **600**	P G	N	0.10	1.00
Tees [17]	VFK	200	Canadian Pacific Railway Co.	300	P G	8 a.m. to 8 p.m.		



Marconi ·5 kw. Hand-Cart Station.

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Toronto VED [17]	VED	100	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.40	4.00
Turbinia VEN [85]		200	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.10	1.00
Venture [80]	VGA	200	Union S.S. Co. of B.C.	300, 600	P G	N	0.40	4.00
Yarmouth VGY [17]	VGY	100	Canadian Pacific Railway	300, 600	P G	N	0.40	4.00
CHILI								
Aysen [41]	CAA	250	Compania Sud-Amer. de Vapores	300, 600	P G	N	0.40	—
Baquedano	CBQ	—	Warship	—	—	—	—	—
Blanco	CBB	—	Warship	—	O	—	—	—
Cachapoal [44]	CAC	—	Compania Sud-Amer. de Vapores	—	—	—	—	—
Casma	CBK	—	Warship	—	O	—	—	—
Chacabuco	CBA	—	Warship	—	O	—	—	—
Cochrane CBC	CBC	—	Warship	—	O	—	—	—
Condell	CBD	—	Warship	—	O	—	—	—
Errazuriz	CBI	—	Warship	—	O	—	—	—
Esmeralda	CBE	—	Warship	—	O	—	—	—
Ex-Cochrane	CBX	—	Warship	—	O	—	—	—
Gamero	CBG	—	Warship	—	O	—	—	—
Huasco [41]	CAH	250	Compania Sud-Amer. de Vapores	300, 600	P G	N	0.40	—
Imperial [41]	CAI	250	Compania Sud-Amer. de Vapores	300, 600	P G	N	0.40	—
Jarna	CBJ	—	Warship	—	O	—	—	—
Lebu [46]	CAD	—	Compania Sud-Amer. de Vapores	—	—	—	—	—
Latorre	CBL	—	Warship	—	O	—	—	—
Limari [41]	CAL	250	Compania Sud-Amer. de Vapores	300, 600	P G	N	0.40	—
Lynch	CBY	—	Warship	—	O	—	—	—
Maipo CBU	CBU	—	Warship	—	O	—	—	—
Maipo CAB [46]	CAB	—	Compania Sud-Amer. de Vapores	—	—	—	—	—
Mapocho [44]	CAM	—	Compania Sud-Amer. de Vapores	—	—	—	—	—
O'Brien CBN	CBN	—	Warship	—	O	—	—	—
O'Higgins	CBH	—	Warship	—	O	—	—	—
Orella	CBO	—	Warship	—	O	—	—	—
Palena [41]	CAP	250	Compania Sud-Amer. de Vapores	300, 600	P G	N	0.40	—
Prat	CBP	—	Warship	—	O	—	—	—
Rancagua	CBW	—	Warship	—	O	—	—	—
Riquelme	CBR	—	Warship	—	O	—	—	—
Serrano	CBS	—	Warship	—	O	—	—	—
Talcahuano	CBF	—	Warship	—	O	—	—	—
Teno [44]	CAT	—	Compania Sud-Amer. de Vapores	—	—	—	—	—
Thompson	CBT	—	Warship	—	O	—	—	—
Tomé	CBM	—	Warship	—	O	—	—	—
Zenteno	CBZ	—	Warship	—	O	—	—	—
CUBA								
Antilla [76]	—	—	New York and Cuba Mail S.S. Co.	300, 600	P G	—	—	—
Camaguey [76]	—	—	New York and Cuba Mail S.S. Co.	300, 600	P G	—	—	—
Guantanamo [76]	—	—	New York and Cuba Mail S.S. Co.	300, 600	P G	—	—	—
Olinda [76]	—	—	Munson S.S. Lines	300, 600	P G	—	—	—
Santiago [76]	—	—	New York and Cuba Mail S.S. Co.	300, 600	P G	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
DENMARK								
							Francs.	Francs.
2den April	OVA	—	Warship	600	O [22]	X	—	—
Absalon	OUA	—	Warship	600	O [22]	X	—	—
Annam [80]	OZN	300	Det Ostasiatiske Co.	300, **600**	P	X	—	—
C. F. Grove [20]	OUO	100	Government	300, **600**	P G	7.30 a.m., 11.30 a.m., 1.30 p.m., 3.30 p.m., 7.30 p.m.	— [23]	— [23]
Dannebrog	OUD	—	Warship	600	O [22]	X	—	—
Delfinen	OVD	—	Warship	600	O [22]	X	—	—
Dykkeren	OVY	—	Warship	600	O [22]	X	—	—
Fionia [80]	OZK	250	Det Ostasiatiske Co.	300, **600**	P	X	0.35	—
Flyvefisken	OVF	—	Warship	600	O [22]	X	—	—
Frederick VIII. [11]	OZL	200	Det Forenede Dampskibsselskab	Co. 300, **600**	P G	N	0.40	4.00
Gejser	OUG	—	Warship	600	O [22]	X	—	—
Havfruen	OVB	—	Warship	600	O [22]	X	—	—
Havmanden	OVE	—	Warship	600	O [22]	X	—	—
Hejmdal	OUJ	—	Warship	600	O [22]	X	—	—
Hellig Olav [11]	OZB	200	Det Forenede Dampskibsselskab	Co. 300, **600**	P G	N	0.40	4.00
Herluf Trolle	OUH	—	Warship	600	O [22]	X	—	—
Hvalrossen	OVH	—	Warship	600	O [22]	X	—	—
Islands Falk	OUI	—	Warship	600	O [22]	X	—	—
Jutlandia [80]	OZG	250	Det Ostasiatiske Co.	300, **600**	P	X	0.35	—
Lossen	OUL	—	Warship	600	O [22]	X	— [23]	— [23]
Lövenörn [21]	OUN	100	Government	300, **600**	P G	7 a.m., 11 a.m., 3 p.m., 7 p.m.		
Malakka [80]	OZO	160	Det Ostasiatiske Co.	300, **600**	P	X	—	—
Najaden	OVN	—	Warship	600	O [22]	X	—	—
Nymfen	OVC	—	Warship	600	O [22]	X	—	—
Olfert Fischer	OUF	—	Warship	600	O [22]	X	—	—
Oscar II. OZ [11]	OZC	200	Det Forenede Dampskibsselskab	Co. 300, **600**	P G	N	0.40	4.00
Peder Skram	OUP	—	Warship	600	O [22]	X	—	—
Selandia [80]	OZF	250	Det Ostasiatiske Co.	300, **600**	P	X	0.35	—
Siam [80]	OZM	300	Det Ostasiatiske Co.	300, **600**	P	X	—	—
Skjold	OUS	—	Warship	600	O [22]	X	—	—
Söridderen	OVR	—	Warship	600	O [22]	X	—	—
Söulven	OVU	—	Warship	600	O [22]	X	—	—
Spækhuggeren	OVS	—	Warship	600	O [22]	X	—	—
Sværdfisken	OVW	—	Warship	600	O [22]	X	—	—
Thetis OVI	OVI	—	Warship	600	O [22]	X	—	—
Tongking [80]	OZP	200	Det Ostasiatiske Co.	300, **600**	P	X	—	—

United States [11]	OZD	200	Det Forenede Dampskibsselskab Co.	300, 600	P G ..	N	0.40	4.00
Valkyrien OUV	OUV	—	Warship	600	O [22] ..	X	—	—
Viking OZH [66]	OZH	Day, 160; night, 320	Em. Z. Svitzers Bjergnings-Entreprise	300, 600	P ..	X	0.40	4.00
Vindhunden	OVV	—	Warship	600	O [22] ..	X	—	—
DUTCH EAST INDIES								
Barensz [11]	—	—	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	—	—	—
Houtman [11]	PMC	300	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	N	0.40	4.00
Melchior Treub [11]	PMD	200	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	N	0.40	4.00
Roggeveen [11]	—	—	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	—	—	—
Rumphius [11]	PME	200	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	N	0.40	4.00
Tasman [11]	PMF	300	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	N	0.40	4.00
Telegraaf [122]	PLA	380	Government	300, 600, 900	O	—	—	—
Tjibodas [11]	—	—	Java, China and Japan Line ..	—	—	—	—	—
Tjikembang [11]	PLH	—	Java, China and Japan Line ..	—	—	—	—	—
Tjikini [11]	—	—	Java, China and Japan Line ..	—	—	—	—	—
Tjiliwong [11]	—	—	Java, China and Japan Line ..	—	—	—	—	—
Tjimanock [11]	PLJ	—	Java, China and Japan Line ..	—	—	—	—	—
Tjisondari [11]	PLI	—	Java, China and Japan Line ..	—	—	—	—	—
Tjitaroem [11]	PLK	—	Java, China and Japan Line ..	—	—	—	—	—
Van Cloon [11]	PMA	200	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	N	0.40	4.00
Van Lansberge [11]	PMG	200	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	N	0.40	4.00
Van Overstraten [11]	PMB	200	Koninklijke Packetvaart Maatschappij	300, 600	P G ..	N	0.40	4.00
EGYPT								
Mahroussa [4]	SUA	350	Government	300, 600	P	—	—	—
FRANCE								
Abda [25]	FPB	160	Cie de Nav. Paquet	300, 600	P G ..	—	0.40	—
Abd-el-Kader [25]	FGK	160	Cie Générale Transatlantique ..	300, 600	P G ..	N	0.40	—
Afrique [87]	FCR	Day, 270; night, 1,080	Cie Chargeurs Réunis	300, 600	P G ..	—	0.40	—
Algérie [80]	FVA	270	Société Générale de Transports Maritimes à Vapeur	300, 600	P G ..	N	0.40	—
Amazone FMA [87]	FMA	Day, 325; night, 650	Cie des Messageries Maritimes ..	300, 600	P G ..	6 a.m. to 10 a.m., 5 p.m. to 7 p.m., 9 p.m. to 12 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
FRANCE—*contd.*							Francs.	Francs.
Amiral Aube	UCJ	350	Warship	300, **600**	P G	N	0.05	—
Amiral Charner	UID	350	Warship	300, **600**	P G	N	0.05	—
Amiral Jaureguiberry	—	—	Cie Chargeurs Réunis	—	—	—	—	—
miral Rigault de Genouilly [28]	FCG	160	Cie Chargeurs Réunis	300, **600**	P G	N	0.40	—
Amiral Sallandrouze de Lamornaix [28]	FCI.	160	Cie Chargeurs Réunis	300, **600**	P G	—	0.40	—
Amiral Trehouart	ULT	100	Warship	300	P G	N	0.05	—
Amiral Troude [28]	FCT	160	Cie Chargeurs Réunis	300, **600**	P G	—	0.40	—
Amiral Villaret de Joyeuse	—	—	Cie Chargeurs Réunis	—	—	—	—	—
Amiral Zédé [28]	FCZ	160	Cie Chargeurs Réunis	300, **600**	P G	—	0.40	—
Anatolie	—	—	Cie de Nav. Paquet	—	—	—	—	—
Ango [25]	FCN	160	Cie Chargeurs Réunis	300, **600**	P G	—	0.40	—
Antilles	—	—	Cie Gén. Transatlantique	—	—	—	—	—
Apache FYP [4]	FYP	270	H. Legru, Paris	300	P G	N	—	—
Arcbalète	UDT	80	Warship	300	P G	N	0.05	—
Arc	UEA	80	Warship	300	P G	N	0.05	—
Argus	UKC	50	Warship	300	P G	N	0.05	—
Armand Béhic [25]	FMB	325	Cie des Messageries Maritimes	300, **600**	P G	N	0.40	—
Arquebuse	UDM	80	Warship	300	P G	N	0.05	—
Asie [27]	FCA	160	Cie Chargeurs Réunis	300, **600**	P G	N	0.40	—
Aspirant-Herber	UFZ	80	Warship	300	P G	N	0.05	—
Astrée	FZA	35	Soc. Navale Caennaise, Caen	300	P G	N	0.40	—
Atlas ULA	ULA	50	Warship	300	P G	N	0.05	—
Atmah [6]	FYA	Day, 540; night, 1,350	Baron E. de Rothschild	200, **600**	P G	N	—	—
Australien [28]	FMU	325	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Bacchante FYB [6]	FYB	160	Henri Menier, Paris	300, **600**	P G	N	—	—
Baliste	UDY	80	Warship	300	P G	N	0.05	—
Belier	UEC	80	Warship	300	P G	N	0.05	—
Bien Hoa	UJA	150	Warship	300, **600**	P G	N	0.05	—
Bisson	UGK	80	Warship	300	P G	N	0.05	—
Bombarde	UEG	80	Warship	300	P G	N	0.05	—
Borda UJK	UJK	350	Warship	300, **600**	P G	N	0.05	—
Bouclier	UFV	80	Warship	300	P G	N	0.05	—
Bougainville	—	—	Cie Chargeurs Réunis	—	—	—	—	—
Boutefeu	UGC	80	Warship	300	P G	N	0.05	—
Bouvet	UAP	350	Warship	300, **600**	P G	N	0.05	—
Bouvines	ULB	150	Warship	300, **600**	P G	N	0.05	—
Branlebas	UEY	80	Warship	300	P G	N	0.05	—

Bretagne [80]	FSB	Day, 270 ; night, 1,080	Cie de Nav. Sud-Atlantique	300, 600	P G	N	0.40	—		
Bruix	UIE	350	Warship	300, 600	P G	N	0.05	—		
Buffle	ULD	50	Warship	300	P G	N	0.05	—		
Burdigala [80]	FSU	Day, 270 ; night, 1,080	Cie de Nav. Sud-Atlantique	300, 600	P G	N	0.40	—		
Calédonien [87]	FNC	300	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—		
Californie [25]	FTK	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—		
Canada FJC [25]	FJC	160	Cyprien Fabre et Cie	300, 600	P G	N	0.40	—		
Capitaine Mehl	UGJ	80	Warship	300	P G	N	0.05	—		
Carabine	UDR	80	Warship	300	P G	N	0.05	—		
Carabinier	UFH	80	Warship	300	P G	N	0.05	—		
Caravelle [25]	FTC	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—		
Carnot	UAT	350	Warship	300, 600	P G	N	0.05	—		
Caroline FTO [25]	FTO	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—		
Carquois	UEP	80	Warship	300	P G	N	0.05	—		
Carthage [25 26]	FGJ	160	Cie Gén. Transatlantique	300, 600	P G	N	0.10	—		
Casabianca	UHC	150	Warship	300, 600	P G	N	0.05	—		
Casque	UFT	80	Warship	300	P G	N	0.05	—		
Cassard	UIK	150	Warship	300, 600	P G	N	0.05	—		
Cassini	UHD	150	Warship	300, 600	P G	N	0.05	—		
Catapulte	UED	80	Warship	300	P G	N	0.05	—		
Caudan	ULE	50	Warship	300	P G	N	0.05	—		
Cavalier	UFP	80	Warship	300	P G	N	0.05	—		
Centaure	ULC	50	Warship	300	P G	N	0.05	—		
Cerbère	UHB	150	Warship	300, 600	P G	N	0.05	—		
Ceylan [25]	FCC	160	Cie Chargeurs Réunis	300, 600	P G	—	0.40	—		
Champagne [25]	FTA	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—		
Champlain	—	—	Cie Chargeurs Réunis	—	—	—	—	—		
Chaouïa [25]	FPC	160	N. Paquet et Cie	300, 600	P G	N	0.40	—		
Charlemagne	UAQ	350	Warship	300, 600	P G	N	0.05	—		
Charles Martel	UAV	350	Warship	300, 600	P G	N	0.05	—		
Charles Roux [25 26]	FGR	160	Cie Gén. Transatlantique	300, 600	P G	N	0.10	—		
Charlotte	FHO	Day, 160 ; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, 600	P G	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—		
Chasseur	UFG	80	Warship	300	P G	N	0.05	—		
Châteaurenault	UCW	350	Warship	300, 600	P G	N	0.05	—		
Chicago FTI [25]	FTI	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—		
Chili [87]	FMC	270	Cie des Messageries Maritimes	300, 600	P G	N	0.40	—		
Cimeterre	UGA	80	Warship	300	P G	N	0.05	—		
Claymore	UEJ	80	Warship	300	P G	N	0.05	—		
Cognée	UFA	80	Warship	300	P G	N	0.05	—		
Commandant Bory	UGD	80	Warship	300	P G	N	0.05	—		
Commandant Lucas	UGP	80	Warship	300	P G	N	0.05	—		
Commandant Riviere	UGE	80	Warship	300	P G	N	0.05	—		
Condé	UCK	350	Warship	300, 600	P G	N	0.05	—		
Condorcet	UAG	350	Warship	300, 600	P G	N	0.05	—		
Cordillère [87]	FMR	300	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—		
Corsica [25 27]	FRC	160	Cie Marseillaise de Nav. à Vapeur	300, 600	P G	N	0.10	—		
Corte II. [25 27]	FRT	160	Cie Marseillaise de Nav. à Vapeur	300, 600	P G	—	0.10	—		
Cosmao	UIR	150	Warship	300, 600	P G	N	0.05	—		
Courbet	UAZ	150	Warship	300, 600	P G	N	0.05	—		

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave lengths in Metres (the Normal Wave length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
FRANCE—*cont'd.*							Francs.	Francs.
Coutelas	UES	80	Warship	300	P G	N	0.05	—
Cyclope	ULI	50	Warship	300	P G	N	0.05	—
Dague	UFY	80	Warship	300	P G	N	0.05	—
Danton	UAB	350	Warship	300, **600**	P G	N	0.05	—
Dard	UDX	80	Warship	300	P G	N	0.05	—
Décidée	UIZ	200	Warship	300, **600**	P G	N	0.05	—
Dehorter	UGH	80	Warship	300	P G	N	0.05	—
Démocratie	UAK	350	Warship	300, **600**	P G	N	0.05	—
d'Entrecasteaux	UIG	350	Warship	300, **600**	P G	N	0.05	—
Desaix	UCR	350	Warship	300, **600**	P G	N	0.05	—
Descartes	UIH	150	Warship	300, **600**	P G	N	0.05	—
d'Estrées	UIO	150	Warship	300, **600**	P G	N	0.05	—
d'Iberville	UIS	200	Warship	300, **600**	P G	N	0.05	—
Diderot	UAE	350	Warship	300, **600**	P G	N	0.05	—
Divona [86]	FSD	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique	300, **600**	P G	N	0.40	—
Djemnah [87]	FMD	350	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Djurjura [25 28]	FXD	160	Cie de Nav. Mixte	300, **600**	P G	N	0.10	—
Doudart de Lagrée	UKD	50	Warship	300	P G	N	0.05	—
Doukkala [25]	FPD	160	N. Paquet et Cie	300, **600**	P G	—	0.40	—
Drôme	UJE	150	Warship	300, **600**	P G	N	0.05	—
Duc d'Aumale [25 29]	FGD	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.10	—
Duc de Bragance [25 29]	FGG	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.10	—
du Chayla	UIJ	150	Warship	300, **600**	P G	N	0.05	—
Duguay Trouin	UJC	350	Warship	300, **600**	P G	N	0.05	—
Dumbea [87]	FND	300	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Dunois	UIT	80	Warship	300	P G	N	0.05	—
Dupetit Thouars	UCN	350	Warship	300, **600**	P G	N	0.05	—
Dupleix —	—	—	Cie Chargeurs Réunis	—	—	—	—	—
Dupleix UCS	UCS	350	Warship	300, **600**	P G	N	0.05	—
Durandal	UDA	80	Warship	300	P G	N	0.05	—
Edgar Quinet	UCB	350	Warship	300, **600**	P G	N	0.05	—
Edouard Jeramec [122]	FZJ	—	Cie Francaise des Câbles Télégraphiques	300, **600**	P	X	0.40	—
Elisabeth Marie	FHB	160	Soc. Nouv. des Pêcheries à vap. à Arcachon	300, **600**	P G	X	0.40	—
Emma	FHE	Day, 160; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, **600**	P G	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—

Epée	UDG	80	Warship	300	P	G	N	0.05	—	—	—
Epieu	UDW	80	Warship	300	P	G	N	0.05	—	—	—
Equateur [87]	FME	300	Cie des Messageries Maritimes	300, 600	P	G	N	0.40	—	—	—
Ernest Renan	UCD	350	Warship	300, 600	P	G	N	0.05	—	—	—
Ernest Simons [82]	FMS	325	Cie des Messageries Maritimes	300, 600	P	G	N	0.40	—	—	—
Eros [4]	FYS	160	Henri de Rothschild	300	P	G	N	—	—	—	—
Escopette	UDJ	80	Warship	300	P	G	N	0.05	—	—	—
Espagne FAE [83]	FAE	160	Cie de Nav. France-Amerique	300	P	G	N	0.40	—	—	—
Espagne FTE [86]	FTE	160	Cie Gén. Transatlantique	300, 600	P	G	N	0.40	—	—	—
Estafette	ULM	50	Warship	300	P	G	N	0.05	—	—	—
Etendard	UFD	80	Warship	300	P	G	N	0.05	—	—	—
Eugène Péreire [25 29]	FGP	160	Cie Gén. Transatlantique	300	P	G	N	0.10	—	—	—
Euphrate FNE [87]	FNE	350	Cie des Messageries Maritimes	300, 600	P	G	N	0.40	—	—	—
Europe [87]	FCU	Day, 270; night, 1,080	Cie Chargeurs Réunis	300, 600	P	G	N	0.40	—	—	—
Fanfare	UEZ	80	Warship	300	P	G	N	0.05	—	—	—
Fanion	UFE	80	Warship	300	P	G	N	0.05	—	—	—
Fantassin	UFO	80	Warship	300	P	G	N	0.05	—	—	—
Fauconneau	UDC	80	Warship	300	P	G	N	0.05	—	—	—
Faulx	UGB	80	Warship	300	P	G	N	0.05	—	—	—
Flamberge	UDL	80	Warship	300	P	G	N	0.05	—	—	—
Flanche	—	—	Cie Gén. Transatlantique	—	—	—	—	—	—	—	—
Flandre [25]	FGF	160	Cie Gén. Transatlantique	300, 600	P	G	N	0.40	—	—	—
Fleuret	UER	80	Warship	300	P	G	N	0.05	—	—	—
Floride [25]	FTF	160	Cie Gén. Transatlantique	300, 600	P	G	N	0.40	—	—	—
Forbin	UIP	150	Warship	300, 600	P	G	N	0.05	—	—	—
Formosa FVO [80]	FVO	270	Soc. Gén. de Transports Maritimes à Vapeur	300, 600	P	G	N	0.40	—	—	—
Foudre	UIM	350	Warship	300, 600	P	G	N	0.05	—	—	—
Fourche	UFW	80	Warship	300	P	G	N	0.05	—	—	—
France FHF	FHF	400	Soc. Anon. des Navires Mixtes	300, 600, 1,800	P	G	N	0.40	—	—	—
France FTZ [25]	FTZ	160	Cie Gén. Transatlantique	300, 600	P	G	N	0.40	—	—	—
France FVF [80]	FVF	270	Soc. Gén. de Transports Maritimes à Vapeur	300, 600	P	G	N	0.40	—	—	—
France UBA	UBA	350	Warship	300, 600	P	G	N	0.05	—	—	—
Francis Garnier	UGI	80	Warship	300	P	G	N	0.05	—	—	—
Francisque	UEH	80	Warship	300	P	G	N	0.05	—	—	—
Friant	UIL	150	Warship	300, 600	P	G	N	0.05	—	—	—
Fronde	UDQ	80	Warship	300	P	G	N	0.05	—	—	—
Furieux	ULF	150	Warship	300, 600	P	G	N	0.05	—	—	—
Gabion	UEX	80	Warship	300	P	G	N	0.05	—	—	—
Gallia [89]	FSA	300	Cie de Nav. Sud-Atlantique	300, 600	P	G	N	0.40	—	—	—
Gange [87]	FMG	300	Cie des Messageries Maritimes	300, 600	P	G	N	0.40	—	—	—
Garonna [80]	FSG	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique	300, 600	P	G	N	0.40	—	—	—
Garonne	UJH	150	Warship	300, 600	P	G	N	0.05	—	—	—
Gascogne [80]	FSC	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique	300, 600	P	G	N	0.40	—	—	—
Gaulois	UAR	350	Warship	300, 600	P	G	N	0.05	—	—	—
Germania [25]	FIG	160	Cyprien Fabre et Cie	300, 600	P	G	N	0.40	—	—	—
Glaive	UFI	80	Warship	300	P	G	N	0.05	—	—	—
Gloire	UCL	350	Warship	300, 600	P	G	N	0.05	—	—	—
Goliath ULG	ULG	50	Warship	300	P	G	N	0.05	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
FRANCE—*contd.*							Francs.	Francs.
Golo [25 27]	FRO	160	Cie Marseillaise de Nav. à Vapeur	300, **600**	P G	N	0.10	—
Guadeloupe [25]	FTG	160	Cie. Gén. Transatlantique	300, **600**	P G	N	0.40	—
Gueydon	UCP	350	Warship	300, **600**	P G	N	0.05	—
Guichen	UCV	350	Warship	300, **600**	P G	N	0.05	—
Hache	UFB	80	Warship	300	P G	N	0.05	—
Haiti [25]	FGH	160	Cie Gén. Transatlantique	300, **600**	P G	—	0.40	—
Hallebarde	UDB	80	Warship	300	P G	N	0.05	—
Harpon	UDP	80	Warship	300	P G	N	0.05	—
Henri IV.	UIA	350	Warship	300, **600**	P G	N	0.05	—
Henriette	FHH	Day, 160; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, **600**	P G	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—
Hudson [25]	FTH	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Hussard	UFQ	80	Warship	300	P G	N	0.05	—
Iberia [25 27]	FRB	160	Cie Marseillaise de Nav. à Vapeur	300, **600**	P G	—	0.10	—
Ibis	UKA	50	Warship	300	P G	N	0.05	—
Ile de France [30]	FVI	160	Soc. Gén. de Transports Maritimes à Vapeur	300, **600**	P G	N	0.40	—
Iméréthie [25]	FPI	160	N. Paquet et Cie	300, **600**	P G	N	0.40	—
Infatigable	ULP	50	Warship	300	P G	N	0.05	—
Ionie [25]	FPO	160	N. Paquet et Cie	300, **600**	P G	—	0.40	—
Italia FRI	FRI	—	Cie Marseillaise de Nav. à Vapeur	—	—	—	—	—
Italie [30]	FAI	270	Cie de Nav. France-Amerique	300, **600**	P G	N	0.40	—
Janissaire	UFS	80	Warship	300	P G	N	0.05	—
Jauréguiberry	UAW	350	Warship	300, **600**	P G	N	0.05	—
Javeline	UDV	80	Warship	300	P G	N	0.05	—
Jean-Bart	UAY	150	Warship	300, **600**	P G	N	0.05	—
Jeanne	FHG	Day, 160; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, **600**	P G	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—
Jeanne Blanche	ULN	50	Warship	300	P G	N	0.05	—
Jeanne d'Arc	UCT	350	Warship	300, **600**	P G	N	0.05	—
Jeannette	FHJ	Day, 160; night, 380	Soc. Nouvelle des Pêcheries à Vapeur, Arcachon	300, **600**	P G	8 a.m. to 10 a.m., 12 a.m. to 2 p.m., 8 p.m. to 10 p.m.	0.40	—
Jules Ferry	UCH	350	Warship	300, **600**	P G	N	0.05	—
Jules Michelet	UCE	350	Warship	300, **600**	P G	N	0.05	—
Jurien de la Graviere	UCX	350	Warship	300, **600**	P G	N	0.05	—
Justice	UAI	350	Warship	300, **600**	P G	N	0.05	—

Karnak FMK [27]	FMK	325	Cie des Messageries Maritimes	300, 600	P G	N	0.40	—	
Kersaint	UIW	200	Warship	300, 600	P G	N	0.05	—	
Kléber	UCQ	350	Warship	300, 600	P G	N	0.05	—	
La Hire	UIV	80	Warship	300	P G	N	0.05	—	
Lansquenet	UFN	80	Warship	300	P G	N	0.05	—	
Latouche-Treville	UIC	350	Warship	300, 600	P G	N	0.05	—	
Lavoisier	UIN	150	Warship	300, 600	P G	N	0.05	—	
Léon Gambetta	UCI	350	Warship	300, 600	P G	N	0.05	—	
Liamone [25 27]	FRA	160	Cie Marseillaise de Nav. à Vapeur	300, 600	P G	—	0.10	—	
Liger [30]	FSL	Day, 270; night, 1,080	Cie de Nav. Sud-Atlantique	300, 600	P G	N	0.40	—	
Loire (La) [30]	FHL	260	Cie Nantaise de Nav. à Vapeur	300, 600	P G	—	0.40	—	
Loiret	UJD	150	Warship	300, 600	P G	N	0.05	—	
Lorraine (La) [25]	FTL	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	
Lotus [27]	FML	270	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—	
Louisiane [25]	FTU	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	
Louqsor [27]	FNL	300	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—	
Madonna [25]	FJM	160	Cyprien Fabre et Cie	300, 600	P G	N	0.40	—	
Magellan FMM [27]	FMM	270	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—	
Magon	UGN	80	Warship	300	P G	N	0.05	—	
Malte [25]	FCM	160	Cie Chargeurs Réunis	300, 600	P G	N	0.40	—	
Mameluck	UFR	80	Warship	300	P G	N	0.05	—	
Mangini	UGO	80	Warship	300	P G	N	0.05	—	
Manouba [25 29]	FXB	160	Cie de Nav. Mixte	300, 600	P G	N	0.10	—	
Marceau	ULQ	50	Warship	300, 600	P G	N	0.05	—	
Maréchal Bugeaud [25]	FGY	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	
Marguerite Marie	FHM	160	Soc. Nouvelle des Pêcheries à Vapeur, Arcachon	300	P G	9 a.m. to 12 a.m., 7 p.m. to 11 p.m.	0.40	—	
Marie-Rose	FHI	Day, 160; night, 325	A. et G. Vidor Fils, Boulogne-sur-Mer	300, 600	P G	7 a.m. to 10 a.m., 2 p.m. to 4 p.m., 7 p.m. to 11 p.m.	0.40	—	
Maroc	FHK	200	Joseph Huret, Esq.	300, 600	P G	X	0.40	—	
Marsa [25 28]	FXR	160	Cie de Nav. Mixte	300, 600	P G	N	0.10	—	
Marseillaise	UCM	350	Warship	300, 600	P G	N	0.05	—	
Martinique [25]	FTM	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	
Masséna	UAO	350	Warship	300, 600	P G	N	0.05	—	
Massue	UFC	80	Warship	300	P G	N	0.05	—	
Medie	FPM	—	N. Paquet et Cie	—	—	—	—	—	
Medjerda [25 29]	FXJ	160	Cie de Nav. Mixte	300, 600	P G	N	0.10	—	
Méhari	ULV	50	Warship	300	P G	N	0.05	—	
Melbourne FNM [27]	FNM	300	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—	
Mexico FTX [25]	FTX	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	
Mingrelie	—	—	N. Paquet et Cie	—	—	—	—	—	
Mirabeau	UAC	350	Warship	300, 600	P G	N	0.05	—	
Moïna [4]	FYM	100	Waché de Roo, Esq.	300, 600	P G	X	0.40	—	
Moïse [25 29]	FGS	160	Cie Gén. Transatlantique	300, 600	P G	—	0.10	—	
Montcalm UCO	UCO	350	Warship	300, 600	P G	N	0.05	—	
Montreal FTJ [25]	FTJ	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	
Mortier	UEO	80	Warship	300	P G	N	0.05	—	
Mousquet	UDN	80	Warship	300	P G	N	0.05	—	
Mousqueton	UDZ	80	Warship	300	P G	N	0.05	—	
Natal FMN [27]	FMN	300	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—	
Navarre (La) [25]	FTN	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
FRANCE—*contd.*							Francs.	Francs.
Nera [87]	FNN	325	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Newhaven FZH [86]	FZH	160	State Railway Administration	300, **600**	P G	X	0.15	—
Niagara FTB [25]	FTB	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Nord [80 30]	FZN	Day, 190; night, 380	Cie du Chemin de Fer du Nord	300, **600**	P G	N	0.15	—
Notre Dame de la Mer [87]	FZM	150	Soc. des Oeuvres de Mer	300, **600**	P G	X	0.40	—
Notre Dame des Dunes	FHW	160	Christiaens and Borgain	300, **600**	P G	X	0.40	—
Numidia [25 27]	FRN	160	Cie Marseillaise de Nav. à Vapeur	300, **600**	P G	—	0.10	—
Obusier	UEM	80	Warship	300	P G	N	0.05	—
Oceanien [87]	FNO	320	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Oriflamme	UEV	80	Warship	300	P G	N	0.05	—
Ouessant [25]	FCW	160	Cie Chargeurs Réunis	300, **600**	P G	—	0.40	—
Oxus [87]	FMQ	300	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Pacifique [87]	FNW	300	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Pampa FVP [80]	FVP	270	Soc. Gén. de Transports Maritimes à Vapeur	300, **600**	P G	N	0.40	—
Parana FVN [80]	FVN	270	Soc. Gén de Transports Maritimes à Vapeur	300, **600**	P G	N	0.40	—
Pas-de-Calais [80 30]	FZP	Day, 190; night, 380	Cie du Chemin de Fer du Nord	300, **600**	P G	N	0.15	—
Patria FJP [25]	FJP	160	Cyprien Fabre et Cie	300, **600**	P G	N	0.40	—
Patrie	UAL	350	Warship	300, **600**	P G	N	0.05	—
Paul Lecat [87]	FNP	400	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Pérou [25]	FTP	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Pertuisane	UDI	80	Warship	300	P G	N	0.05	—
Phrygié [25]	FPJ	160	N. Paquet et Cie	300, **600**	P G	—	0.40	—
Pierrier	UEN	80	Warship	300	P G	N	0.05	—
Pique	UDE	80	Warship	300	P G	N	0.05	—
Pistolet	UEB	80	Warship	300	P G	N	0.05	—
Plata FVL [80]	FVL	270	Soc. Gén. de Transports Maritimes à Vapeur	300, **600**	P G	N	0.40	—
Pluton	UHA	150	Warship	300, **600**	P G	N	0.05	—
Poignard	UFJ	80	Warship	300	P G	N	0.05	—
Polynesien [87]	FNQ	300	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Portugal FNZ [87]	FNZ	300	Cie des Messageries Maritimes	300, **600**	P G	—	0.40	—
Pothuau	UIB	150	Warship	300, **600**	P G	N	0.05	—
Protet	UGM	80	Warship	300	P G	N	0.05	—
Provence FAP [80]	FAP	160	Cie de Nav. France-Amerique	300	P G	N	0.40	—
Provence FTD (La) [25]	FTD	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—

Québec [26]	FTQ	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	—
Rapière	UDK	80	Warship	300	P G	N	0.05	—	—
Renaudin	UGL	80	Warship	300	P G	N	0.05	—	—
République	UAM	350	Warship	300, 600	P G	N	0.05	—	—
Requin	ULR	150	Warship	300, 600	P G	N	0.05	—	—
Résolue [4]	FYR	215	M. Pierre Lebaudy	300	P G	N	—	—	—
Rhône	UJG	150	Warship	300, 600	P G	N	0.05	—	—
Rochambeau [25]	FTR	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	—
Roma FJR [25]	FJR	160	Cyprien Fabre et Cie	300, 600	P G	N	0.40	—	—
Rosemonde	FHD	120	Victor Fourny, Esq.	300, 600	P G	8 a.m. to 10 a.m., 2 p.m. to 4 p.m.	0.40	—	—
Rosita	FHY	250	Victor Fourny, Esq.	300, 600	P G	—	0.40	—	—
Rouen [88]	FZR	160	State Railway Administration	300, 600	P G	X	0.15	—	—
Sabre	UEI	80	Warship	300	P G	N	0.05	—	—
Sabretache	UET	80	Warship	300	P G	N	0.05	—	—
Sacha	FHC	160	Soc. Nouvelle des Pêcheries à Vapeur, Archachon	300	P G	6 a.m. to 9 a.m., 4 p.m. to 7 p.m.	0.40	—	—
Sagaie	UDO	80	Warship	300	P G	N	0.05	—	—
Saghalien [87]	FNS	300	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—	—
St. Anna [28]	FJS	160	Cyprien Fabre et Cie	300, 600	P G	N	0.05	—	—
St. Domingue [26]	—	—	Cie Gén. Transatlantique	—	—	—	—	—	—
St. Jehanne [87]	FZS	300	Soc. des Oeuvres de Mer	300, 600	P G	X	0.40	—	—
St. Laurent [26]	FTY	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	—
St. Louis UAS	UAS	350	Warship	300, 600	P G	N	0.05	—	—
St. Michel	FAM	180	Soc. Navale de l'Ouest	300, 600	P G	X	0.40	—	—
Salta [50]	FVS	270	Soc. Gén. de Transports Maritimes à Vapuer	300, 600	P G	N	0.40	—	—
Samara [80]	FSM	300	Cie de Nav. Sud-Atlantique	300, 600	P G	—	0.40	—	—
Samson ULH	ULH	50	Warship	300	P G	N	0.05	—	—
Sape	UEW	80	Warship	300	P G	N	0.05	—	—
Sarbacane	UDS	80	Warship	300	P G	N	0.05	—	—
Savoie (La) [25]	FTS	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	—
Sentinelle	ULK	50	Warship	300	P G	N	0.05	—	—
Sequana [80]	FSQ	Day, 200; night, 600	Cie de Nav. Sud-Atlantique	300, 600	P G	—	0.40	—	—
Sidi-Brahim [80]	FVB	160	Soc. Gén. de Transports Maritimes à Vapeur	300, 600	P G	N	0.10	—	—
Sontay [87]	FMX	300	Cie des Messageries Maritimes	300, 600	P G	—	0.40	—	—
Surcouf	UIQ	150	Warship	300, 600	P G	N	0.05	—	—
Spahi	UFK	80	Warship	300	P G	N	0.05	—	—
Stylet	UEK	80	Warship	300	P G	N	0.05	—	—
Suffren	UAN	350	Warship	300, 600	P G	N	0.05	—	—
Surprise	UIY	200	Warship	300, 600	P G	N	0.05	—	—
Sussex FZX [88]	FZX	160	State Railway Administration	300, 600	P G	X	0.15	—	—
Taillebourg	ULJ	50	Warship	300	P G	N	0.05	—	—
Théodore Mante [25 29]	FXM	160	Cie de Nav. Mixte	300, 600	P G	N	0.10	—	—
Timgad [25 28]	FGO	160	Cie Gén. Transatlantique	300	P G	N	0.10	—	—
Tirailleur	UFM	80	Warship	300	P G	N	0.05	—	—
Touraine (La) [25]	FTT	160	Cie Gén. Transatlantique	300, 600	P G	N	0.40	—	—
Trident	UEQ	80	Warship	300	P G	N	0.05	—	—
Tromblon	UEL	80	Warship	300	P G	N	0.05	—	—
Valdivia [50]	FVV	270	Cie Gén. de Transports Maritimes à Vapeur	300	P G	N	0.40	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
FRANCE—*contd.*							Francs.	Francs.
Vaucluse	ULO	80	Warship	300	P G	N	0.05	—
Venezia FJV [25]	FJV	160	Cyprien Fabre et Cie	300, **600**	P G	N	0.40	—
Venezuela [25]	FTW	325	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—
Vergniaud	UAH	350	Warship	300, **600**	P G	N	0.40	—
Vérité	UAJ	350	Warship	300, **600**	P G	N	0.05	—
Victor Hugo	UCG	350	Warship	300, **600**	P G	N	0.05	—
Vigilante	UKB	50	Warship	300, **600**	P G	N	0.05	—
Ville d'Alger [25] [29]	FGQ	160	Cie Gén. Transatlantique	300	P G	N	0.05	—
Ville de Barcelone [25]	FGL	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.10	—
Ville de Böne [25] [27]	FGB	160	Cie Gén. Transatlantique	300, **600**	P G	—	—	—
Ville de la Ciotat [07]	FMV	300	Cie des Messageries Maritimes	300, **600**	P G	N	0.40	—
Ville de Madrid [25] [26]	FGM	160	Cie Gén. Transatlantique	300, **600**	P G	—	0.40	—
Ville d'Oran [25]	FGA	160	Cie Gén. Transatlantique	300, **600**	P G	—	0.10	—
Ville de Tunis [25]	FGT	160	Cie Gén. Transatlantique	300, **600**	P G	—	—	—
Vinh Long	UJB	150	Warship	300, **600**	P G	—	—	—
Virginie [25]	FTV	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.05	—
Voltaire UAD	UAD	350	Warship	300, **600**	P G	N	0.40	—
Voltigeur	UFL	80	Warship	300, **600**	P G	N	0.05	—
Waldeck-Rousseau	UCA	350	Warship	300	P G	N	0.05	—
Yarra FMY [07]	FMY	325	Cie des Messageries Maritimes	300, **600**	P G	N	0.05	—
Yatagan	UDH	80	Warship	300, **600**	P G	—	0.40	—
Zélée	UIX	200	Warship	300	P G	N	0.05	—
				300, **600**	P G	N	0.05	—
GERMANY.								
Aachen [32]	DAP	200	Norddeutscher-Lloyd	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Adamsturm [60]	DAY	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Adelaide [60]	DAE	325	Deutsche - Australische Dampfschiffs-Ges.	300, **600**	P G	X	0.40	4.00
Adeline-Hugo Stinnes III [60]	DAH	200	Hugo Stinnes, Müllheim	300, **600**	P G	X	0.40 [32]	4.00 [32]
Adler [60]	DAD	100	D.S. Ges. Argo	300, **600**	P G	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to 12 p.m.	0.40 [32]	4.00 [32]
Admiral [31]	DAL	325	Deutsche Ost-Afrika Line	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m	0.40	4.00
Adolf [60]	DAO	60	Geestemünder Herings und Hochseefischerie-Aktienges. Geestemünde	300, **600**	P G	X	0.40	4.00

Adorna [43]	DON	200	Deutsch-Amerikanische Petroleum Ges.	300, 600	P G	..	9.30 p.m. to 1.30 a.m. X	0.40	4.00
Aegir	AAE	—	Warship	300, 600	O ..	..	N	0.40 [32]	4.00 [32]
Aenne Rickmers [42]	DMY	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G	..	X	0.40	4.00
Albany DAK [40]	DAK	325	Deutsche-Australische D.S. Ges.	300, 600	P G	..	X	0.40	4.00
Albatross	AAK	—	Warship	300, 600	O ..	..	N	0.40 [32]	4.00 [32]
Albingia [31]	DAB	200	Hamburg-Amerika Line (Atlas Line)	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Alda [40]	DAJ	325	Roland Line	300, 600	P G	..	X	0.40	4.00
Alexandra Woermann [43] ..	DXW	325	Woermann Line	300, 600	P G	..	X	0.40	4.00
Alexandria [21]	DQC	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Allemannia [31]	DAM	200	Hamburg-Amerika Line (Atlas Line)	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Alrich [40]	DAQ	325	Roland Line	300, 600	P G	..	X	0.40	4.00
Amasis [43]	DYV	200	D.S. Ges. Kosmos	300, 600	P G	..	X	0.40	4.00
Amazone AAM	AAM	—	Warship	300, 600	O ..	..	N	0.40 [32]	4.00 [32]
Ambria [31]	DMB	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Amerika [21]	DDR	250	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Andalusia [21]	DQE	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Andree Rickmers	DND	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G	..	X	0.40	4.00
Anhalt [21]	DLT	200	Norddeutscher-Lloyd	300, 600	P G	..	X	0.40	4.00
Annie-Hugo Stinnes VI ..	DAI	200	Hugo Stinnes	300, 600	P G	..	X	0.40 [32]	4.00 [32]
Antonina [31]	DAN	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Arcadia DXC [31]	DXC	200	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Arcona	AAR	—	Warship	300, 600	O ..	..	N	0.40 [32]	4.00 [32]
Arensburg [37]	DAG	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Argenfels [37]	DAZ	100	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Armenia [21]	DXM	200	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Arsterturm	DUA	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Artemisia	DTQ	100	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m. 12 p.m. to 2 a.m.	0.40	4.00
Asgard [40]	DAS	200	Midgard. Deutsche Seeverkehrs-Aktienges.	300, 600	P G	..	X	0.40	4.00
Asuncion DAC [31]	DAC	200	Hamburg Süd. Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Atto [40]	DAT	325	Roland Line	300, 600	P G	..	X	0.40	4.00
Augsburg	AAX	—	Warship	300, 600	O ..	..	N	0.40 [32]	4.00 [32]
Australia DAU [40]	DAU	325	Deutsche-Australische D.S. Ges.	300, 600	P G	..	X	0.40	4.00
Axenfels [40]	DAX	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Badenia [31]	DBX	200	Hamburg Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Bahia DBP [21]	DBP	325	Hamburg-Süd. Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Bahia Blanca [31]	DBB	200	Hamburg-Süd. Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Bahia Castillo [31]	DBK	200	Hamburg-Süd. Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Bahia Laura [31]	DBL	200	Hamburg-Süd Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Barbarossa [31]	DKS	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Barcelona DBA [31]	DBA	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Bärenfels [30]	DBH	100	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Batavia [31]	DDJ	250	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Bavaria [31]	DBV	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Bayern [31]	DQF	200	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Belgia [31]	DBY	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Belgrano DBN [31]	DBN	325	Hamburg-Sud. Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Belgravia [31]	DEL	200	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Beowulf	ABW	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Berengar [30]	DBE	325	Roland Line	300, 600	P G	X	0.40	4.00
Berlin ABE	ABE	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Berlin DKB [31]	DKB	250	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Bermuda [31]	DQG	200	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Berthold [30]	DBD	60	Geestemünder Herings und Hochseefischerie-Aktienges. Geestemünde	300, 600	P G	6 a.m. to 7 a.m., 6 p.m. to 7 p.m.	0.40	4.00
Bethania [31]	DQH	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Birkenfels [30]	DBF	325	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Blitz	ABZ	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Blücher [31]	DDB	250	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Bochum [30]	DOM	325	Deutsche-Australische D.S. Ges.	300, 600	P G	X	0.40	4.00
Bohemia DBJ [31]	DBJ	200	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Bosnia [31]	DBZ	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Brandenburg ABD	ABD	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Brandenburg DBG [31]	DBG	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Brasilia [31]	DQI	100	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Braunfels [30]	DBC	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Braunschweig	ABG	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Bremen ABN	ABN	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Bremen DBR [31]	DBR	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00

Brisbane DBI [50]	DBI	325	Deutsche-Australische D.S. Ges.	300, 600	P G	..	X	0.40	4.00
Brisgavia [31]	DBQ	200	Hamburg-Amerika Line.. ..	300, 600	P G	..	N	0.12	—
Bubendey [31]	DEY	200	Hamburg-Amerika Line	300, 600	P G	..	X	0.40	4.00
Buenos Aires DBS [31]	DBS	200	Hamburg-S. Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Buffalo DFF [42]	DFF	200	Deutsche-Amerikanische Petroleum Ges	300, 600	P G	..	X	0.40	4.00
Bulgaria [31]	DDG	250	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Bülow [31]	DBW	325	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Bürgermeister [31]	DBM	325	Deutsche Ost.-Afrika Line ..	300, 600	P G	..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Camilla Rickmers [43]	DLR	200	Rickmers, Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G	..	X	0.40	4.00
Cannstatt [80]	DTT	325	Deutsche-Australische D.S. Ges.	300, 600	P G	..	X	0.40	4.00
Cap Arcona [31]	DCA	325	Hamburg-S. Am. D.S. Ges. ..	300, 600	P G	..	N	0.40	4.00
Cap Blanco [31]	DCB	325	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Cap Finisterre [31]	DCN	325	Hamburg-S. Am. D.S. Ges. ..	300, 600	P G	..	N	0.40	4.00
Cap Ortegal [31]	DCO	250	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Cap Roca [31]	DCR	200	Hamburg-S. Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Cap Verde [31]	DCE	200	Hamburg-S. Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Cap Vilano [31]	DCV	250	Hamburg-S. Am. D.S. Ges. ..	300, 600	P G	..	N	0.40	4.00
Carmen	ACR	—	Warship	300, 600	O ..	..	N	0.40 [33]	4.00 [33]
Cassel [31]	DCC	200	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
C. Ferd. Laeisz [31]	DQJ	200	Hamburg-Amerika Line	300, 600	P G	..	X	0.40	4.00
Chemnitz [31]	DCZ	200	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Christian X. [31]	DCX	325	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Cincinnati DDC [31]	DDC	250	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Claire-Hugo Stinnes I. [80]	DCS	200	Hugo Stinnes	300, 600	P G	..	X	0.40	4.00
Clara Blumenfeld [80]	DCL	200	Freight Agent Bd. Blumenfeld ..	300, 600	P G	..	X	0.40 [32]	4.00 [32]
Cleveland DDV [31]	DDV	250	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Cobra [31]	DCD	60	Hamburg-Amerika Line	300, 600	P G	..	N	0.12	—
Coburg [31]	DCG	200	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Colmar [80]	DOL	325	Deutsche-Australische D.S. Ges..	300, 600	P G	..	X	0.40	4.00
Cöln	ACO	—	Warship	300, 600	O ..	..	N	0.40 [33]	4.00 [33]
Condor	ACN	—	Warship	300, 600	O ..	..	N	0.40 [33]	4.00 [33]
Corcovado DRC [31]	DRC	250	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Cordoba DCK [31]	DCK	200	Hamburg-Sud. Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Corrientes [31]	DOY	200	Hamburg Sud.-Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Crefeld [31]	DCT	200	Norddeutscher-Lloyd	300, 600	P G	..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Crostafels [80]	DOT	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Dania [31]	DDX	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Danzig	ADZ	—	Warship	300, 600	O ..	..	N	0.40 [33]	4.00 [33]
Deike Rickmers [43]	DIK	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G	..	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Delphin ADC	ADC	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Delphin DPH [43]	DPH	200	Deutsche-Amerikanische Petroleum Ges.	300, **600**	P G	X	0.40	4.00
Derfflinger ADF	ADF	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Derfflinger DER [31]	DER	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Desterro [31]	DET	200	Hamburg-Sud. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Deutschland ADE	ADE	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Deutschland DDU [36 80]	DDU	110	Prussian Railway Administration	300, 375, **600**	O [34]	X	0.18 [37]	1.80 [37]
Deutschland DEU [43]	DEU	200	Deutsche-Amerikanische Petroleum Ges.	300, **600**	P G	X	0.40	4.00
Diedrich [80]	DTD	60	Geestemünder Herings- und Hochseefischerei-Aktienges.	300, **600**	P G	6 a.m. to 7 a.m., 6 p.m. to 7 p.m.	0.40	4.00
Ditmar Koel [50 97]	DKV	28	Administration of Marine, Cuxhaven	300	O	9 a.m. to 10 a.m., 1 p.m. to 2 p.m., 6 p.m. to 7 p.m.	—	—
Dora-Hugo Stinnes XII. [80]	DOS	200	Hugo Stinnes	300, **600**	P G	X	0.40	4.00
Dorothea Rickmers [43]	DDY	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G	X	0.40	4.00
Dortmund [31]	DQK	200	Hamburg-Amerika Line	300, **600**	P G	X	0.40	4.00
Drache	ADA	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Drachenfels [80]	DCH	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Dresden ADR	ADR	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Düsseldorf	DSU	325	Deutsche-Australische D.S. Ges.	300, **600**	P G	X	0.40	4.00
Eber	AEB	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Ebernburg	DEG	—	D.S. Ges. Hansa	—	P G	—	—	—
Edmund-Hugo Stinnes IV. [80]	DEH	200	Hugo Stinnes	300, **600**	P G	X	0.40 [32]	4.00 [32]
Edward [80]	DED	60	Geestemünder Herings- und Hochseefischerei-Aktienges.	300, **600**	P G	X	0.40	4.00
Ehrenfels [80]	DEV	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Eisenach [31]	DEI	200	Norddeutscher-Lloyd	300, **600**	P G	X	0.40	4.00
Elisabeth Rickmers [43]	DRX	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G	X	0.40	4.00
Elkab [31]	DEB	325	D.S. Ges. Kosmos	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Ellen Rickmers [12]	DEX	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G	X	0.40	4.00
Elsass AEL	AEL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]

Emden [31]	DQL	100	Hamburg-Amerika Line	300, 600	P G		X	0.40	4.00
Ems [43]	DEM	200	Deutsche - Amerikanische Petroleum-Ges.	300, 600	P G		X	0.40	4.00
Entrerios DIO [31]	DIO	200	Hamburg Süd. Am. D.S. Ges.	300, 600	P G		10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Erlangen [31]	DEN	200	Norddeutscher-Lloyd	300, 600	P G		N	0.40	4.00
Ernst-Hugo Stinnes XI. [80]	DES	200	Hugo Stinnes	300, 600	P G		X	0.40	4.00
Essen [80]	DEA	325	Deutsche-Australische D.S. Ges.	300, 600	P G		X	0.40	4.00
Esslingen [80]	DEE	325	Deutsche-Australische D.S. Ges.	300, 600	P G		X	0.40	4.00
Etha Rickmers [43]	DYR	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G		X	0.40	4.00
Excelsior DEO [43]	DEO	200	Deutsche - Amerikanische Petroleum-Ges.	300, 600	P G		X	0.40	4.00
Fangturm [80]	DFA	200	D.S. Ges. Hansa	300, 600	P G		X	0.40	4.00
Feldmarschall [31]	DFL	325	Deutsche Ost-Afrika Line	300, 600	P G		9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Frankenfels [80]	DFX	200	D.S. Ges. Hansa	300, 600	P G		X	0.40	4.00
Frankenwald [31]	DFD	200	Hamburg-Amerika Line	300, 600	P G		10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Frankfurt [31]	DFT	200	Norddeutscher-Lloyd	300, 600	P G		N	0.40	4.00
Frauenlob	AFO	—	Warship	300, 600	O ..		N	0.40 [33]	4.00 [33]
Freiberg [80]	DFG	325	Deutsche-Australische D.S. Ges.	300, 600	P G		X	0.40	4.00
Freienfels [80]	DFS	200	D.S. Ges. Hansa	300, 600	P G		X	0.40	4.00
Fremantle [80]	DFE	325	Deutsche-Australische D.S. Ges.	300, 600	P G		X	0.40	4.00
Freya	AFR	—	Warship	300, 600	O ..		N	0.40 [33]	4.00 [33]
Friedrich der Grosse AFU	AFU	—	Warship	300, 600	O ..		N	0.40 [33]	4.00 [33]
Friedrich der Grosse DKD [31]	DKD	200	Norddeutscher-Lloyd	300, 600	P G		N	0.40	4.00
Friesenberg [80]	DBO	200	Hermann Kimme	300, 600	P G		X	0.40	4.00
Frisia DFJ [31]	DFJ	100	Hamburg-Amerika Line	300, 600	P G		X	0.40	4.00
Frithjof AFT	AFT	—	Warship	300, 600	O ..		N	0.40 [33]	4.00 [33]
Fritz-Hugo Stinnes V. [80]	DFH	200	Hugo Stinnes	300, 600	P G		X	0.40 [33]	4.00 [33]
Frosch IV. [4 80]	DZY	50	Dr. Gunther Falckenberg	200, 300, 600	P ..		X	0.40	4.00
Fuchs	AFV	—	Warship	300, 600	O ..		N	0.40 [33]	4.00 [33]
Fürst Bismarck ABI	ABI	—	Warship	300, 600	O ..		N	0.40 [33]	4.00 [33]
Fürst Bismarck DFB [31]	DFB	325	Hamburg-Amerika Line	300, 600	P G		N	0.40	4.00
Fürst Bulow [31]	DQM	100	Hamburg-Amerika Line	300, 600	P G		X	0.40	4.00
Ganelon [80]	DGA	325	Roland Line	300, 600	P G		X	0.40	4.00
Gazelle	AGL	—	Warship	300, 600	O ..		N	0.40 [33]	4.00 [33]
Gefion	AGF	—	Warship	300, 600	O ..		N	0.40 [33]	4.00 [33]
General [31]	DGL	325	Deutsche Ost-Afrika Line	300, 600	P G		9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
George Washington [31]	DKN	250	Norddeutscher-Lloyd	300, 600	P G		N	0.40	4.00
Gernis [80]	DGQ	325	Roland Line	300, 600	P G		X	0.40	4.00
Gertrud Woermann [31]	DGW	325	Woermann Line	300, 600	P G		9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Giessen [31]	DGI	200	Norddeutscher-Lloyd	300, 600	P G		N	0.40	4.00
Gneisenau [31]	DGU	325	Norddeutscher-Lloyd	300, 600	P G		N	0.40	4.00
Goeben DGN [31]	DGN	325	Norddeutscher-Lloyd	300, 600	P G		N	0.40	4.00
Goldenfels [80]	DGF	200	D.S. Ges. Hansa	300, 600	P G		X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave lengths in Metres (the Normal Wave length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Gotha [31]	DGT	200	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	**4.00**
Gouverneur Jaeschke [31]	DGJ	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 p.m.	0.40	4.00
Graecia [31]	DGC	200	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Graf Waldersee [31]	DDW	200	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Granada [31]	DQN	100	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	—	—
Graudenz	AGR	—	Warship	300, **600**	O	N	0.40 [32]	4.00 [32]
Greiffenfels [80]	DGE	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Grete-Hugo Stinnes VIII. [80]	DGH	200	Hugo Stinnes	300, **600**	P G	X	0.40 [32]	4.00 [32]
Grille	AGS	—	Warship	300, **600**	O	N	0.40 [32]	4.00 [32]
Grosser Kürfurst AKZ	AKZ	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Grosser Kürfurst DKG [81]	DKG	250	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Grossherzog Friedrich August [80]	DGG	200	Deutscher Schulschiffverein, Bremen	300, **600**	P G	X	0.40	4.00
Grossherzog von Oldenburg [80 122]	DGO	200	Norddeutsche Seekabelwerke Coy.	300, **600**	— [38]	X	—	—
Grunewald [31]	DGR	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Guahyba [31]	DGY	200	Hamburg Sud. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Gutenfels [80]	DGB	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Gutrune [31]	DUN	325	Hamburg Sud. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Habsburg, DHG [31]	DHG	250	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Hagen AHA	AHA	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Hagen DHJ [43]	DHJ	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Haimon [80]	DHA	325	Roland Line	300, **600**	P G	X	0.40	4.00
Hamburg AHM	AHM	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Hamburg DDH [31]	DDH	250	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Hannover AHV	AHV	—	Warship	300, **600**	O	N	0.40 [32]	4.00 [32]
Hannover DHV [31]	DHV	200	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Hansa AHN	AHN	—	Warship	300, **600**	O	N	0.40 [32]	4.00 [32]
Hansa DZH [31]	DZH	100	Hamburg-Amerika Line	300, **600**	P G	X	0.40	4.00
Harport [43]	DHP	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Harzburg [80]	DZG	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Hathor [44]	DHC	325	D.S. Ges. Kosmos	300, **600**	P G	X	0.40	4.00
Hay	AHP	—	Warship	300, **600**	O	N	0.40 [32]	4.00 [32]

Heimdall	AHD	—	Warship	300, 600	O	N	0.40	4.00
Heinrich-Hugo Stinnes VII.[80]	DHH	200	Hugo Stinnes	300, 600	P G ..	X	0.40[32]	4.00[32]
Helene Blumenfeld[80]	DHB	200	Freight Agent Bd. Blumenfeld ..	300, 600	P G ..	X	0.40[32]	4.00[32]
Helene-Hugo Stinnes XIV.[80]	DHU	200	Hugo Stinnes	300, 600	P G ..	X	0.40	4.00
Helgoland AHC	AHC	—	Warship	300, 600	O	N	0.40[38]	4.00[38]
Helios DHS[43]	DHS	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G ..	X	0.40	4.00
Heluan[31]	DHE	325	D.S. Ges. Kosmos	300, 600	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Henny Woermann[31]	DHW	325	Woermann Line	300, 600	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Hera[13]	DHK	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G ..	X	0.40	4.00
Hertha	AHT	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Herzogin Cecilie[24 43]	DHZ	200	Norddeutscher-Lloyd	300, 600	P G ..	X	0.40	4.00
Hesperus[43]	DHX	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G ..	X	0.40	4.00
Hessen	AHE	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Hildebrand AHI	AHI	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Hilde-Hugo Stinnes X.[80] ..	DHI	200	Hugo Stinnes	300, 600	P G ..	X	0.40[32]	4.00[32]
Hobart[80]	DHT	325	Deutsche-Australische D.S. Ges...	300, 600	P G ..	X	0.40	4.00
Hof[80]	DHO	325	Deutsche-Australische D.S. Ges...	300, 600	P G ..	X	0.40	4.00
Hohenfels[80]	DHM	100	D.S. Ges. Hansa	300, 600	P G ..	X	0.40	4.00
Hohenstaufen[31]	DHN	250	Hamburg-Amerika Line	300, 600	P G ..	X	0.40	4.00
Hohenzollern	AHO	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Holger[80]	DHR	325	Roland Line	300, 600	P G ..	X	0.40	4.00
Holsatia[31]	DZE	200	Hamburg-Amerika Line	300, 600	P G ..	X	0.40	4.00
Holstein[80]	DHL	325	Roland Line	300, 600	P G ..	X	0.40	4.00
Hubertels[80]	DHD	200	D.S. Ges. Hansa	300, 600	P G ..	X	0.40	4.00
Imkenturm[80]	DIM	200	D.S. Ges. Hansa	300, 600	P G ..	X	0.40	4.00
Imperator DIR[31]	DIR	100	Stettiner D.S. Ges. I. F. Braeunlich G. m. b. H.	300, 600	P G ..	— [40]	0.18	1.80
Imperator DIT[31]	DIT	325	Hamburg-Amerika Line	300, 600, 1,800	P G ..	N	0.40	4.00
Irene	AIR	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Irmingard[80]	DID	200	Midgard. Deutsche Seeverkehrs-Aktienges.	300, 600	P G ..	X	0.40	4.00
Italia DIL[43]	DIL	200	Reederei W. Kunstmann ..	300, 600	P G ..	10 a.m. to 11 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m.	0.40	4.00
Jade	AIA	80	Imperial Ministry of Marine ..	300, 600	O	X	0.40[33]	4.00[33]
Java[80]	DJV	325	Deutsche-Australische D.S. Ges...	300, 600	P G ..	X	0.40	4.00
Jupiter DJU[43]	DJU	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G ..	X	0.40	4.00
Kaiser AKS	AKS	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kaiser DKQ[31]	DKQ	60	Hamburg-Amerika Line	300, 600	P G ..	N	0.12	—
Kaiser Barbarossa	AKB	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kaiser Friedrich III.	AKF	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kaiserin	AKT	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kaiserin Augusta	AKA	—	Warship	300, 600	O	N	0.40[33]	4.00[33]
Kaiserin Auguste Victoria[31] ..	DDA	250	Hamburg-Amerika Line	300, 600	P G ..	N	0.40	4.00
Kaiser Karl der Grosse ..	AKG	—	Warship	300, 600	O	N	0.40[33]	4.00[33]

Ship Stations—*Continued*

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							Per Word.	Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Kaiser Wilhelm II. AKI ..	AKI	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Kaiser Wilhelm II. DKM [31] ..	DKM	325	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Kaiser Wilhelm der Grosse,	AKW	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Kandelfels [80]	DKU	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Karnak DNK [42]	DNK	325	D.S. Ges. Kosmos	300, **600**	P G ..	X	0.40	4.00
Kattenturm [80]	DNT	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Kigoma [21]	DYT	325	Hamburg-Amerika Line	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Kiowa [43]	DKX	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G ..	X	0.40	4.00
Kleist [21]	DST	325	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Kommodore [43]	DOR	325	Deutsche Ost-Afrika Line ..	300, **600**	P G ..	—	0.40	4.00
König AKP	AKP	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
König DKJ [80]	DKJ	325	Deutsche Ost-Afrika Line ..	300, **600**	P G ..	X	0.40	4.00
König Albert AAL	AAL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
König Albert [21] ..	DKO	200	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
König Friedrich August [31] ..	DFR	250	Hamburg-Amerika Line	300, **600**	P G ..	N	0.40	4.00
Königin Luise [21]	DKL	200	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
König Wilhelm II. [21]	DDK	250	Hamburg-Amerika Line	300, **600**	P G ..	N	0.40	4.00
Kraft	AKV	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Kronprinz [31]	DPZ	325	Deutsche Ost-Afrika Line ..	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Kronprinzessin Cecilie DCI [21]	DCI	325	Hamburg-Amerika Line	300, **600**	P G ..	N	0.40	4.00
Kronprinzessin Cecilie DKA [31]	DKA	250	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Kronprinz Wilhelm [21]	DKP	250	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Kybfels [80]	DKY	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Lauterfels [80]	DLA	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Leda DLD [43]	DLD	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G ..	X	0.40	4.00
Lensahn	ALS	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Lichtenfels [80]	DLS	100	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Liebenfels [82]	DLB	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Lilly Rickmers [43]	DLY	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G ..	X	0.40	4.00
Lindenfels [80]	DLI	200	D.S. Ges. Hansa	300, **600**	P G ..	X		

				eum-Ges.					
Loongmoon [31]	DLN	200	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 p.m.	0.40	4.00	
Lothringen	ALO	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]	
Löwenburg [80]	DLQ	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00	
Lübeck ALK	ALK	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]	
Lübeck DZC [80]	DZC	325	Deutsche-Australische D.S. Ges. ..	300, **600**	P G ..	X	0.40	4.00	
Lucie Woermann [31]	DLW	325	Woermann Line	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00	
Lüneburg [80]	DLU	325	Deutsch-Australische D.S. Ges. ..	300, **600**	P G ..	X	0.40	4.00	
Lützow ALT	ALT	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]	
Lützow DLO [31]	DLO	325	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00	
Luxor [43]	DLX	200	D.S. Ges. Kosmos	300, **600**	P G ..	X	0.40	4.00	
Mabel Rickmers [43]	DML	—	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G ..	X	0.40	4.00	
Madeleine Rickmers [43] ..	DMC	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G ..	X	0.40	4.00	
Main [31]	DKI	200	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00	
Mai Rickmers [43]	DMT	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, **600**	P G ..	X	0.40	4.00	
Mannheim [80]	DMM	325	Deutsche-Australische Petroleum Ges.	300, **600**	P G ..	X	0.40	4.00	
Marienfels [80]	DMS	100	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00	
Mark [31]	DMD	325	Norddeutscher-Lloyd	300, **600**	P G ..	X	0.40	4.00	
Markgraf	AMF	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]	
Marksburg [80]	DMU	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00	
Mecklenburg DMQ [31]	DMQ	100	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 p.m.	0.40	4.00	
Mecklenburg AME	AME	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]	
Medusa AMD	AMD	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]	
Melbourne DME [80]	DME	325	Deutsch-Australische Petroleum Ges.	300, **600**	P G ..	X	0.40	4.00	
Memphis [43]	DMP	325	D.S. Ges. Kosmos	300, **600**	P G ..	X	0.40	4.00	
Menes [43]	DMN	200	D.S. Ges. Kosmos	300, **600**	P G ..	X	0.40	4.00	
Meppen [43]	DMZ	200	Deutsche - Amerikanische Petroleum Ges.	300, **600**	P G ..	X	0.40	4.00	
Mera [43]	DMX	200	D.S. Ges. Kosmos	300, **600**	P G ..	X	0.40	4.00	
Meteor DMR [31]	DMR	200	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00	
Mohawk DMK [43]	DMK	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G ..	X	0.40	4.00	
Mohican [43]	DMI	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G ..	X	0.40	4.00	
Moltke AMT	AMT	—	Warship	300, **600**	O	N	0.40 [78]	4.00 [33]	
Moltke DDM [81]	DDM	250	Hamburg-Amerika Line	300, **600**	P G ..	N	0.40	4.00	
Moltkefels [80]	DMO	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00	
Möwe [80]	DMW	100	D.S. Ges. Argo	300, **600**	P G ..	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to 12 p.m.	0.40	4.00	
München	AMU	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]	
Najade [81]	DNJ	60	Norddeutscher-Lloyd	300, **600**	P G ..	10 a.m. to 12 a.m., 1 p.m. to 3 p.m.	0.12	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Nassau	ANA	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Nautilus	ANL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Navarra [31]	DNV	325	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Neckar [31]	DKK	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Negada [31]	DNA	325	D.S. Ges. Kosmos	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Neidenfels [80]	DNS	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Neuenfels [80]	DNU	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Niagara DNG [43]	DNG	200	Deutsche-Amerikanische Petroleum Ges.	300, **600**	P G	X	0.40	4.00
Nicaria [31]	DYP	100	Hamburg-Amerika Line	300, **600**	P G	X	0.40	4.00
Nicomedia [31]	DYQ	100	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Niederwald [31]	DQR	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Niobe ANI	ANI	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Nitokris [31]	DNI	325	D.S. Ges. Kosmos	300, **600**	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Nixe [31]	DNX	60	Norddeutscher-Lloyd	300, **600**	P G	10 a.m. to 12 a.m., 1 p.m. to 3 p.m.	0.12	—
Nora-Hugo Stinnes II. [89]	DNH	200	Hugo Stinnes	300, **600**	P G	X	0.40	4.00
Norder	ANR	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Normannia DNO [43]	DNO	200	Reederie W. Kunstmann	300, **600**	P G	10 a.m. to 11 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m.	0.40	4.00
Nymphe ANY	ANY	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Ockenfels [80]	DOC	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Odenwald [31]	DQS	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Odin AOD	AOD	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [31]
O. I. D. Ahlers [80]	DAR	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Oldenburg	AOL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [32]
Osage [43]	DOG	200	Deutsche-Amerikanische Petroleum Ges.	300, **600**	P G	X	0.40	4.00
Osiris DIS [43]	DIS	200	D.S. Ges. Kosmos	300, **600**	P G	X	0.40	4.00
Ostfriesland	AOF	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]

Ostmark [31]	DOK	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Otavi [31]	DQT	200	Hamburg-Amerika Line	300, 600	O	N	0.40 [33]	4.00 [33]
Otter	AOT	—	Warship	300, 600	P G	X	0.40 [33]	4.00 [33]
Otto-Hugo Stinnes IX. [80]	DOH	200	Hugo Stinnes	300, 600	P G	X	0.40	4.00
Pagenturm [80]	DTV	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Palatia [31]	DPJ	100	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Pallanza [31]	DDQ	200	Hamburg Amerika Line	300, 600	P G	N	0.40 [33]	4.00 [33]
Panther APA	APA	—	Warship	300, 600	O	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Patagonia DQU [31]	DQU	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Patricia [31]	DDP	200	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Pawnee [43]	DPF	200	Deutsche-Amerikanische Petroleum Ges.	300, 600	P G	N	0.40 [33]	4.00 [33]
Pelikan APE	APE	—	Warship	300, 600	O	11.15 a.m. to 11.45 a.m., 11.15 p.m. to 11.45 p.m.	0.40	4.00
Pennoil [48]	DOI	200	Pure Oil Co., G.M.B.H., Hamburg	300, 600	P G	N	0.40	4.00
Pennsylvania DDN [31]	DDN	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Pernambuco DPR [31]	DPR	325	Hamburg Süd-Am. D.S. Ges.	300, 600	P G	X	0.40	4.00
Persepolis [31]	DEP	100	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Persia DYS [31]	DYS	100	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Peter Rickmers [68]	DPM	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Petropolis [31]	DPS	325	Hamburg Süd-Am. D.S. Ges.	300, 600	P G	X	0.40	4.00
Pfalz [31]	DPA	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40 [33]	4.00 [33]
Pfeil	APF	—	Warship	300, 600	O	X	0.40	4.00
Phœbus [68]	DPU	200	Deutsche-Amerikanische Petroleum Ges.	300, 600	P G	X	0.40	4.00
Phœnicia [31]	DOX	100	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Pisa DDF [31]	DDF	200	Hamburg-Amerika Line	300, 600	P G	N	0.40 [33]	4.00 [33]
Planet	APL	—	Warship	300, 600	O	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Plata DLP (La) [31]	DLP	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Polynesia [31]	DPO	325	Hamburg-Amerika Line	300, 600	P G	N	0.40 [33]	4.00 [33]
Pommern APM	APM	—	Warship	300, 600	O	X	0.40	4.00
Pommern DPX [31]	DPX	200	Norddeutscher-Lloyd	300, 600	P G	8 a.m. to 1.30 a.m., 1.15 p.m. to 1.30 p.m., 8 p.m. to 8.30 p.m.	0.40	4.00
Poseidon	DPY	325	Government	300, 600	P G	N	0.40 [33]	4.00 [33]
Posen APO	APO	—	Warship	300, 600	O	X	0.40	4.00
Posen DPQ [31]	DPQ	200	Norddeutscher-Lloyd	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Präsident [31]	DPT	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
President Grant [31]	DDS	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
President Lincoln [31]	DDI	200	Hamburg-Amerika Line	300, 600	P G	N	0.40	4.00
Pretoria [31]	DDT	200	Hamburg-Amerika Line	300, 600	O	N	0.40 [33]	4.00 [33]
Preussen APR	APR	—	Warship	300, 375 600	O [34] P R [35]	X	0.18 [37]	1.80 [37]
Preussen DPC [30 36]	DPC	110	Prussian Railway Administration	300, 600	P G	X	0.40	4.00
Primus [31]	DPV	200	Hamburg-Amerika Line					

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
Princess Alice DKZ [31] ..	DKZ	200	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Prinz Adalbert AAD ..	AAD	—	Warship	300, **600**	O	N	0.40 [32]	4.00 [32]
Prinz Adalbert DDZ [31] ..	DDZ	200	Hamburg-Amerika Line	300, **600**	P G ..	N	0.40	4.00
Prinz August Wilhelm [31] ..	DSB	200	Hamburg - Amerika Line (Atlas Line)	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Prinz Eitel Friedrich DPE [31]	DPE	325	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Prinz Eitel Friedrich DPI [30] ..	DPI	200	Neue Dampfer Kompagnie ..	300, **600**	P G ..	— [41]	0.25	2.50
Prinz Eitel Friedrich DSI [31]	DSI	200	Hamburg - Amerika Line (Atlas Line)	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Prinzessin [31]	DPN	325	Deutsche Ost.-Afrika Line ..	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Prinzessin Heinrich [31] ..	DPD	60	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m. 12 p.m. to 2 a.m.	0.12	—
Prinzessin Sophie Charlotte [50]	DPP	200	Neue Dampfer Kompagnie ..	300, **600**	P G ..	— [1]	0.25	2.50
Prinzess Irene [31]	DKE	200	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Prinzess Wilhelm	AWL	—	Warship	300, **600**	O	N	0.40 [33]	4.00 [33]
Prinz Friedrich Wilhelm [31] ..	DKF	250	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Prinz Heinrich AHR ..	AHR	—	Warship	300, **600**	O	N	0.40 [31]	4.00 [33]
Prinz Heinrich DPB [31] ..	DPB	325	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Prinz Joachim [31]	DSP	200	Hamburg - Amerika Line (Atlas Line)	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Prinz Ludwig [31]	DPL	325	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Prinz Oskar [31]	DDO	200	Hamburg-Amerika Line	300, **600**	P G ..	N	0.40	4.00
Prinzregent [31]	DPG	325	Deutsche Ost-Afrika Line ..	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Prinzregent Luitpold ALP ..	ALP	—	Warship	300, **600**	O	N	0.40 [32]	4.00 [32]
Prinz-Regent Luitpold DRL [31]	DRL	325	Norddeutscher-Lloyd	300, **600**	P G ..	N	0.40	4.00
Prinz Sigismund [31]	DSG	200	Hamburg - Amerika Line (Atlas Line)	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [39]	2.50 [39]
Professor Woermann [31] ..	DPW	325	Woermann Line	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Prometheus DOP [13]	DOP	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G ..	X	0.40	4.00
Prussia [31]	DJL	200	Hamburg-Amerika Line	300, **600**	P G ..	X	0.40	4.00
Purelight	DIG	200	Pure Oil Co., G.M.B.H., Hamburg	300, **600**	P G ..	11.15 a.m. to 11.45	0.40	4.00

Ramses [42]	DRM	325	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Rappenfels [60]	DRK	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Rauenfels [60]	DUE	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Regina [60]	DRI	200	Rud. Chris. Gribel	300, 600	P G	— [42]	0.25	2.50
Reichenfels [60]	DXR	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Rhætia [21]	DRE	325	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rhakotis [21]	DRH	325	D.S. Ges. Kosmos	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Rhein [21]	DKR	200	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Rheinfels [60]	DNF	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Rheinland ARL	ARL	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Rheinland DRJ [21]	DRJ	200	Norddeutscher-Lloyd	300, 600	P G	X	0.40	4.00
Rhenania DIA [21]	DIA	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rhenania DRZ [43]	DRZ	200	Reederei W. Kuntsmann	300, 600	P G	10 a.m. to 11 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m.	0.40	4.00
Rhodopis [21]	DRS	325	D.S. Ges. Kosmos	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Rio Grande DRR [21]	DRR	325	Hamburg-Süd. Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rio Negro [21]	DRQ	325	Hamburg-Süd. Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rio Pardo [21]	DRP	325	Hamburg-Süd. Am. D.S. Ges.	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Roda [21]	DRA	325	D.S. Ges. Kosmos	300, 600	P G	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Roland DRB [60]	DRB	75	Vereinigte Bugsir- und Frachtschiffahrts-Ges.	300, 600	P G	X	0.40	4.00
Roland DRV	DRV	325	Roland Line	300, 600	P G	X	0.40	4.00
Rolandseck [60]	DRW	100	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Roon ARO	ARO	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Roon DRN [21]	DRN	325	Norddeutscher-Lloyd	300, 600	P G	N	0.40	4.00
Rostock	ARK	—	Warship	300, 600	O	N	0.40 [32]	4.00 [32]
Rotenfels [60]	DRT	200	D.S. Ges. Hansa	300, 600	P G	X	0.40	4.00
Rugi [21]	DRU	325	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Rüstringen	ARU	—	Warship	300, 600	O	N	0.40 [33]	4.00 [33]
Sabine Rickmers [43]	DIB	200	Rickmers Reismühlen, Reederei und Schiffbau, A.C.	300, 600	P G	X	0.40	4.00
Sachsen [21]	DQX	200	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00
Sachsenwald [21]	DQZ	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sakkarah [43]	DYD	325	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Salamanca [21]	DSH	200	Hamburg-Amerika Line	300, 600	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Salatis [43]	DYC	325	D.S. Ges. Kosmos	300, 600	P G	X	0.40	4.00
Sambia [21]	DYM	100	Hamburg-Amerika Line	300, 600	P G	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GERMANY—*contd.*							Francs.	Francs.
San Nicolas[31]	DIC	325	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Cruz DNZ[31]	DNZ	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Elena[31]	DNL	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Fé[31]	DNN	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Maria DNM[31]	DNM	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santa Rita DNR	DNR	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Santos[31]	DTO	200	Hamburg-Süd. Am. D.S. Ges.	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sardinia DSJ[31]	DSJ	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sarnia DSM[31]	DSM	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Scandia[31]	DJN	200	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Scharnhorst[31]	DSA	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Scharzfels[80]	DXA	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Schaumburg[31]	DXD	100	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Schildturm[80]	DTX	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Schlesien	ASN	—	Warship	300, **600**	O	N	0.40[33]	4.00[33]
Schleswig[31]	DSW	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Schleswig-Holstein	ASX	—	Warship	300, **600**	O	N	0.40[33]	4.00[33]
Schneefels[80]	DCF	200	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Schönfels[80]	DXB	100	D.S. Ges. Hansa	300, **600**	P G	X	0.40	4.00
Schwaben	ASA	—	Warship	300, **600**	O	N	0.40[33]	4.00[33]
Schwalbe[80]	DSL	100	D.S. Ges. Argo	300, **600**	P G	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to 12 p.m.	0.40[32]	4.00[32]
Schwan[80]	DSN	100	D.S. Ges. Argo	300, **600**	P G	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to 12 p.m.	0.40[32]	4.00[32]
Schwarzburg[31]	DUG	100	Hamburg-Amerika Line	300, **600**	P G	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00

Schwarzwald [81]	DSX	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sebara [49]	DVE	325	D.S. Ges. Kosmos	300, 600	P G	..	X	0.40	4.00
Secundus [81]	DUS	—	Hamburg-Amerika Line	300, 600	P G	..	X	0.40	4.00
Seeadler ASE	ASE	—	Warship	300, 600	O ..	..	N	0.40 [38]	4.00 [38]
Seeadler DSE [88]	DSE	60	Norddeutscher-Lloyd	300, 600	— [39]	..	10 a.m. to 12 a.m., 4 p.m. to 6 p.m.	0.40	4.00
Segovia [81]	DGV	100	Hamburg-Amerika Line	300, 600	P G	..	X	0.40	4.00
Serak [49]	DYG	—	D.S. Ges. Kosmos	300, 600	P G	..	X	0.40	4.00
Serapis [65]	DIP	200	D.S. Ges. Kosmos	300, 600	P G	..	X	0.40	4.00
Setos [49]	DYF	325	D.S. Ges. Kosmos	300, 600	P G	..	X	0.40	4.00
Sevilla [81]	DQY	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Seydlitz AST	AST	—	Warship	300, 600	O ..	..	N	0.40 [38]	4.00 [38]
Seydlitz DSZ [81]	DSZ	325	Norddeutscher Lloyd	300, 600	P G	..	N	0.40	4.00
Sibiria [81]	DSV	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Siegfried	ASI	—	Warship	300, 600	O ..	..	N	0.40 [38]	4.00 [38]
Sierra Cordoba [81]	DOD	325	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Sierra Nevada [81]	DNE	325	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Sierra Salvada [81]	DVA	325	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Sierra Ventana [81]	DVE	325	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Sikiang [81]	DGS	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Silesia DJP [81]	DJP	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m to 2 a.m.	0.40	4.00
Silvana [81]	DAV	60	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.12	—
Silvia [81]	DSQ	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sioux [48]	DXS	200	Deutsche-Amerikanische Petroleum Ges.	300, 600	P G	..	X	0.40	4.00
Sirius DIU [49]	DIU	200	Deutsche - Amerikanische Petroleum Ges.	300, 600	P G	..	X	0.40	4.00
Sisak [86]	DYH	325	D.S. Ges. Kosmos	300, 600	P G	..	X	0.40	4.00
Sithonia [81]	DTH	200	Hamburg-Amerika Line	300, 600	P G	..	X	0.40	4.00
Sleipner	ASL	—	Warship	300, 600	O ..	..	N	0.40 [38]	4.00 [38]
Solfels [86]	DOU	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Sonnenberg [86]	DDD	200	Hermann Kimme	300, 600	P G	..	X	0.40	4.00
Sophie Rickmers [48]	DRY	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G	..	X	0.40	4.00
S. Paulo DOO [81]	DOO	325	Hamburg-Sud. Am. D.S. Ges.	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Sperber [86]	DSK	100	D.S. Ges. Argo	300, 600	P G	..	8 a.m. to 1 p.m., 3 p.m. to 6 p.m., 8 p.m. to 12 p.m.	0.40 [38]	4.00 [38]
Spezia [81]	DJR	200	Hamburg-Amerika Line	300, 600	P G	..	X	0.40	4.00
Spitzfels [86]	DOZ	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Spreewald [81]	DSO	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Staatssekretär Kraetke [81]	DTK	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Standard [48]	DRD	200	Deutsche - Amerikanische Petroleum Ges.	300, 600	P G	..	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-leugth in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GERMANY—*contd.*								
Steigerwald [81]	DGD	200	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	Francs. 0.40	Francs. 4.00
Steinturm [80]	DUM	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Steiermark [81]	DJS	200	Hamburg-Amerika Line	300, **600**	P G ..	X	0.40	4.00
Stephan [80 122]	DSC	325	Norddeutsche Seekabelwerke Coy.	300, **600**	— [86] ..	X	—	—
Stettin	ASY	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Stolberg	DLG	325	Deutsche-Australische D.S. Ges...	300, **600**	P G ..	X	0.40	4.00
Stolzenfels [80]	DOE	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Stralsund	ASM	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Strassburg	ASK	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Sturmfels [80]	DUR	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Stuttgart	ASZ	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Südmark [81]	DMV	100	Hamburg Amerika Line	—	—	—	—	—
Suevia [81]	DJT	200	Hamburg-Amerika Line	300, **600**	P G ..	X	0.40	4.00
Sumatra DUD [86]	DUD	325	Deutsche-Australische D.S. Ges...	300, **600**	P G ..	X	0.40	4.00
Sydney DSY [86]	DSY	325	Deutsche-Australische D.S. Ges...	300, **600**	P G ..	X	0.40	4.00
Syria DSR [81]	DSR	200	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Tabora [81]	DTA	325	Deutsche Ost-Afrika Line ..	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Tanis [48]	DTJ	200	D.S. Ges. Kosmos	300, **600**	P G ..	9.30 a.m. to 5.30 p.m., 9.30 p.m. to 1.30 a.m.	0.40	4.00
Tannenfels [80]	DTS	100	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00
Tasmania [86]	DTB	325	Deutsche-Australische D.S. Ges.	300, **600**	P G ..	X	0.40	4.00
Tecumseh [48]	DTC	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G ..	X	0.40	4.00
Thessalia [81]	DTE	325	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Thetis ATH	ATH	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Thüringen	ATU	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Thuringia [81]	DTU	325	Hamburg-Amerika Line	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Tijuca [81]	DUC	325	Hamburg-Sud. Am. D.S. Ges. ..	300, **600**	P G ..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Titania	ATG	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Totmes [48]	DYX	325	D.S. Ges. Kosmos	300, **600**	P G ..	X	0.40	4.00
Trautenfels [80]	DTR	200	D.S. Ges. Hansa	300, **600**	P G ..	X	0.40	4.00

Triton DTN [43]	.. .. ..	DTN	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	..	X	0.40	4.00
Trostburg [80]	.. .. ..	DTG	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Tucuman [81]	.. .. ..	DMA	325	Hamburg S. Am. D.S. Ges. ..	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Uarda [43]	.. .. ..	DUU	200	D.S. Ges. Kosmos	300, 600	P G	..	X	0.40	4.00
Uckermark [81]	.. .. ..	DJW	200	Hamburg-Amerika Line	300, 600	P G	..	X	0.40	4.00
Uhenfels [80]	.. .. ..	DUH	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Ulm [80] ..	.. .. ..	DVM	325	Deutsche-Australische D.S. Ges. ..	300, 600	P G	..	X	0.40	4.00
Undine ..	.. .. ..	AUN	—	Warship	300, 600	O ..	..	N	0.40 [88]	4.00 [88]
Ursula Rickmers [42]	.. ..	DUL	200	Rickmers Reismühlen, Reederei und Schiffbau, A.G.	300, 600	P G	..	X	0.40	4.00
Utgard [80]	.. .. ..	DUT	200	Midgard. Deutsche Seeverkehrs-Aktienges.	300, 600	P G	..	X	0.40	4.00
Valencia [81]	.. .. ..	DVC	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Valesia [81]	.. .. ..	DVL	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Vaterland [81] ...	.. ..	DVD	325	Hamburg-Amerika Line	300,600, 1,800	P G	..	N	0.40	4.00
Victoria Luise ..	.. ..	AVL	—	Warship	300, 600	O ..	..	N	0.40 [88]	4.00 [88]
Viktoria Luise [81]	.. ..	DDL	325	Hamburg-Amerika Line	300, 600	P G	..	N	0.40	4.00
Vineta ..	.. .. ..	AVN	—	Warship	300, 600	O ..	..	N	0.40 [88]	4.00 [88]
Virginia DVI [81] ..	.. ..	DVI	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Vulkan	.. ..	AVU	—	Warship	300, 600	O ..	..	N	0.40 [88]	4.00 [88]
Wachtfels [80]	.. .. ..	DOW	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Wartburg [80]	.. .. ..	DWC	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Wartenfels [80]	.. .. ..	DWV	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Warturm [80]	.. .. ..	DWT	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Wasgenwald [81]	.. ..	DWG	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.40	4.00
Washington DWB [42] ..	..	DWB	200	Deutsche-Amerikanische Petroleum-Ges.	300, 600	P G	..	X	0.40	4.00
Werdenfels [80] ..	.. ..	DWF	200	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Westerwald [81] ..	.. ..	DWE	200	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.25 [80]	2.50 [88]
Westfalen ..	.. ..	AWA	—	Warship	300, 600	O ..	..	N	0.40 [88]	4.00 [88]
Westmark [81] ..	.. ..	DZB	100	Hamburg-Amerika Line	300, 600	P G	..	X	0.40	4.00
Wettin ..	.. ..	AWE	—	Warship	300, 600	O ..	..	N	0.40 [88]	4.00 [88]
Wiegand [80]	.. .. ..	DWI	325	Roland Line	300, 600	P G	..	X	0.40 [88]	4.00
Wildenfels [80]	.. .. ..	DWL	100	D.S. Ges. Hansa	300, 600	P G	..	X	0.40	4.00
Wilhelms [80]	.. .. ..	DWS	100	Government	300, 600	particular correspondence		X	0.40	4.00
Willehad [81]	.. .. ..	DWH	200	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Willkommen [81]	.. ..	DWN	60	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 12 p.m. to 2 a.m.	0.12	—
Windhuk [81]	.. .. ..	DWK	325	Hamburg-Amerika Line	300, 600	P G	..	10 a.m. to 12 a.m., 1 p.m. to 2 a.m.	0.40	4.00
Wismar [80]	.. .. ..	DWR	325	Deutsche-Australische D.S. Ges...	300, 600	P G	..	X	0.40	4.00
Wittekind [81]	.. .. ..	DWD	200	Norddeutscher-Lloyd	300, 600	P G	..	N	0.40	4.00
Wittelsbach ..	.. .. ..	AWI	—	Warship	300, 600	O ..	..	N	0.40 [88]	4.00 [88]

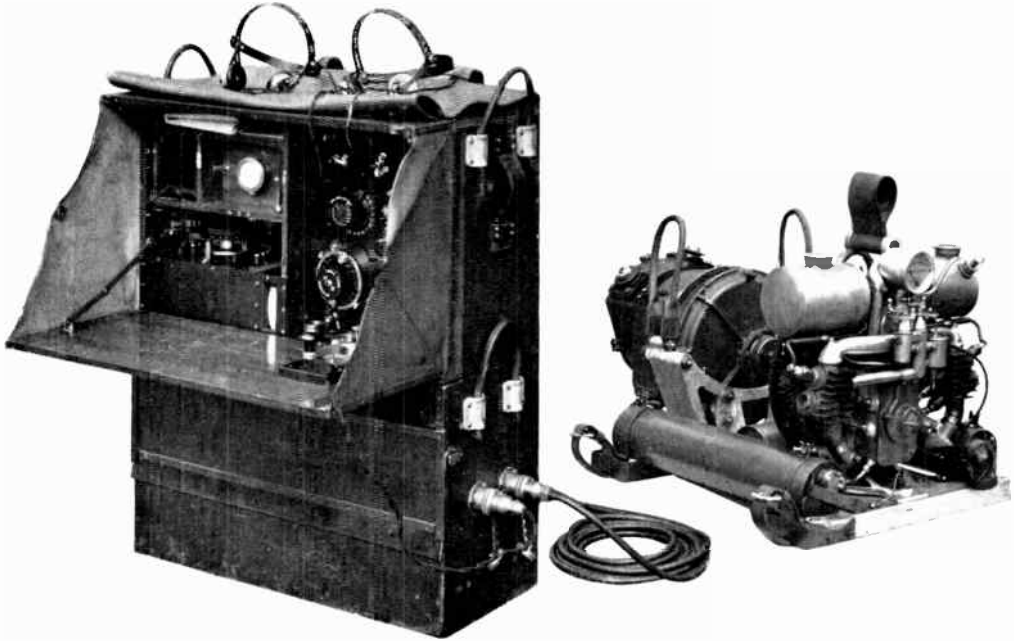
Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GERMANY—*contd.*								
							Francs.	Francs.
Wörth	AWO	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Wotan [61]	DWO	200	Deutsche-Amerikanische Petroleum-Ges.	300, **600**	P G	X	0.40	4.00
Württemberg	AWU	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Würzburg [81]	DWU	200	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Yorck [81]	DYK	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
Ypiranga [81]	DYA	250	Hamburg-Amerika Line	300, **600**	P G	N	0.40	4.00
Zähringen	AZA	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Zieten AZI	AZI	—	Warship	300, **600**	O	N	0.40 [88]	4.00 [88]
Zieten DZN [81]	DZN	325	Norddeutscher-Lloyd	300, **600**	P G	N	0.40	4.00
GREAT BRITAIN								
Aaro [44]	MWA	250	T. Wilson, Sons & Co.	300, **600**	P G	8 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15 [74]	0.90 [74]
Abinsi [44]	MVP	200	Elder Dempster	300, **600**	P G	—	—	—
Abosso [44]	GDI	250	Elder Dempster	300, **600**	P G	X	0.40	—
Acasta	BHS	—	Navy	—	O	—	—	—
Achates	BHT	—	Navy	—	O	—	—	—
Acheron	BHU	—	Navy	—	O	—	—	—
Achilles	BCY	—	Navy	—	O	—	—	—
Acorn	BHV	—	Navy	—	O	—	—	—
Actaeon	BOP	—	Navy	—	O	—	—	—
Active	BHD	—	Navy	—	O	—	—	—
Adamant	BPN	—	Navy	—	O	—	—	—
Adriatic [44]	MHC	250	White Star Line	300, **600**	P G	N	0.40	—
Adventure BHK	BHK	—	Navy	—	O	—	—	—
Aeneas [44]	MFU	250	A. Holt & Co.	300, **600**	P G	X	0.40	—
Aeolus	BEV	—	Navy	—	O	—	—	—
Afric [44]	MYC	250	White Star Line	300, **600**	P G	X	0.40	—
Africa BAA	BAA	—	Navy	—	O	—	—	—
Afridi	BHW	—	Navy	—	O	—	—	—
Agadir [44]	GFE	150	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Agamemnon	BAB	—	Navy	—	O	—	—	—
Aguila [44]	GFF	250	Yeoward Bros.	300, **600**	P G	X	0.40	—
Aidan [44]	MFM	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Ajana [75]	GTI	250	Australind Steam Shipping Co.	300, **600**	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—

Ajax BAC	BAC	—	Navy	—	O	—	—	—	—	—
Ajax GUZ [80]	GUZ	175	A. Holt & Co.	300, 600	P G	X	0.40	4.00	—	—
Akabo [44]	MZE	250	Elder Dempster	300, 600	P G	X	0.40	—	—	—
Alacrity	BQI	—	Navy	—	O	—	—	—	—	—
Alarm	BHX	—	Navy	—	O	—	—	—	—	—
Alaunia [44]	GAI	250	Cunard Line	300, 600	P G	N	0.40	—	—	—
Albacore	BKE	—	Navy	—	O	—	—	—	—	—
Alban [78]	GWW	225	Booth S.S. Co.	300, 600	P G	X	0.40	—	—	—
Albemarle	BAD	—	Navy	—	O	—	—	—	—	—
Alberta MHW [6]	MHW	200	Commodore F. G. Bourne	300, 600	P	X	0.40	—	—	—
Albion	BAE	—	Navy	—	O	—	—	—	—	—
Alcantara [44]	MRR	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—	—	—
Alecto	BPO	—	Navy	—	O	—	—	—	—	—
Alert BQA	BQA	—	Navy	—	O	—	—	—	—	—
Almanzora [44]	—	—	Royal Mail Steam Packet Co.	300, 600	P G	—	—	—	—	—
Almora [44]	YYR	—	Donaldson Bros.	300, 600	P G	—	0.40	—	—	—
Alnwick Castle [44]	GFH	250	Union Castle	300, 600	P G	X	0.40	—	—	—
Alsatian [44]	GYH	250	Allan Line	300, 600	P G	N	0.40	—	—	—
Amazon BHY	BHY	—	Navy	—	O	—	—	—	—	—
Amazon MBZ	MBZ	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—	—	—
Amber [80] [122]	GFI	140	Eastern Telegraph Co.	300, 450, 600	P	—	0.40	—	—	—
Ambrose [44]	MDR	250	Booth S.S. Co.	300, 600	P G	X	0.40	—	—	—
Ambuscade	BHZ	—	Navy	—	O	—	—	—	—	—
Amethyst	BGN	—	Navy	—	O	—	—	—	—	—
Amphitrite	BEF	—	Navy	—	O	—	—	—	—	—
Amsterdam [88]	GPF	130	Great Eastern Railway	300, 450, 600 [44]	P R [47]	N	0.10	1.00	—	—
Anchises [44]	MFW	250	A. Holt & Co.	300, 600	P G	X	0.40	—	—	—
Andes MRQ [44]	MRQ	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—	—	—
Andorinha [44]	MIU	250	Yeoward Bros.	300, 600	P G	X	0.40	—	—	—
Andromache	BQQ	—	Navy	—	O	—	—	—	—	—
Anglia [89]	GRE	170	London & North Western Railway	300, 600	P G	N	0.05	0.50	—	—
Anglian [44]	MNR	250	Wilsons & Furness-Leyland Line	300, 600	P G	N	0.40	—	—	—
Anglo-Australian [44]	GTQ	140	Nitrate Producers S.S. Co.	300, 600	P G	—	0.40	—	—	—
Anglo-Bolivian [44]	GRA	—	Nitrate Producers S.S. Co.	300, 600	P G	—	0.40	—	—	—
Anglo Californian [44]	YYH	—	Nitrate Producers S.S. Co.	200, 600	P G	—	0.40	—	—	—
Anglo-Colombian [44]	GUA	120	Nitrate Producers S.S. Co.	300, 600	P G	—	0.40	—	—	—
Anglo-Mexican [44]	YYC	—	Nitrate Producers S.S. Co.	300, 600	P G	—	0.40	—	—	—
Anglo-Patagonian [44]	GRC	—	Nitrate Producers S.S. Co.	300, 600	P G	—	0.40	—	—	—
Anglo-Saxon [44]	GUB	—	Nitrate Producers S.S. Co.	300, 600	P G	—	0.40	—	—	—
Angora [44]	GFL	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—	—
Anselm [44]	MDK	250	Booth S.S. Co.	300, 600	P G	X	0.40	—	—	—
Antelope	BPP	—	Navy	—	O	—	—	—	—	—
Antillian [44]	MJL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—	—	—
Antiochus [80]	GTC	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00	—	—
Antony [44]	MAY	250	Booth S.S. Co.	300, 600	P G	X	0.40	—	—	—
Antrim BCZ	BCZ	—	Navy	—	O	—	—	—	—	—
Antrim GPN [89]	GPN	150	Midland Railway	300, 400, 600 [44]	P R [48]	N	0.05	0.50	—	—
Aparima [81]	GIM	250	Union S.S. Co. of New Zealand	300, 600	P G	X	0.40	—	—	—
Apollo	BQR	—	Navy	—	O	—	—	—	—	—
Appalachee [44]	GFM	150	Anglo-American Oil Co.	300, 600	P G	X	0.40	—	—	—
Appam [44]	GDJ	250	Elder Dempster	300, 600	P G	X	0.40	—	—	—
Aquarius	BQS	—	Navy	—	O	—	—	—	—	—
Aquitania [44]	MSU	350	Cunard Line	300, 600	P G	N	0.40	—	—	—
Arab	BIA	—	Navy	—	O	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*								
Arabia [44]	MMZ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	Francs. 0.40	Francs. —
Arabic [44]	MFC	250	White Star Line	300, **600**	P G	N	0.40	—
Arabistan [80]	GQJ	90	Strick Line	300, **600**	P G	X	0.40	—
Aracataca [44]	MLB	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
Aragon [44]	MBX	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Araguaya [44]	MBG	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Arankola [44]	GFN	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Arawa [44]	MWE	250	Shaw, Savill & Albion	300, **600**	P G	X	0 40	—
Arcadia GFO [44]	GFO	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Arcadian [44]	MIR	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40 [49]	— [49]
Archer	BIB	—	Navy	—	O	—	—	—
Ardent	BIC	—	Navy	—	O	—	—	—
Ardeola [44]	GCJ	250	Yeoward Bros.	300, **600**	P G	X	0.40	—
Arethusa BFL	BFL	—	Navy	—	O	—	—	—
Argentino GGT (El) [44]	GGT	250	Argentine Cargo Line	300, **600**	P G	X	0.40	—
Argonaut	BEH	—	Navy	—	O	—	—	—
Argyll BDA	BDA	—	Navy	—	O	—	—	—
Ariadne	BEI	—	Navy	—	O	—	—	—
Ariel	BID	—	Navy	—	O	—	—	—
Argyllshire [80]	GTJ	220	Turnbull, Martin & Co.	300, 450, **600**	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m. 8 p.m. to 1 a.m.	0.40	—
Arlanza [44]	GFP	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Armadale [78]	GQT	250	Australind S.S. Co.	300, **600**	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—
Armadale Castle [44]	MQG	250	Union Castle	300, **600**	P G	N	0.40	—
Armenian [44]	MVR	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Aronda [44]	MAZ	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Arracan [78]	GWO	180	British & Burmese Steam Nav. Co.	300, **600**	P G	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.40	—
Arratoon Apcar [44]	—	180	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Arrino [78]	GQU	250	Australind S.S. Co.	300, **600**	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—
Arrogant	BEW	—	Navy	—	O	—	—	—
Arun	BIE	—	Navy	—	O	—	—	—



Transmitting and Receiving Apparatus and Generating Group of the Marconi 5 kw. Hand-Cart Station.

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Arundel [80]	MDZ	90	L.B. & S.C. Railway Co.	300, 600	P G	N	0.15 [80]	1.50 [88]
Atzila [44]	GFQ	150	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Ascania [44]	MTU	250	Cunard Line	300, 600	P G	N	0.40	—
Ascanius [44]	MFV	250	A. Holt & Co.	300, 600	P G	X	0.40	—
Ascot [44]	MKZ	150	Britain S.S. Co.	300, 600	P G	X	0.40	—
Ashburton [78]	GQV	250	Australind S.S. Co.	300, 600	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—
Ashtabula GKC [44]	GKC	150	Anglo-American Oil Co.	300, 600	P G	X	0.40	—
Asian [44]	MKL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Aspinet	GTY	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—
Assaye [44]	MOO	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Assistance	BOM	—	Navy	—	O	—	—	—
Astraea	BEX	—	Navy	—	O	—	—	—
Asturias [44]	MBB	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Atahualpa [44]	MDU	250	Booth S.S. Co.	300, 600	P G	X	0.40	—
Athenia [44]	MBA	250	Donaldson Bros.	300, 600	P G	N	0.40	—
Athenic [44]	MWN	250	White Star Line	300, 600	P G	X	0.40	—
Atlantian [44]	MVL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Attack	BIF	—	Navy	—	O	—	—	—
Attentive	BHL	—	Navy	—	O	—	—	—
Aurora	BGA	—	Navy	—	O	—	—	—
Ausonia [42]	MTR	250	Cunard Line	300, 600	P G	N	0.40	—
Australind [78]	GQW	250	Australind S.S. Co.	300, 600	P G	9.15 a.m. to 1 p.m., 4.30 p.m to 12 p.m.	0.40	—
Austrian Prince [44]	YVJ	—	Prince Line	300, 600	P G	—	0.40	—
Ava [78]	GWE	140	British & Burmese Steam Nav. Co	300, 600	P G	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.40	—
Avon BIG	BIG	—	Navy	—	O	—	—	—
Avon MBO [44]	MBO	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Ayrshire	GQA	220	Turnbull, Martin & Co.	300, 450, 600	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Bacchante BDB	BDB	—	Navy	—	O	—	—	—
Badger	BIH	—	Navy	—	O	—	—	—
Balantia [44]	GIH	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Ballarat [44]	MKQ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Balmoral Castle [44]	MPW	250	Union Castle	300, 600	P G	N	0.40	—
Baltic MBC [44]	MBC	250	White Star Line	300, 600	P G	N	0.40	—
Bamora [44]	MST	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Banca [44]	MFS	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Bandra [44]	MCH	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Banffshire [80]	GWQ	220	Scottish Shire Line	300, 600	P G	9 a.m. to 12.30 p.m, 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Bangala [44]	GAC	160	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Bankura [44]	GCH	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Barata [44]	GCM	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Baralong [44]	MWV	—	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—

Ship Stations —*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*cont.*								
Bardolph [44]	MGE	100	Hellyers' Steam Fishing Co.	300, **600**	P	X	Francs. 0.05 [88]	Francs. 0.50 [88]
Barham	BAW	—	Navy	—	O	—	—	—
Barjora [44]	GCT	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Barneson [44]	GYW	250	A. Weir & Co.	300, **600**	P G	N	0.40	—
Baroda [44]	GDL	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Baron Ardrossan [44]	MWW	—	Hogarth Shipping Co.	300, **600**	P G	X	0.40	—
Baron Erskine [44]	MHF	250	Hogarth Shipping Co.	300, **600**	P G	X	0.40	—
Baron Jedburgh [44]	MGD	250	Hogarth Shipping Co.	300, **600**	P G	X	0.40	—
Baron Napier [44]	MJS	250	Hogarth Shipping Co.	300, **600**	P G	X	0.40	—
Baron Polwarth [44]	GRB	160	Hogarth Shipping Co.	300, **600**	P G	X	0.40	—
Barpeta [44]	MPR	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Barranca [44]	MLL	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
Basilisk	BII	—	Navy	—	O	—	—	—
Bayano [44]	GMK	250	Elders & Fyffes	300, **600**	P G	X	0.40	—
Bay State [44]	YYY	165	Furness, Withy & Co.	300, **600**	P G	—	0.40	—
Beacon Grange [44]	GFG	250	Houlder Line	300, **600**	P G	X	0.40	—
Beagle	BIJ	—	Navy	—	O	—	—	—
Beaver BIK	BIK	—	Navy	—	O	—	—	—
Bellerophon BAG	BAG	—	Navy	—	O	—	—	—
Bellerophon GTD [80]	GTD	90	A. Holt & Co.	300, 450, **600**	P G	X	0.40	4.00
Bellona	BHF	—	Navy	—	O	—	—	—
Beltana [44]	MKR	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Bempton [44]	MHS	100	Hull Steam Fishing & Ice Co.	300, **600**	P	X	0.05 [88]	0.50 [88]
Benalla [44]	GBJ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Benbow	BAH	—	Navy	—	O	—	—	—
Benefactor [44]	MOE	250	T. & J. Harrison	300, **600**	P G	X	0.40	—
Ben-my-Chree [44]	MBQ	66	Isle of Man Steam Packet Co.	300	P R [44]	N	0.05	0.50
Berbera [44]	GPD	250	British India Steam Nav. Co	300, **600**	P G	X	0.40	—
Berbice [44]	GIF	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Bermudian [44]	MBD	200	Quebec S.S. Co.	300, **600**	P G	N	0.40	—
Berrima [44]	MFF	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Berwick	BDC	—	Navy	—	O	—	—	—
Berwick Castle [44]	GFJ	250	Union Castle	300, **600**	P G	X	0.40	—
Berwindmoor [44]	GFK	250	Havana Coal Co.	300, **600**	P G	X	0.40	—
Berwindvale [44]	GFR	250	Havana Coal Co.	300, **600**	P G	X	0.40	—
Bharata [44]	GAD	150	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—

Birmingham BEY	BEY	—	Navy	—	O	—	—	—	—	—
Bittern	BIL	—	Navy	—	O	—	—	—	—	—
Black Prince	BDD	—	Navy	—	O	—	—	—	—	—
Blake	BPC	—	Navy	—	O	—	—	—	—	—
Blanca (La) [44]	GJR	250	Argentine Cargo Line	300, 600	P G	X	0.40	—	—	—
Blanche	BHG	—	Navy	—	O	—	—	—	—	—
Blenheim	BPD	—	Navy	—	O	—	—	—	—	—
Bloemfontein [44]	GBN	150	Ellerman and Bucknall S.S. Co.	300, 600	P G	N	0.40	—	—	—
Blonde	BHH	—	Navy	—	O	—	—	—	—	—
Bloodhound [58]	VYI	—	Murray & Crawford	300, 600	P G	—	0.40	—	—	—
Boadicea	BHI	—	Navy	—	O	—	—	—	—	—
Bogota [44]	GFS	250	Pacific Steam Nav. Co.	300, 600	P G	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—	—	—
Bohemian [44]	MEL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—	—	—
Bolton Castle [44]	MAQ	150	Lancashire Shipping Co.	300, 600	P G	X	0.40	—	—	—
Bonaventure BPE	BPE	—	Navy	—	O	—	—	—	—	—
Bonetta	BKI	—	Navy	—	O	—	—	—	—	—
Borda MFQ [44]	MFQ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—	—	—
Borderdale [44]	GTE	120	Borderdale Shipping Co.	300, 600	P G	X	0.40	—	—	—
Borderer [44]	GCL	150	Borderdale Shipping Co.	300, 600	P G	X	0.40	—	—	—
Botanist [44]	MAP	250	T. & J. Harrison	300, 600	P G	X	0.40	—	—	—
Bovic [44]	GDO	250	White Star Line	300, 600	P G	X	0.40	—	—	—
Boyne	BIM	—	Navy	—	O	—	—	—	—	—
Braemar Castle [44]	GFU	250	Union Castle	300, 600	P G	N	0.40	—	—	—
Bramble	BPQ	—	Navy	—	O	—	—	—	—	—
Brighton [60]	MOV	95	L.B. & S.C. Railway Co.	300, 600	P G	N	0.15 [60]	1.50 [60]	—	—
Brilliant BEZ	BEZ	—	Navy	—	O	—	—	—	—	—
Brisbane River [44]	GRJ	120	Houlder Bros. & Co.	—	—	—	—	—	—	—
Brisk	BIN	—	Navy	—	O	—	—	—	—	—
Bristol	BFA	—	Navy	—	O	—	—	—	—	—
Britannia BAI	BAI	—	Navy	—	O	—	—	—	—	—
Britannia GFV [60] [122]	GFV	140	Eastern Telegraph Co.	300, 450, 600	P	—	0.40	—	—	—
Britannic [44] [60]	MUW	650	White Star Line	300, 600	P G	N	0.40	—	—	—
British Sun [44]	MGT	110	British Sun Co.	300, 600	P	—	—	—	—	—
Britomart	BPR	—	Navy	—	O	—	—	—	—	—
Briton [44]	MQJ	250	Union Castle	300, 600	P G	N	0.40	—	—	—
Brodmount [44]	MYP	250	Blue Star Line	300, 600	P G	X	0.40	—	—	—
Brodstone [44]	MIS	250	Blue Star Line	300, 600	P G	X	0.40	—	—	—
Brodvale [44]	MRB	250	Blue Star Line	300, 600	P G	X	0.40	—	—	—
Brussels [88]	GPG	130	Great Eastern Railway	300, 450, 600 [44]	P R [88]	N	0.10	1.00	—	—
Buffalo GFW [44]	GFW	250	T. Wilson Sons & Co.	300, 600	P G	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—	—	—
Bulldog	BIO	—	Navy	—	O	—	—	—	—	—
Bulysses [44]	MZA	150	Anglo-Saxon Petroleum Co.	300, 600	P G	X	0.40	—	—	—
Burma	BQL	—	Navy	—	O	—	—	—	—	—
Burmese Prince [44]	GRP	—	Prince Line, Ltd.	—	—	—	—	—	—	—
Burutu [44]	MZU	250	Elder Dempster	300, 600	P G	X	0.40	—	—	—
Byron [44]	GDH	250	Lamport & Holt	300, 600	P G	N	0.40	—	—	—
Cabotia [44]	YYS	—	Donaldson Bros.	300, 600	P G	—	0.40	—	—	—
Cadmus	BQB	—	Navy	—	O	—	—	—	—	—
Cæsar BAK	BAK	—	Navy	—	O	—	—	—	—	—
Cæsarea [44]	MSZ	250	London & South Western Railway	300, 600	P G	N	0.15	1.50	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Calabria MAJ "	MAJ	250	Anchor Line	300, **600**	P G ..	N	0.40	—
Calchas "	MYJ	180	A. Holt & Co.	300, **600**	P G ..	X	0.40	—
Caledonia MAI "	MAI	250	Anchor Line	300, **600**	P G ..	N	0.40	—
Caledonia MNU "	MNU	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G ..	X	0.40 [69]	— [69]
Caledonian "	MDT	250	F. Leyland & Co.	300, **600**	P G ..	N	0.40	—
Calgarian "	MJU	250	Allan Line	300, **600**	P G ..	N	0.40	—
Caliban "	MGS	100	Hellyers' Steam Fishing Co. ..	300, **600**	P	X	0.05 [89]	0.50 [89]
California MCI "	MCI	250	Anchor Line	300, **600**	P G ..	N	0.40	—
California MWH "	MWH	250	Pacific Steam Nav. Co.	300, **600**	P G ..	N	0.40	—
Californian MWL "	MWL	250	F. Leyland & Co.	300, **600**	P G ..	N	0.40	—
Calypso "	GFY	250	T. Wilson Sons & Co.	300, **600**	P G ..	8 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15 [74]	0.90 [74]
Cambria GRG [80]	GRG	170	London & North Western Railway	300, **600**	P G ..	N	0.05	0.50
Cambria MCG [80 122]	MCG	140	Eastern Telegraph Co.	300, 450, **600**	P	—	0.40	—
Cambrian BFB	BFB	—	Navy	—	O	—	—	—
Cambrian MNT "	MNT	250	Wilsons & Furness Leyland Line	300, **600**	P G ..	N	0.40	—
Cameleon	BIP	—	Navy	—	O	—	—	—
Cameronia "	MIO	250	Anchor Line	300, **600**	P G ..	N	0.40	—
Campanello "	MGU	250	Uranium S.S. Co.	300, **600**	P G ..	N	0.40	—
Campania MCA "	MCA	250	Cunard Line	300, **600**	P G ..	N	0.40	—
Canada MCF "	MCF	250	Dominion Line	300, **600**	P G ..	N	0.40	—
Canadian "	MGL	250	F. Leyland & Co.	300, **600**	P G ..	N	0.40	—
Canara "	GAF	170	British India Steam Nav. Co. ..	300, **600**	P G ..	X	0.40	—
Candia "	MPH	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G ..	X	0.40	—
Candidate "	MTD	140	T. & J. Harrison	300, **600**	P G ..	X	0.40	—
Canning "	GKG	250	Lamport & Holt	300, **600**	P G ..	X	0.40	—
Canopic "	MPC	250	White Star Line	300, **600**	P G ..	N	0.40	—
Canopus	BAL	—	Navy	—	O	—	—	—
Caraquet "	MQD	250	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Cardiganshire "	MAU	250	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Cardium "	MZB	150	Anglo-Saxon Petroleum Co. ..	300, **600**	P G ..	X	0.40	—
Caribbean "	GBR	250	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Carisbrook Castle "	MOW	250	Union Castle	300, **600**	P G ..	N	0.40	—
Carmania "	MAA	250	Cunard Line	300, **600**	P G ..	N	0.40	—
Carmarthenshire "	MUS	200	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Carnarvon	BDE	—	Navy	—	O	—	—	—

Carnarvonshire [44]	.. ..	MZR	250	Royal Mail Steam Packet Co. ..	300, 600	P G	..	N	0.40	—	—
Caroline BUA ..	.. ..	BUA	—	Navy	—	O ..	..	—	—	—	—
Caronia [44] ..	.. ..	MRA	350	Cunard Line	300, 600	P G	..	N	0.40	—	—
Carpathia [44] ..	.. ..	MPA	250	Cunard Line	300, 600	P G	..	N	0.40	—	—
Carpenturia [44] ..	.. ..	MHG	250	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Carsten Bruun ..	.. ..	GTK	80	Blacksod Whaling Co.	300, 450, 600	P ..	..	—	0.25	—	—
Carthaginian [44] ..	.. ..	MHN	250	Allan Line	300, 600	P G	..	N	0.40	—	—
Cassandra MED [44] ..	.. ..	MED	250	Donaldson Bros.	300, 600	P G	..	N	0.40	—	—
Cassis [44] ..	.. ..	MPO	250	Anglo-Saxon Petroleum Co. ..	300, 600	P G	..	X	0.40	—	—
Castalia [44] ..	.. ..	MWZ	250	Anchor Line	300, 600	P G	..	X	0.40	—	—
Cawdor Castle [44] ..	.. ..	GFZ	250	Union Castle	300, 600	P G	..	X	0.40	—	—
Cedric [44] ..	.. ..	MDC	250	White Star Line	300, 600	P G	..	N	0.40	—	—
Celtic MLC [44] ..	.. ..	MLC	250	White Star Line	300, 600	P G	..	N	0.40	—	—
Centurion ..	.. ..	BAM	—	Navy	—	O ..	..	—	—	—	—
Ceramic [44] ..	.. ..	MCP	250	White Star Line	300, 600	P G	..	X	0.40	—	—
Cestrian [44] ..	.. ..	MHL	250	F. Leyland & Co.	300, 600	P G	..	N	0.40	—	—
Cetriana ..	.. ..	MOB	150	W. Eadie	300, 600	P G	..	X	0.40	—	—
Cevic [44] ..	.. ..	GDQ	250	White Star Line	300, 600	P G	..	X	0.40	—	—
Chagres [44] ..	.. ..	GCN	250	Elders & Fyffes	300, 600	P G	..	X	0.40	—	—
Chakdara [44] ..	.. ..	MUO	160	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Chakdina [44] ..	.. ..	MZY	160	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Chakla [44] ..	.. ..	MWQ	160	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Chakrata [44] ..	.. ..	GPE	140	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Chaleur [44] ..	.. ..	GMN	250	Royal Mail Steam Packet Co. ..	300, 600	P G	..	N	0.40	—	—
Challenger ..	.. ..	BFC	—	Navy	—	O ..	..	—	—	—	—
Champion ..	.. ..	BTY	—	Navy	—	O ..	..	—	—	—	—
Chanda [44] ..	.. ..	GPT	180	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Changuinola [44]	.. ..	MPM	200	Elders & Fyffes	300, 600	P G	..	X	0.40	—	—
Chantala [44] ..	.. ..	MYI	160	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Charybdis ..	.. ..	BFD	—	Navy	—	O ..	..	—	—	—	—
Chatham ..	.. ..	BFE	—	Navy	—	O ..	..	—	—	—	—
Chaudiere [44] ..	.. ..	GDK	250	Royal Mail Steam Packet Co. ..	300, 600	P G	..	N	0.40	—	—
Cheerful ..	.. ..	BIQ	—	Navy	—	O ..	..	—	—	—	—
Chelmer ..	.. ..	BIR	—	Navy	—	O ..	..	—	—	—	—
Chenab [72] ..	.. ..	GWK	115	James Nourse, Ltd.	300, 600	P G	..	X	0.40	—	—
Cherwell ..	.. ..	BIS	—	Navy	—	O ..	..	—	—	—	—
Cheyenne GGB [44]	.. ..	GGB	150	Anglo-American Oil Co.	300, 600	P G	..	X	0.40	—	—
Chignecto [44] ..	.. ..	MBV	250	Royal Mail Steam Packet Co. ..	300, 600	P G	..	N	0.40	—	—
Chile [44]	.. ..	GGC	250	Pacific Steam Nav. Co.	300, 600	P G	..	N	0.40	—	—
Chilka [44] ..	.. ..	GGD	250	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
China MMU [44] ..	.. ..	MMU	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	..	X	0.40	—	—
Chindwara [44] ..	.. ..	GAR	140	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Chindwin [72] ..	.. ..	GWG	180	British & Burmese Steam Nav. Co.	300, 600	P G	..	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.40	—	—
Chinkoa [44] ..	.. ..	MKO	250	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Chipana [54] ..	.. ..	YYQ	—	New York & Pacific S.S. Co. ..	300, 600	P G	..	—	0.40	—	—
Chiria [80] ..	.. ..	GUV	30	James Bird, London	300, 600	P ..	..	X	—	—	—
Chirripo [44] ..	.. ..	MLP	150	Elders & Fyffes	300, 600	P G	..	X	0.40	—	—
Christopher ..	.. ..	BIT	—	Navy	—	O ..	..	—	—	—	—
Chupra [44] ..	.. ..	GPU	180	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Chyebassa [44] ..	.. ..	MYF	160	British India Steam Nav. Co. ..	300, 600	P G	..	X	0.40	—	—
Circassia [44] ..	.. ..	MWY	250	Anchor Line	300, 600	P G	..	X	0.40	—	—

Ship Stations—*Continued*

Name	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
City of Athens	MVB	160	Ellerman Lines	300, 600	P G	—	0.40	—
City of Baroda	GPC	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Benares	GED	250	Ellerman Lines	300, 600	P G	X	0.40	—
City of Birmingham	GEP	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Bombay	GUJ	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Bristol	GEC	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Cairo	YVV	—	Ellerman Lines	300, 600	P G	—	0.40	—
City of Calcutta	GEE	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Chester	MAG	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Colombo	GYG	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Corinth	MFE	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Delhi	GIC	150	Ellerman Lines	300, 600	P G	N	0.40	—
City of Dunkirk	GDD	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Durham	GET	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Edinburgh	GNC	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Exeter	MSW	200	Ellerman Lines	300, 600	P G	X	0.40	—
City of Florence	GPY	140	Ellerman Lines	300, 600	P G	X	0.40	—
City of Glasgow	GEU	250	Ellerman Lines	300, 600	P G	X	0.40	—
City of Karachi	GBW	250	Ellerman Lines	300, 600	P G	X	0.40	—
City of Lahore	GEN	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Lincoln	GDP	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of London	GEV	250	Ellerman Lines	300, 600	P G	X	0.40	—
City of Madras	MCY	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Madrid	MTM	125	Ellerman Lines	300, 600	P G	X	0.40	—
City of Marseilles	GEW	250	Ellerman Lines	300, 600	P G	N	0.40	—
City of Mysore	MUI	130	Ellerman Lines	300, 600	P G	X	0.40	—
City of Nagpur	MUJ	200	Ellerman Lines	300, 600	P G	X	0.40	—
City of Naples	GEO	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Newcastle	YVU	—	Ellerman Lines	300, 600	P G	—	0.40	—
City of Norwich	GYA	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of Paris	GER	250	Ellerman Lines	300, 600	P G	X	0.40	—
City of Poona	GBB	250	Ellerman Lines	300, 600	P G	X	0.40	—
City of Rangoon	MTP	135	Ellerman Lines	300, 600	P G	X	0.40	—
City of Vienna	MSK	150	Ellerman Lines	300, 600	P G	X	0.40	—
City of York	GAO	250	Ellerman Lines	300, 600	P G	X	0.40	—
Clan Colquhoun	YZA	150	Cayzer, Irvine & Co.	300, 600	—	—	—	—
Clan Macewan	GVH	100	Cayzer, Irvine & Co.	300, 600	P	X	—	—
Clan Macrea	GVM	100	Cayzer, Irvine & Co.	300, 600	P	X	—	—

Clan Sinclair [80]	YZB	160	Cayzer, Irvine & Co.	300, 600	—	—	—	—	—
Clan Urquhart [80]	YZG	—	Cayzer, Irvine & Co.	300, 600	—	—	—	—	—
Clearway [44]	MYH	250	Anglo-Oriental Nav. Co.	300, 600	P G	X	0.40	—	—
Clement [44]	MDB	250	Booth S.S. Co.	300, 600	P G	X	0.40	—	—
Clio	BQC	—	Navy	—	O	—	—	—	—
Cluny Castle [44]	GGE	250	Union Castle	300, 600	P G	X	0.40	—	—
Clutha River	GRQ	120	Houlder Bros. & Co.	300, 600	P G	X	0.40	—	—
Cochrane BDF	BDF	—	Navy	—	O	—	—	—	—
Cockatrice	BIU	—	Navy	—	O	—	—	—	—
Coconada [44]	GGF	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Colaba [44]	GBT	170	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Colchester [80]	GPH	130	Great Eastern Railway	300, 450, 600 [46]	P R [47]	N	0.10	1.00	—
Collegian [44]	MVT	—	T. & J. Harrison	300, 600	P G	X	0.40	—	—
Collingwood	BAN	—	Navy	—	O	—	—	—	—
Colne	BIV	—	Navy	—	O	—	—	—	—
Colonia MCL [80] [122]	MCL	140	Telegraph Construction & Maintenance Co.	300, 600	P	—	—	—	—
Colonian [44]	MGW	250	F. Leyland & Co.	300, 600	P G	N	0.40	—	—
Colorado MMS [44]	MMS	250	T. Wilson, Sons, & Co.	300, 600	P G	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—	—
Colossus	BAO	—	Navy	—	O	—	—	—	—
Columbia MFH [44]	MFH	200	Hellyers' Steam Fishing Co.	300, 600	P	X	0.05 [88]	0.50 [88]	—
Columbia MOI [44]	MOI	250	Anchor Line	300, 600	P G	N	0.40	—	—
Columbian MNV [44]	MNV	250	F. Leyland & Co.	300, 600	P G	N	0.40	—	—
Coluna [44]	MYW	—	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Colusa [44]	GBI	150	Atlantic & Pacific S.S. Co.	300, 600	P G	N	0.40	—	—
Comanchee [44]	GGG	150	Anglo-American Oil Co.	300, 600	P G	X	0.40	—	—
Comet BSQ	BSQ	—	Navy	—	O	—	—	—	—
Commonwealth BAP	BAP	—	Navy	—	O	—	—	—	—
Commonwealth GGH [44]	GGH	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Comrie Castle [44]	GGI	250	Union Castle	300, 600	P G	X	0.40	—	—
Comus BTW	BTW	—	Navy	—	O	—	—	—	—
Conch [44]	MZD	150	Anglo-Saxon Petroleum Co.	300, 600	P G	X	0.40	—	—
Connaught [44]	MCU	140	City of Dublin Steam Packet Co.	300, 600	P G	N	0.05	0.50	—
Conqueror BAQ	BAQ	—	Navy	—	O	—	—	—	—
Conqueror GID [4] [44]	GID	150	Duke of Manchester	300, 600	P G	X	0.40	—	—
Contest	BIX	—	Navy	—	O	—	—	—	—
Copenhagen [80]	GPI	130	Great Eastern Railway	300, 450, 600 [46]	P R [47]	N	0.10	1.00	—
Corcovado MIE [44]	MIE	250	Pacific Steam Navigation Co.	300, 600	P G	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—	—
Cordelia	BUB	—	Navy	—	O	—	—	—	—
Cordobes (El) [44]	MHO	250	British & Argentine Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Corinthian [44]	MKN	250	Allan Line	300, 600	P G	N	0.40	—	—
Corinthic [44]	MWT	250	White Star Line	300, 600	P G	X	0.40	—	—
Cormorant [80] [122]	MFJ	140	Western Telegraph Co.	300, 600	P	—	—	—	—
Cornishman [44]	GDW	250	Dominion Line	300, 600	P G	X	0.40	—	—
Cornwall	BDG	—	Navy	—	O	—	—	—	—
Cornwallis	BAR	—	Navy	—	O	—	—	—	—
Corsican [44]	MCN	250	Allan Line	300, 600	P G	N	0.40	—	—
Cossack	BIY	—	Navy	—	O	—	—	—	—
Cooeyanna [44]	GBV	—	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Crane	BKL	—	Navy	—	O ..	—	—	—
Crescent	BEJ	—	Navy	—	O ..	—	—	—
Cretic "	MRC	250	White Star Line	300, **600**	P G	N	0.40	—
Crown of Seville "	MTL	150	Crown S.S. Co.	300, **600**	P G	X	0.40	—
Crown of Toledo "	MHV	250	Crown S.S. Co.	300, **600**	P G	X	0.40	—
Crown Point "	GHM	250	Norfolk & North America S.S Co.	300, **600**	P G	X	0.40	—
Crusader	BIZ	—	Navy	—	O ..	—	—	—
Cufic "	GDR	250	White Star Line	300, **600**	P G	X	0.40	—
Culna "	GOQ	160	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Cumberland	BDI	—	Navy	—	O ..	—	—	—
Custodian "	GCE	250	T. & J. Harrison	300, **600**	P G	X	0.40	—
Cuyahoga "	MYT	140	Anglo-American Oil Co.	300, **600**	—	—	—	—
Cyclops BON	BON	—	Navy	—	O ..	—	—	—
Cyclops GTF [80]	GTF	90	A. Holt & Co.	300, 450, **600**	P G	X	0.40	4.00
Cymric "	MGC	150	White Star Line	300, **600**	P G	N	0.40	—
Dacia GUY [80 122]	GUY	145	India Rubber G. P. and Tel. Works Co.	300, **600**	P ..	—	—	—
Dakar "	GCO	250	Elder Dempster	300, **600**	P G	X	0.40	—
Danube "	MBM	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Darro "	GGJ	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Dartmouth	BFF	—	Navy	—	O ..	—	—	—
Dee	BJB	—	Navy	—	O ..	—	—	—
Defence	BDJ	—	Navy	—	O ..	—	—	—
Defender	BJC	—	Navy	—	O ..	—	—	—
Defiance	BOQ	—	Navy	—	O ..	—	—	—
Delaware GGK "	GGK	150	Anglo-American Oil Co.	300, **600**	P G	X	0.40	—
Delphic "	GDS	250	White Star Line	300, **600**	P G	X	0.40	—
Delta "	MKG	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Demerara "	GGN	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Demosthenes "	MGK	250	Aberdeen Line	300, **600**	P G	X	0.40	—
Denbigh Hall "	GOW	150	Ellerman Lines	300, **600**	P G	X	0.40	—
Denbighshire "	MPG	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Denis "	MDE	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Den of Airlie "	GBK	150	Chas. Barrie & Son	300, **600**	P G	X	0.40	—
Den of Crombie "	GBL	150	Chas. Barrie & Son	300, **600**	P G	X	0.40	—
Den of Ewnie "	MVO	130	Chas. Barrie & Son	300, **600**	P G	X	0.40	—
Den of Ogil "	MPU	250	Chas. Barrie & Son	300, **600**	P G	X	0.40	—
Den of Ruthven "	GYC	150	Chas. Barrie & Son	300, **600**	P G	X	0.40	—

Derbyshire [44]	MYB	250	Bibby Bros. & Co.	300, 600	P G	X	0.40	—
Derwent BJD	BJD	—	Navy	—	O	—	—	—
Desabla [44]	GYV	250	A. Weir & Co.	300, 600	P G	N	0.40	—
Deseado [44]	GGL	250	Royal Mail Steam Packet Co.	300, 600	P G	X	0.40	—
Desna [44]	GGM	250	Royal Mail Steam Packet Co.	300, 600	P G	X	0.40	—
Devanha [44]	MOU	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Devona [44]	GRD	120	Cairn Line	—	—	—	—	—
Devonian [44]	MDL	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Devonshire	BDK	—	Navy	—	O	—	—	—
Dewa [44]	GAK	150	James Nourse, Ltd.	300, 600	P G	X	0.40	—
Diadem	BEK	—	Navy	—	O	—	—	—
Diamond	BGP	—	Navy	—	O	—	—	—
Diana	BFG	—	Navy	—	O	—	—	—
Dido	BFH	—	Navy	—	O	—	—	—
Dieppe [80]	MRL	80	L.B. & S.C. Railway Co.	300, 600	P G	N	0.15 [80]	1.50 [80]
Digby [44]	MNG	250	Furness Withy & Co.	300, 600	P G	X	0.40	—
Diligence	BSD	—	Navy	—	O	—	—	—
Dilwara [44]	GCF	200	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Dominion BAT	BAT	—	Navy	—	O	—	—	—
Dominion MDF [44]	MDF	250	Dominion Line	300, 600	P G	N	0.40	—
Dominion Miller [44]	MTF	170	Norfolk & North American S.S. Co.	300, 600	P G	X	0.40	—
Donegal BDL	BDL	—	Navy	—	O	—	—	—
Donegal GPO [88]	GPO	150	Midland Railway Co.	300, 400, 600 [44]	P R [46]	N	2.05	0.50
Dongola [44]	MNH	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	N	0.40	—
Don Hugo [78]	GWU	100	Rio Tinto Co.	300, 600	P	X	0.05 [88]	0.50 [88]
Doon	BJE	—	Navy	—	O	—	—	—
Doris BFI	BFI	—	Navy	—	O	—	—	—
Dorrington Court [44]	MWR	145	Cressington S.S. Co.	—	—	—	—	—
Dorset [50]	GRY	320	Federal Steam Nav. Co.	300, 450, 600	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Dove	BLF	—	Navy	—	O	—	—	—
Dover Castle [44]	MQM	250	Union Castle	300, 600	P G	N	0.40	—
Drake	BDM	—	Navy	—	O	—	—	—
Dreadnought	BAU	—	Navy	—	O	—	—	—
Dresden GPM [89]	GPM	130	Great Eastern Railway	300, 450, 600 [44]	P R [47]	N	0.10	1.00
Drina [44]	GGO	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Druid BJG	BJG	—	Navy	—	O	—	—	—
Drumcliffe [44]	GOS	250	J. Chadwick & Sons	300, 600	P G	X	0.40	—
Drumcree [44]	GCP	250	J. Chadwick & Sons	300, 600	P G	X	0.40	—
Drumnarrig [44]	GDE	250	J. Chadwick & Sons	300, 600	P G	X	0.40	—
Dublin	BFJ	—	Navy	—	O	—	—	—
Duchess of Devonshire [88]	GPP	150	Midland Railway Co.	300, 400, 600	P G	N	0.05	—
Duendes [44]	GGP	250	Pacific Steam Nav. Co.	300, 600	P G	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Duke of Edinburgh	BDN	—	Navy	—	O	—	—	—
Duncan BAV	BAV	—	Navy	—	O	—	—	—
Dunera [44]	GCU	200	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Dunluce Castle [44]	MQO	250	Union Castle	300, 600	P G	N	0.40	—
Dunvegan Castle [44]	MPQ	250	Union Castle	300, 600	P G	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*								
Durham [60]	GQC	300	Federal Steam Nav. Co.	300, 600	P G ..	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., p.m. to 6 p.m., 8 p.m. to 1 a.m..	Francs. 0.40	Francs. —
Durham Castle [44]	MQN	250	Union Castle	300, 600	P G ..	N	0.40	—
Dwarf	BUT	—	Navy	—	O	—	—	—
Eagle Point [44]	GKI	250	Norfolk & North America S.S. Co.	300, 600	P G ..	X	0.40	—
East Point [44]	GHJ	250	Norfolk & North America S.S. Co.	300, 600	P G ..	X	0.40	—
Ebro [44]	MTJ	210	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Eclipse	BFK	—	Navy	—	O	—	—	—
Edavana [44]	GGQ	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Eden	BJH	—	Navy	—	O	—	—	—
Edgar	BEL	—	Navy	—	O	—	—	—
Edinburgh Castle [44]	MQE	250	Union Castle	300, 600	P G ..	N	0.40	—
Egba [44]	GRO	200	Elder Dempster	—	—	—	—	—
Egra [44]	GGR	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Egypt [44]	MMG	250	Peninsular & Oriental Steam Nav. Co	300, 600	P G ..	X	0.40	—
Eileen [44]	GAN	200	S. B. Joel	300, 600	P G ..	X	0.40	—
Ekma [44]	GGS	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Electra [60] [122]	MEE	140	Eastern Telegraph Co.	300, 450, 600	P	—	0.40	—
Elephanta [44]	GGU	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Ellenga [44]	GGV	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Ellora [44]	GGW	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Elmina [44]	MZI	250	Elder, Dempster	300, 600	P G ..	N	0.40	—
Elysia [44]	MRH	250	Anchor Line	300, 600	P G ..	X	0.40	—
Emperor of India	BAS	—	Navy	—	O	—	—	—
Empress [60]	GUI	50	South Eastern & Chatham Railway	300, 600	P G ..	N	0.15 [59]	1.50 [59]
Empress of Asia [44]	GKR	250	Canadian Pacific Railway.. ..	300, 600	P G ..	X	0.40	—
Empress of Britain [44] ..	MPB	250	Canadian Pacific Railway ..	300, 600	P G ..	N	0.40	—
Empress of India, [44]	MPI	250	Canadian Pacific Railway ..	300, 600	P G ..	X	0.40	—
Empress of Japan [44]	MPJ	250	Canadian Pacific Railway ..	300, 600	P G ..	X	0.40	—
Empress of Russia [44]	MRD	250	Canadian Pacific Railway ..	300, 600	P G ..	X	0.40	—
Empress Queen [44]	MEQ	66	Isle of Man Steam Packet Co. ..	300	P R [48] ..	N	0.05	0.50
Enchantress	BQG	—	Navy	—	O	—	—	—
Endeavour	BPL	—	Navy	—	O	—	—	—
Endymion	BEM	—	Navy	—	O	—	—	—
Engadine [60]	GUK	50	South Eastern & Chatham Railway	300, 600	P G ..	N	0.15	1.50
Engineer [44]	MFO	250	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Englishman [44]	GDY	250	Dominion Line	300, 600	P G ..	X	0.40	—

Erin [4] [44]	MUC	225	Sir T. J. Lipton	300, 600	P G ..	X	0.40	—
Erinpura [44]	MVJ	250	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Erne	BJI	—	Navy	—	O	—	—	—
Erris	GTO	80	Blacksod Whaling Co.	300, 450, 600	P	—	0.25	—
Escalona [78]	GPZ	150	British & Chilian S.S. Co. ..	300, 600	P G ..	X	0.40	—
Eskimo [44]	GHE	250	T. Wilson, Sons & Co.	300, 600	P G ..	8 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15 [74]	0.90 [74]
Esmeraldas [44]	GHF	250	Pacific Steam Nav. Co.	300, 600	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Espiegle	BQD	—	Navy	—	O	—	—	—
Essequibo [44]	MTK	210	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Essex BDO	BDO	—	Navy	—	O	—	—	—
Essex GXE [80]	GXE	300	Federal Steam Nav. Co.	300, 600	P G ..	9 a.m. to 12.30 p.m. 1 p.m. to 2 p.m. 4 p.m. to 6 p.m. 8 p.m. to 1 a.m.	0.40	—
Etonian [44]	MFD	250	Wilsons & Furness-Leyland Line	300, 600	P G ..	N	0.40	—
Ettrick	BJJ	—	Navy	—	O	—	—	—
Eupion [44]	MKT	150	Eupion S.S. Co.	300, 600	P G ..	X	0.40	—
Euripides [44]	MSE	250	G. Thompson & Co.	300, 600	P G ..	X	0.40	—
Europa BEN	BEN	—	Navy	—	O	—	—	—
Euryalus BDP	BDP	—	Navy	—	O	—	—	—
Euryalus GCZ [44]	GCZ	180	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Exe	BJK	—	Navy	—	O	—	—	—
Exmouth	BAX	—	Navy	—	O	—	—	—
Exmouth II. [26] [80]	GYF	150	Metropolitan Asylums Board ..	300, 600	P	X	0.40	—
Explorer MVV [44]	MVV	160	T. & J. Harrison	300, 600	P G ..	—	0.40	—
Express	BLN	—	Navy	—	O	—	—	—
Falaba [44]	MZK	250	Elder, Dempster	300, 600	P G ..	X	0.40	—
Falcon	BLT	—	Navy	—	O	—	—	—
Falmouth	BFM	—	Navy	—	O	—	—	—
Faraday [80] [122]	GTP	290	Siemens Bros. & Co.	300, 450, 600	P G ..	X	0.40	—
Fauvette [80]	GTA	90	General Steam Nav. Co.	300, 600	P G ..	X [81]	0.40	—
Fazilka [44]	GDA	200	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Fearless	BHJ	—	Navy	—	O	—	—	—
Ferret	BJL	—	Navy	—	O	—	—	—
Filey [44]	MGY	100	Hull Steam Fishing & Ice Co. ..	300, 600	P	X	0.05 [89]	0.50 [89]
Firedrake	BJM	—	Navy	—	O	—	—	—
Flamenco [44]	GHG	250	Pacific Steam Nav. Co.	300, 600	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Flirt	BUC	—	Navy	—	O	—	—	—
Flora	BFN	—	Navy	—	O	—	—	—
Florizel [44]	MZL	250	Bowring Line	300, 600	P G ..	N	0.40	—
Foresight	BHM	—	Navy	—	O	—	—	—
Forester	BJO	—	Navy	—	O	—	—	—
Forte	BFO	—	Navy	—	O	—	—	—
Forth	BPF	—	Navy	—	O	—	—	—
Fortune	BJP	—	Navy	—	O	—	—	—
Forward BHN	BHN	—	Navy	—	O	—	—	—
Fox	BFP	—	Navy	—	O	—	—	—
Foxhound	BJQ	—	Navy	—	O	—	—	—
Foyle	BJR	—	Navy	—	O	—	—	—
Francis [44]	MDG	250	Booth S.S. Co.	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Francisco "	GHI	250	T. Wilson, Sons & Co.	300, **600**	P G ..	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—
Franconia "	MEA	350	Cunard Line	300, **600**	P G ..	N	0.40	—
Frem na "	GSN	150	Cairn Line	—	—	—	—	—
Fultala "	GDC	200	British India Steam Nav. Co. ..	300, **600**	P G ..	X	0.40	—
Fury	BJS	—	Navy	—	O	—	—	—
Gaika "	MQU	250	Union Castle	300, **600**	P G ..	N	0.40	—
Galatea	BGO	—	Navy	—	O	—	—	—
Galeka "	MQR	250	Union Castle	300, **600**	P G ..	N	0.40	—
Galicia "	GIG	250	Pacific Steam Nav. Co.	300, **600**	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Galileo "	GII	250	T. Wilson, Sons & Co.	300, **600**	P G ..	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—
Galtee More "	GUU	250	London and North-Western Railway Co.	300, **600**,	P G ..	N.	0.40	—
Galway Castle "	MPY	250	Union Castle	300, **600**	P G ..	N	0.40	—
Ganges "	GWJ	115	James Nourse, Ltd.	300, **600**	P G ..	X	0.40	—
Garland	BJT	—	Navy	—	O	—	—	—
Garry	BJU	—	Navy	—	O	—	—	—
Garth Castle "	MQP	250	Union Castle	300, **600**	P G ..	N	0.40	—
Gascon "	MQV	250	Union Castle	300, **600**	P G ..	N	0.40	—
Geelong "	GIJ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G ..	X	0.40	—
Genesee "	MIT	150	Anglo-American Oil Co.	300, **600**	P G ..	X	0.40	—
Georgian MFI "	MFI	250	Wilsons & Furness-Leyland Line	300, **600**	P G ..	X	0.40	—
Georgic "	GDI	250	White Star Line	300, **600**	P G ..	X	0.40	—
Germanic "	GPB	—	White Star Line	300, **600**	P G ..	—	—	—
Ghazee "	GAV	150	Gellatly, Hankey & Co.	300, **600**	P G ..	X	0.40	—
Ghurka	BJV	—	Navy	—	O	—	—	—
Gibraltar	BEO	—	Navy	—	O	—	—	—
Gipsy	BLW	—	Navy	—	O	—	—	—
Glasgow	BFQ	—	Navy	—	O	—	—	—
Glenart Castle "	MQT	250	Union Castle	300, **600**	P G ..	N	0.40	—
Glenartney "	MZS	—	Caledonia S.S. Co...	300, **600**	—	—	—	—
Glenetive "	MEZ	250	Caledonia S.S. Co...	300, **600**	P G ..	N	0.40	—
Glengorm Castle "	MQS	250	Union Castle	300, **600**	P G ..	N	0.40	—
Glengyle "	MUD	200	Glen Line	300, **600**	P G ..	X	0.40	—

Gleniffer [44]	MUE	200	Glen Line	300, 600	P G	X	0.40	—	—
Glenlochy [75]	GWN	120	Glen Line	300, 600	P	X	—	—	—
Glenlogan [44]	MUF	130	Glen Line	300, 600	P G	X	0.40	—	—
Glenroy [44]	MYK	150	Glen Line	300, 600	—	—	—	—	—
Glenshiel [44]	YZC	150	Gairloch S.S. Co.	300, 600	P G	—	0.40	—	—
Glory	BAZ	—	Navy	—	G	—	—	—	—
Gloucester BFR	BFR	—	Navy	—	O	—	—	—	—
Gloucester Castle [44]	MQZ	250	Union Castle	300, 600	P G	X	0.40	—	—
Gloucestershire [44]	MYG	250	Bibby Bros. & Co.	300, 600	P G	X	0.40	—	—
Golconda [44]	MUQ	180	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Goldfinch	BJW	—	Navy	—	O	—	—	—	—
Goldmouth [44]	MZG	150	Anglo-Saxon Petroleum Co.	300, 600	—	—	—	—	—
Goliath BBA	BBA	—	Navy	—	O	—	—	—	—
Goorkha [44]	MQW	250	Union Castle	300, 600	P G	X	0.40	—	—
Goshawk	BJX	—	Navy	—	O	—	—	—	—
Gracchus [44]	GDF	180	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Grafton	BEP	—	Navy	—	O	—	—	—	—
Grampian [44]	MRN	250	Allan Line	300, 600	P G	X	0.40	—	—
Grampus	BUE	—	Navy	—	O	—	—	—	—
Grantully Castle [44]	MQQ	250	Union Castle	300, 600	P G	X	0.40	—	—
Grasshopper	BJY	—	Navy	—	O	—	—	—	—
Great City [44]	MKW	250	R. W. Smith & Sons	300, 600	P G	X	0.40	—	—
Greenore [66]	GUS	250	London & North-Western Railway Co.	300, 600	P G	X	0.05	0.50	—
Gregory Apcar [44]	—	160	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Greyhound	BJZ	—	Navy	—	O	—	—	—	—
Grifion	BMA	—	Navy	—	O	—	—	—	—
Grive [66]	GQI	90	General Steam Nav. Co., Ltd.	300, 600	P G	X	0.40	—	—
Guatemala [44]	MWM	250	Pacific Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Guiana [44]	MBH	200	Quebec S.S. Co.	300, 600	P G	X	0.40	—	—
Guildford Castle [44]	MPZ	250	Union Castle	300, 600	P G	X	0.40	—	—
Gujarat [44]	GBO	250	A. Weir & Co.	300, 600	P G	X	0.40	—	—
Halcyon	BPS	—	Navy	—	O	—	—	—	—
Hampshire	BDR	—	Navy	—	O	—	—	—	—
Hannibal BBC	BBC	—	Navy	—	O	—	—	—	—
Hantonia [44]	GIL	250	London & South Western Railway	300, 600	P G	X	0.15	1.50	—
Hardy	BKA	—	Navy	—	O	—	—	—	—
Harpy	BKB	—	Navy	—	O	—	—	—	—
Harrier	LQY	—	Navy	—	O	—	—	—	—
Hatumet [44]	MGR	150	Hathor S.S. Co.	300, 600	P G	X	0.40	—	—
Haverford [44]	MJH	250	American Line	300, 600	P G	X	0.40	—	—
Hawkes Bay [44]	GAJ	250	Commonwealth and Dominion Line	300, 600	P G	X	0.40	—	—
Hazard	BOW	—	Navy	—	O	—	—	—	—
Hearty	BSE	—	Navy	—	O	—	—	—	—
Hebe	BOX	—	Navy	—	O	—	—	—	—
Hecla	BOS	—	Navy	—	O	—	—	—	—
Henzada [75]	GWD	180	British and Burmese Steam Nav. Co.	300, 600	P G	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.40	—	—
Hercules	BBD	—	Navy	—	O	—	—	—	—
Herefordshire [44]	MYA	250	Bibby Bros. & Co.	300, 600	P G	X	0.40	—	—
Hermione BFT	BFT	—	Navy	—	O	—	—	—	—
Hermione GIN [44]	GIN	250	British & S. American Steam Nav. Co.	300, 600	P G	X	0.40	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
							Francs.	Francs.
Herschel [44]	MUA	180	Lamport & Holt	300, **600**	P G	X	0.40	—
Hesperian [44]	MSN	250	Allan Line	300, **600**	P G	N	0.40	—
Hesperides GIO [44]	GIO	250	British & S. American Steam Nav. Co.	300, **600**	P G	X	0.40	—
Hibernia BBE	BBE	—	Navy	—	O	—	—	—
Hibernia GRW [80]	GRW	170	London & North Western Railway	300, **600**	P G	N	0.05	0.50
Highflyer	BFU	—	Navy	—	O	—	—	—
Highland Brigade [44]	MCZ	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Corrie [44]	GIQ	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Enterprise [44]	MDA	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Glen [44]	GIR	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Harris [44]	MDO	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Heather [44]	MEK	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Laddie [44]	GIU	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Laird [44]	MEP	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Loch [44]	GIY	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Piper [44]	GNM	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Pride [44]	GJA	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Rover [44]	GJB	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Scot [44]	GJC	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Warrior [44]	GJD	250	Nelson Line	300, **600**	P G	X	0.40	—
Highland Watch [44]	MER	250	Nelson Line	300, **600**	P G	X	0.40	—
Hilary [44]	MDP	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Hildebrand MDM [44]	MDM	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Himalaya [44]	MNY	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Hind	BKF	—	Navy	—	O	—	—	—
Hindustan	BBF	—	Navy	—	O	—	—	—
Historian [44]	MHT	250	T. & J. Harrison	300, **600**	P G	X	0.40	—
Holbein [44]	MUB	180	Lamport & Holt	300, **600**	P G	X	0.40	—
Homer City [44]	GAB	160	W. R. Smith & Sons	300, **600**	P G	X	0.40	—
Honorius [44]	GJE	250	British & South American Steam Nav. Co.	300, **600**	P G	X	0.40	—
Hope	BKG	—	Navy	—	O	—	—	—
Hornet BKH	BKH	—	Navy	—	O	—	—	—
Hororata [78]	MRF	250	New Zealand Shipping Co.	300, **600**	P G	X	0.40	—
Huanchaco [44]	GJF	250	Pacific Steam Nav. Co.	300, **600**	P G	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—

Huayna [44]	.. .. ..	MDV	250	Booth S.S. Co.	300, 600	P G ..	X	0.40	—
Hubert [44]	.. .. ..	MVI	250	Booth S.S. Co.	300, 600	P G ..	X	0.40	—
Huntsman [44]	.. .. ..	GLB	250	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Hurunui [70]	.. .. ..	GCQ	250	New Zealand Shipping Co. ..	300, 600	P G ..	X	0.40	—
Hussar	.. .. ..	BPT	—	Navy	—	O	—	—	—
Hyacinth	.. .. ..	BFV	—	Navy	—	O	—	—	—
Hyacinthus [44]	.. .. ..	GJG	250	British & South America Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Hydaspes [44]	.. .. ..	GJH	250	British & South America Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Hydra BKJ	.. .. ..	BKJ	—	Navy	—	O	—	—	—
Hymettus [44]	.. .. ..	GEF	180	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Hypatia [44]	.. .. ..	GJI	250	British & South America Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Iberian [44]	.. .. ..	MHA	250	F. Leyland & Co.	300, 600	P G ..	N	0.40	—
Ibex [80]	.. .. ..	MSC	120	Great Western Railway Co. ..	300, 600	P G ..	N	0.05	0.50
Idaho GJJ [44]	.. .. ..	GJJ	250	T. Wilson, Sons & Co.	300, 600	P G ..	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—
Illustrious	.. .. ..	BBG	—	Navy	—	O	—	—	—
Implacable	.. .. ..	BBH	—	Navy	—	O	—	—	—
Inanda [44]	.. .. ..	MID	250	T. & J. Harrison	300, 600	P G ..	N	0.40	—
Inca [44]	.. .. ..	MIF	250	Pacific Steam Navigation Co. ..	300, 600	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Inconstant	.. .. ..	BGW	—	Navy	—	O	—	—	—
Indefatigable	.. .. ..	BCO	—	Navy	—	O	—	—	—
India [44]	.. .. ..	MMY	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Indian MHB [44]	.. ..	MHB	250	F. Leyland & Co.	300, 600	P G ..	N	0.40	—
Indomitable	.. .. ..	BCP	—	Navy	—	O	—	—	—
Indore [44]	.. .. ..	GMI	250	Gulf Transport Co.	300, 600	P G ..	X	0.40	—
Indra [80]	.. ..	GSZ	175	Indra Line	300, 600	P	9 a.m. to 11 a.m., 9 p.m. to 11 p.m.	—	—
Indrabarah [44]	.. .. ..	MOT	250	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—
Indradeo [80]	.. .. ..	GSY	175	Indra Line	300, 600	P	9 a.m. to 11 a.m., 9 p.m. to 11 p.m.	—	—
Indraghiri [80]	.. .. ..	GQF	175	Indra Line	300, 600	P	9 a.m. to 11 a.m., 9 p.m. to 11 p.m.	—	—
Indrakuala [80]	.. .. ..	GQQ	175	Indra Line	300, 600	P	9 a.m. to 11 a.m., 9 p.m. to 11 p.m.	—	—
Indralema [44]	.. .. ..	MTG	160	Commonwealth and Dom. Line ..	300, 600	P G ..	N	0.40	—
Indrani ..	.. .. ..	GQP	150	Donaldson Line	300, 600	P G ..	—	0.40	—
Indrapura [44]	.. .. ..	GCR	250	Commonwealth and Dom. Line ..	300, 600	P G ..	N	0.40	—
Inflexible	.. .. ..	BCQ	—	Navy	—	O	—	—	—
Ingoma [44]	.. .. ..	GDV	250	T. & J. Harrison	300, 600	P G ..	N	0.40	—
Inkosi [44]	.. .. ..	MIK	250	T. & J. Harrison	300, 600	P G ..	N	0.40	—
Intaba [44]	.. .. ..	MIP	250	T. & J. Harrison	300, 600	P G ..	N	0.40	—
Intrepid	.. .. ..	BPG	—	Navy	—	O	—	—	—
Inventor [44]	.. .. ..	MVY	—	T. & J. Harrison	300, 600	P G ..	—	0.40	—
Invicta [80]	.. .. ..	GUL	50	South Eastern & Chatham Railway	300, 600	P G ..	N	0.15 [50]	1.50 [50]
Invincible	.. .. ..	BCR	—	Navy	—	O	—	—	—
Iona [44]	.. .. ..	GTU	—	Cairn Line	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Ionian "	MIN	250	Allan Line	300, **600**	P G	N	0.40	—
Ionic "	MWI	250	White Star Line	300, **600**	P G	X	0.40	—
Iphigenia	BQT	—	Navy	—	O	—	—	—
Iris [80] [122]	MNI	—	Pacific Cable Board	—		—	—	—
Irishman "	GJK	250	White Star Line	300, **600**	P G	X	0.40	—
Iron Duke	BBI	—	Navy	—	O	—	—	—
Iroquois MEI "	MEI	150	Anglo-American Oil Co.	300, **600**	P G	X	0.40	—
Irrawady [75]	GWH	140	Burmah S.S. Co.	300, **600**	P G	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.40	—
Irresistible	BBJ	—	Navy	—	O	—	—	—
Isis BFW	BFW	—	Navy	—	O	—	—	—
Isis GAP "	GAP	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Islanda "	GFA	160	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Ismaila "	GFB	160	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Italia MAR "	MAR	250	Anchor Line	300, **600**	P G	X	0.40	—
Itaura "	GFC	160	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Itchen	BKK	—	Navy	—	O	—	—	—
Itola "	GFD	160	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Itonus "	GFT	200	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Itria "	GGA	160	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Ivernia "	MIA	250	Cunard Line	300, **600**	P G	X	0.40	—
Invertay "	MAT	250	Law, Leslie & Co.	300, **600**	P G	X	0.40	—
Ixion [80]	GRZ	90	A. Holt & Co.	300, **600**	P G	X	0.40	—
Jabberwock [80] [92]	GNN	10	H. Merton, London	300, 450, **600**	P G	X	0.40	4.00
Jackal	BKM	—	Navy	150, **300**	P	—	—	—
Jacona "	GUW	—	Cairn Line	—	O	—	—	—
Janus "	GHB	180	British India Steam Nav. Co.	—		—	—	—
Japan "	—	170	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Jason BPU	BPU	—	Navy	300, **600**	P G	X	0.40	—
Jed	BKN	—	Navy	—	O	—	—	—
John Pender [80] [122]	MEF	140	Eastern Telegraph Co.	—	O	—	—	—
Jose de Larrinaga "	GAU	250	Miguel de Larrinaga S.S. Co.	300, 450, **600**	P	—	0.40	—
Junin "	GJL	250	Pacific Steam Nav. Co.	300, **600**	P G	X	0.40	—
Juno	BFX	—	Navy	300, **600**	P G	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Jupiter BBK	BBK	—	Navy	—	O	—	—	—
Kabinga "	GEI	150	Ellerman & Bucknall S.S. Co.	—	O	—	—	—
				300, **600**	P G	X	0.40	—

Kafue	MRT	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kaiser-i-Hind	MSI	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—	
Kale	BKO	—	Navy	—	O	—	—	—	
Kalomo	GBY	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kanakuk [82]	GTM	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—	
Kanawha	MNL	250	Furness Withy & Co.	300, 600	P G	X	0.40	—	
Kandahar	MAB	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kangaroo	BMF	—	Navy	—	O	—	—	—	
Kansas MRW	MRW	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kaikoura [79]	MRS	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—	
Karamea	MSB	250	Shaw, Savill & Albion	300, 600	P G	X	0.40	—	
Karema	MAF	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Karina MZJ	MZJ	250	Elder, Dempster	300, 600	P G	X	0.40	—	
Karmala	MTF	200	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—	
Karonga	GEJ	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Karroo	GNS	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kasama	GBP	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kasenga	GEK	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kashgar	YYL	180	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	—	0.40	—	
Kashmir	—	180	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	—	0.40	—	
Kastalia	GPA	150	Donaldson Bros.	300, 600	P G	X	0.40	—	
Katharine Park	GRU	140	Park S.S. Co.	—	—	—	—	—	
Kathiawar	GEM	250	A. Weir & Co.	300, 600	P G	N	0.40	—	
Kathlamba	GLF	150	Ellerman and Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Katuna	GEH	150	Ellerman and Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kazembe	GYQ	150	Ellerman and Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Keelung	MFP	150	Ellerman and Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kelvinbank	GJM	150	J. Black & Co.	300, 600	P G	X	0.40	—	
Kelvinia	MGQ	250	J. Black & Co.	300, 600	P G	X	0.40	—	
Kenilworth Castle	MQF	250	Union Castle	300, 600	P G	N	0.40	—	
Kennet	BKP	—	Navy	—	O	—	—	—	
Kent BDT	BDT	—	Navy	—	O	—	—	—	
Kent MOP [80]	MOP	150	Federal Steam Nav. Co.	300, 600	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m. 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—	
Kentucky GDN	GDN	150	Ellerman and Bucknall S.S. Co.	300, 600	P G	X	0.40	—	
Kenuta	GJO	250	Pacific Steam Nav. Co.	300, 600	P G	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—	
Khiva	MGZ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—	
Khyber	MCE	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—	
Kia Ora	GJP	250	Shaw, Savill & Albion	300, 600	P G	X	0.40	—	
Kildonan Castle	MQK	250	Union Castle	300, 600	P G	N	0.40	—	
Kinfauns Castle	MQL	250	Union Castle	300, 600	P G	N	0.40	—	
King Alfred	BDU	—	Navy	—	O	—	—	—	
King Edward VII.	BBL	—	Navy	—	O	—	—	—	
King George V.	BBM	—	Navy	—	O	—	—	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
King Orry	MPE	100	Isle of Man Steam Packet Co.	300, **600**	P G	N	0.05	0.50
Kingstonian	MHM	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Kinsha	BSG	—	Navy	—	O	—	—	—
Kioto	GEZ	150	Ellerman and Bucknall S.S. Co.	300, **600**	P G	X	0.40	—
Knight Companion	GKS	250	Knight S.S. Co.	300, **600**	P G	X	0.40	—
Knight of the Garter	MSQ	250	Knight S.S. Co.	300, **600**	P G	X	0.40	—
Knight of the Thistle	GMG	250	Knight S.S. Co.	300, **600**	P G	X	0.40	—
Knight Templar	GKT	250	Knight S.S. Co.	300, **600**	P G	X	0.40	—
Knowsley Hall	YYW	—	Hall Line, Ltd.	300, **600**	P G	—	0.40	—
Kohistan [80]	GQK	90	Strick Line	300, **600**	P G	X	0.40	—
Koranna	GYY	150	Ellerman and Bucknall S.S. Co.	300, **600**	P G	X	0.40	—
Korona	MBI	200	Quebec S.S. Co.	300, **600**	P G	N	0.40	—
Kumara	MFG	250	Shaw, Savill & Albion	300, **600**	P G	X	0.40	—
Kumeric	GJQ	250	Andrew Weir & Co.	300, **600**	P G	X	0.40	—
Lackawanna	GJV	150	Anglo-American Oil Co.	300, **600**	P G	X	0.40	—
Laconia	GJS	250	Cunard Line	300, **600**	P G	N	0.40	—
Lady Brassey [80 116]	GQS	90	Dover Harbour Board	150, **300**	P	X	—	—
Lady Crundall [80 116]	GQR	90	Dover Harbour Board	150, **300**	P	X	—	—
Laertes	BMG	—	Navy	—	O	—	—	—
Laforey	BMH	—	Navy	—	O	—	—	—
Lake Manitoba	MLM	150	Canadian Pacific Railway	300, **600**	P G	X	0.40	—
Lake Michigan	MLH	150	Canadian Pacific Railway	300, **600**	P G	X	0.40	—
Lakonia	GPW	—	Donaldson Line	300, **600**	P G	—	—	—
Lama	GJN	140	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Lancaster	BDV	—	Navy	—	O	—	—	—
Lancastrian	MBP	250	F. Leyland & Co.	300, **600**	P G	N	0.40	—
Lance	BMM	—	Navy	—	O	—	—	—
Landrail	BMZ	—	Navy	—	O	—	—	—
Lanfranc	MDS	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Lapland	YYE	150-200	American Line	300, 450, **600**	P G	N	—	—
Lapwing	BKQ	—	Navy	—	O	—	—	—
Lark	BNE	—	Navy	—	O	—	—	—
Larne	BKR	—	Navy	—	O	—	—	—
Latona	BQU	—	Navy	—	O	—	—	—
Laurel	BNM	—	Navy	—	O	—	—	—
Laurentic	MIC	250	White Star Line	300, **600**	P G	N	0.40	—
Laverock	BNP	—	Navy	—	O	—	—	—
Lawford	BOJ	—	Navy	—	O	—	—	—
Leander	BOT	—	Navy	—	O	—	—	—

Leda BPV	BPV	—	Navy	—	O	—	—	—	—
Legion	BQJ	—	Navy	—	O	—	—	—	—
Leicestershire [44]	MYL	250	Bibby Bros. & Co.	300, 600	P G	X	0.40	—	—
Leinster [44]	MCV	140	City of Dublin Steam Packet Co.	300, 600	P G	N	0.05	0.50	—
Lennox	BQZ	—	Navy	—	O	—	—	—	—
Leonidas BRA	BRA	—	Navy	—	O	—	—	—	—
Leopard	BRB	—	Navy	—	O	—	—	—	—
Letitia [44]	GKA	250	Donaldson Bros.	300, 600	P G	N	0.40	—	—
Levant II [80 122]	GJY	110	Eastern Telegraph Co.	300, 450, 600	P	—	0.40	—	—
Leviathan	BDW	—	Navy	—	O	—	—	—	—
Lhasa [44]	GKF	140	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Liberty	BRC	—	Navy	—	O	—	—	—	—
Liffey	BKS	—	Navy	—	O	—	—	—	—
Limerick [79]	MVM	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—	—
Linga [44]	GLJ	140	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Linnet BRD	BRD	—	Navy	—	O	—	—	—	—
Linnet MKI [80]	MKI	150	Liverpool Salvage Association	300, 600	P	X	0.05[89]	0.50[89]	—
Lion	BCS	—	Navy	—	O	—	—	—	—
Lively	BRE	—	Navy	—	O	—	—	—	—
Liverpool	BFV	—	Navy	—	O	—	—	—	—
Lizard	BKT	—	Navy	—	O	—	—	—	—
Llandovery Castle [44]	MCO	250	Union Castle	300, 600	P G	N	0.40	—	—
Llanstephan Castle [44]	MJT	250	Union Castle	300, 600	P G	N	0.40	—	—
Llewellyn	BRF	—	Navy	—	O	—	—	—	—
Locust	BRG	—	Navy	—	O	—	—	—	—
London	BBN	—	Navy	—	O	—	—	—	—
Londonderry [80]	GPR	150	Midland Railway Co.	300, 400, 600 [46]	P R [49]	N	0.05	0.50	—
Lookout	BRH	—	Navy	—	O	—	—	—	—
Lord Nelson	BBO	—	Navy	—	O	—	—	—	—
Louis	BRI	—	Navy	—	O	—	—	—	—
Lowestoft	BFZ	—	Navy	—	O	—	—	—	—
Loyal	BRJ	—	Navy	—	O	—	—	—	—
Luceric [44]	GJZ	250	Andrew Weir & Co.	300, 600	P G	N	0.40	—	—
Lucifer	BRK	—	Navy	—	O	—	—	—	—
Lunka [44]	GLM	140	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Lurcher	BKU	—	Navy	—	O	—	—	—	—
Lusitania [46]	MFA	250	Cunard Line	110, 300, 600	P G	N	0.40	—	—
Lydiard	BRL	—	Navy	—	O	—	—	—	—
Lynx BKV	BKV	—	Navy	—	O	—	—	—	—
Lyra BKW	BKW	—	Navy	—	O	—	—	—	—
Lysander	BRM	—	Navy	—	O	—	—	—	—
Macedonia MML [44]	MML	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Mackay-Bennett [80 122]	MMB	250	Commercial Cable Co.	300, 600	P	X	—	—	—
Madras [44]	MSH	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—	—
Magdalena [44]	GUC	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—	—
Magellan MIH [44]	MIH	250	Pacific Steam Navigation Co.	300, 600	P G	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—	—
Magnet MEH [49 122]	MEH	140	Eastern Extension Australasian & China Telegraph Co.	300, 600	P	—	0.40	—	—
Magnificent	BBP	—	Navy	—	O	—	—	—	—
Mahanada [75]	GVJ	130	T. & J. Brocklebank, Ltd.	300, 600	P G	X	—	—	—
Maidan [76]	GVN	130	T. & J. Brocklebank, Ltd.	300, 600	P G	X	—	—	—
Maidstone	BOY	—	Navy	—	O	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Maine BQK	BQK	—	Navy	—	O	—	—	—
Majestic BBQ	BBQ	—	Navy	—	O	—	—	—
Makarini [44]	GKB	250	Commonwealth and Dominion Line	300, **600**	P G	X	0.40	—
Malakuta [78]	GVI	130	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	—	—
Malda [44]	GIS	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Maloja [44]	MKM	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Malta [44]	GKD	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Malwa [44]	MMD	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Mamari [44]	GKE	250	Shaw, Savill & Albion	300, **600**	P G	X	0.40	—
Manchester City [44]	GKH	250	Manchester Liners, Ltd.	300, **600**	P G	7 a.m. to 11 p.m.	0.40	—
Manchester Corporation [44]	YYB	140	Manchester Liners, Ltd.	300, **600**	P G	—	0.40	—
Mandalay [76]	GWP	180	British and Burmese Steam Nav. Co.	300, **600**	P G	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.40	—
Manhattan [44]	GKK	250	National S.S. Co.	300, **600**	P G	N	0.40	—
Manistee [44]	MLR	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
Manitou MNM [44]	MNM	250	Atlantic Transport Line	300, **600**	P G	N	0.40	—
Manly	BUF	—	Navy	—	O	—	—	—
Manora [44]	GIT	250	British India Steam Nav. Co	300, **600**	P G	X	0.40	—
Mansfield	BUG	—	Navy	—	O	—	—	—
Mantua [44]	MME	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40 [48]	— [48]
Manxman GDZ [44]	GDZ	250	Dominion Line	300, **600**	P G	X	0.40	—
Manxman GPS [88]	GPS	150	Midland Railway Co.	300, 400, **600**	P G	N	0.05	—
Manzanares [44]	MLS	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
Maori BKX	BKX	—	Navy	—	O	—	—	—
Marathon [44]	MGJ	250	Aberdeen Line	300, **600**	P G	X	0.40	—
Marengo [44]	GKJ	250	T. Wilson Sons & Co.	300, **600**	P G	8 a.m. to 1 p.m., 2 p.m. to 5 p.m., 6 p.m. to 10 p.m.	0.40	—
Marere [44]	MBU	250	Commonwealth and Dom. Line	300, **600**	P G	X	0.40	—
Marguerite (La) [44]	GJU	250	Liverpool & North Wales S.S. Co.	300, **600**	P G	N	0.05	0.50
Marina [44]	MNK	250	Donaldson Bros.	300, **600**	P G	X	0.40	—
Marlborough	BBR	—	Navy	—	O	—	—	—
Marmora [44]	MMR	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—

Marquette [44]	MNQ	250	Atlantic Transport Line	300, 600	P G	N	0.40	—		
Mars BBS	BBS	—	Navy	—	O	—	—	—		
Martaban [78]	GWC	140	British and Burmese Steam Nav. Co.	300, 600	F G	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.40	—		
Martin	BKY	—	Navy	—	O	—	—	—		
Maryland MBW [44]	MBW	250	Atlantic Transport Line	300, 600	P G	X	0.40	—		
Mary Park	GRH	140	Park S.S. Co.	—		—	—	—		
Masconomo [93]	GTR	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—		
Mashobra [44]	GMS	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—		
Mashona [44]	GEY	150	Ellerman and Bucknall S.S. Co.	300, 600	P G	X	0.40	—		
Massasoit [93]	GTB	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—		
Massilia [44]	MHQ	250	Anchor Line	300, 600	P G	X	0.40	—		
Mastiff	BUI	—	Navy	—	O	—	—	—		
Matatua [44]	GKL	250	Shaw, Savill & Albion	300, 600	P G	X	0.40	—		
Matchless	BUJ	—	Navy	—	O	—	—	—		
Matheran [75]	GVO	130	T. & J. Brocklebank, Ltd.	300, 600	P G	X	—	—		
Matiana [44]	MYZ	200	British India Steam Nav. Co.	300, 600	P G	X	0.40	—		
Matina [44]	MLT	150	Elders & Fyffes	300, 600	P G	X	0.40	—		
Matoppo [44]	MAM	150	Ellerman and Bucknall S.S. Co.	300, 600	P G	X	0.40	—		
Matura [44]	GYD	250	Trinidad Shipping & Trading Co.	300, 600	P G	N	0.40	—		
Mauretania [44]	MGA	250	Cunard Line	110, 300, 600	P G	N	0.40	—		
Mayaro [44]	MFR	250	Trinidad Shipping & Trading Co.	300, 600	P G	N	0.40	—		
Mechanician [44]	GCG	250	T. & J. Harrison	300, 600	P G	X	0.40	—		
Medic [44]	MKK	250	White Star Line	300, 600	P G	X	0.40	—		
Medina [44]	MKP	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—		
Megantic [44]	MZC	250	White Star Line	300, 600	P G	N	0.40	—		
Mekong [78]	GSV	270	V. Morton-Jackson, Clonmel, Ireland	300, 450, 600	P	—	—	—		
Melania [44]	MPP	250	Anglo-Saxon Petroleum Co.	300, 600	P G	X	0.40	—		
Melford Hall [44]	GEQ	150	Ellerman Lines	300, 600	P G	X	0.40	—		
Mendi [44]	MZM	250	Elder, Dempster	300, 600	P G	X	0.40	—		
Menominee [44]	MNE	250	Atlantic Transport Line	300, 600	P G	N	0.40	—		
Mentor	BUL	—	Navy	—	O	—	—	—		
Mercedes BQN	BQN	—	Navy	—	O	—	—	—		
Merion [44]	MJM	250	American Line	300, 600	P G	N	0.40	—		
Merkara [44]	GMY	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—		
Mermaid	BKZ	—	Navy	—	O	—	—	—		
Mersey [24] [88]	MWJ	135	White Star Line	300, 600	P G	X	0.40	—		
Mesaba [44]	MMV	250	Atlantic Transport Line	300, 600	P G	N	0.40	—		
Meteor BRN	BRN	—	Navy	—	O	—	—	—		
Mexico MWG [44]	MWG	250	Pacific Steam Nav. Co.	300, 600	P G	N	0.40	—		
Miami MLU [44]	MLU	150	Elders & Fyffes	300, 600	P G	X	0.40	—		
Michael [76]	GWV	225	Booth S.S. Co.	300, 600	P G	X	0.40	—		
Michigan GKM [44]	GKM	250	National S.S. Co.	300, 600	P G	N	0.40	—		
Michigan MOG [44]	MOG	250	White Diamond S.S. Co.	300, 600	P G	X	0.40	—		
Middlesex [40]	MRE	250	Federal Steam Nav. Co.	300, 600	P G	X	0.40	—		
Midge	BLA	—	Navy	—	O	—	—	—		
Milne	BUM	—	Navy	—	O	—	—	—		
Miltiades [44]	MGF	250	Aberdeen Line	300, 600	P G	X	0.40	—		
Milwaukee MLF	MLF	150	Canadian Pacific Railway Co.	300, 600	P G	X	0.40	—		
Mimiro [44]	MKH	250	Commonwealth and Dom. Line	300, 600	P G	X	0.40	—		
Minerva BGB	BGB	—	Navy	—	O	—	—	—		

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Minia [80] [122]	GUQ	150	Anglo-American Telegraph Co.	300, **600**	P	X	—	—
Minneapolis MMN [44]	MMN	250	Atlantic Transport Line	300, **600**	P G	N	0.40	—
Minnehaha [44]	MMA	250	Atlantic Transport Line	300, **600**	P G	N	0.40	—
Minnetonka [44]	MMK	250	Atlantic Transport Line	300, **600**	P G	N	0.40	—
Minnewaska [44]	MMW	250	Atlantic Transport Line	300, **600**	P G	N	0.40	—
Minnie de Larrinaga [44]	MLA	250	Miguel de Larrinaga S.S. Co.	300, **600**	P G	X	0.40	—
Minos	BUN	—	Navy	—	O	—	—	—
Minotaur	BDX	—	Navy	—	O	—	—	—
Minstrel	BLB	—	Navy	—	O	—	—	—
Miranda	BRO	—	Navy	—	O	—	—	—
Missanabi [44]	MZQ	220	Canadian Pacific Railway	300, **600**	P G	N	0.40	—
Mississippi GRI [44]	GRI	180	Atlantic Transport Co.	300, **600**	P G	—	0.40	—
Missouri MLG [44]	MLG	250	Atlantic Transport Co.	300, **600**	P G	X	0.40	—
Mitra [44]	MZH	150	Anglo-Saxon Petroleum Co.	—	—	—	—	—
Mohawk BLC	BLC	—	Navy	—	O	—	—	—
Moldavia [44]	MMH	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Mombassa [44]	MWS	220	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Monarch BBT	BBT	—	Navy	—	O	—	—	—
Monarch GTS [44] [122]	GTS	100	General Post Office	300	—[88]	—	—	—
Mongara [44]	MSF	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Mongolia MMJ [44]	MMJ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Mongolian [44]	MON	250	Allan Line	300, **600**	P G	N	0.40	—
Monmouth [44]	MGV	150	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—
Monmouthshire [44]	GAM	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Montcalm MLZ [44]	MLZ	150	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—
Monteagle [44]	MPF	250	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—
Montezuma [44]	MLK	150	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—
Monttort [44]	MLW	150	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—
Montreal MLI [44]	MLI	150	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—
Mooltan [44]	MMM	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Moorhen	BSH	—	Navy	—	O	—	—	—
Moorish Prince [44]	YYK	—	Prince Line	300, **600**	P G	—	0.40	—
Morayshire [80]	GWS	220	Scottish Shire Line	300, **600**	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—

Morvada [44]	MUP	200	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Morea [44]	MMF	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Morris	BUQ	—	Navy	—	O	—	—	—
Mosquito	BLD	—	Navy	—	O	—	—	—
Motagua [44]	MPN	250	Elders & Fyffes	300, 600	P G	X	0.40	—
Mount Royal [44]	MLO	150	Canadian Pacific Railway Co.	300, 600	P G	X	0.40	—
Mount Temple [44]	MLQ	150	Canadian Pacific Railway Co.	300, 600	P G	X	0.40	—
Moy	BLE	—	Navy	—	O	—	—	—
Moyune [44]	YVO	—	A. Holt & Co.	300, 600	P G	—	0.40	—
Munich [80]	GPJ	130	Great Eastern Railway	300, 450, 600 [45]	P R [47]	N	0.10	1.00
Munster [44]	MCQ	140	City of Dublin Steam Packet Co.	300, 600	P G	N	0.05	0.50
Muritai [44]	MKF	250	Commonwealth and Dom. Line	300, 600	P G	X	0.40	—
Murray	BUR	—	Navy	—	O	—	—	—
Musician [44]	MAD	250	T. & J. Harrison	300, 600	P G	X	0.40	—
Mutlah [44]	MOA	150	J. Nourse, Ltd.	300, 600	P G	X	0.40	—
Muttra [44]	GMJ	170	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Myngs	BUS	—	Navy	—	O	—	—	—
Myrmidon	BUD	—	Navy	—	O	—	—	—
Nagoya [44]	GCD	259	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Naiad	BPH	—	Navy	—	O	—	—	—
Nairnshire [80]	GWR	—	Scottish Shire Line	300, 600	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Namur [44]	GKN	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Naneric [44]	GKO	250	Andrew Weir & Co.	300, 600	P G	N	0.40	—
Nankin [44]	GKP	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Narragansett	MEC	150	Anglo-American Oil Co.	300, 600	P G	X	0.40	—
Narrung [44]	GKQ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	N	0.40	—
Natal BDZ	BDZ	—	Navy	—	O	—	—	—
Natica [44]	MZN	150	Anglo-Saxon Petroleum Co.	—		—	—	—
Navahoe [24]	MEN	150	Anglo-American Oil Co.	300, 600	P G	X	0.40	—
Negra (La) [44]	MTI	250	British & Argentine Steam Nav. Co.	300, 600	P G	X	0.40	—
Nellore [44]	MEW	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Nemesis BLG	BLG	—	Navy	—	O	—	—	—
Nemesis MSM [80]	MSM	150	Lindsay Swan Hunter, Ltd.	300, 600	P	X	—	—
Neptune BBU	BBU	—	Navy	—	O	—	—	—
Nerehana [44]	MCB	250	Commonwealth and Dom. Line	300, 600	P G	X	0.40	—
Nereide	BLH	—	Navy	—	O	—	—	—
Ness	BLI	—	Navy	—	O	—	—	—
Nessian [44]	GPV	—	F. Leyland & Co.	300, 600	P G	X	0.40	—
Nestor [44]	GBQ	250	A. Holt & Co.	300, 600	P G	X	0.40	—
Neuralia [44]	GCV	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Nevasa [44]	GBG	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Newcastle	BGC	—	Navy	—	O	—	—	—
New Londoner [44]	MDQ	150	Tyne & Tees S.S. Co.	300, 600	P G	N	0.15	0.90
New Zealand	BCT	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Niagara GBE [81]	GBE	250	Union S.S. Co. of New Zealand	300, **600**	P G	N	0.40	—
Nigeria [44]	MZF	250	Elder, Dempster	300, **600**	P G	X	0.40	—
Nightingale	BSI	—	Navy	—	O	—	—	—
Nirvana [44]	MZW	250	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Nith	BLJ	—	Navy	—	O	—	—	—
Niwaru [44]	MJD	250	Commonwealth and Dom. Line	300, **600**	P G	X	0.40	—
Nore [44]	GKV	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Norfolk GVK [94]	GVK	250	Potter, Trinder & Gwyn	300, **600**	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Norman [44]	MOM	250	Union Castle	300, **600**	P G	X	0.40	—
Normannia GKW [44]	GKW	250	London & South Western Railway	300, **600**	P G	N	0.15	1.50
Norseman MEG [80 122]	MEG	140	Western Telegraph Co.	300, **600**	P	—	—	—
Norseman MGH [44]	MGH	250	Aberdeen Line	300, **600**	P G	N	0.40	—
North Point [44]	GIW	250	Norfolk & North American S.S. Co.	300, **600**	P G	X	0.40	—
North Western Miller [44]	MTV	170	Norfolk & North American S.S.Co.	300, **600**	P G	X	0.40	—
Nottingham	BGD	—	Navy	—	O	—	—	—
Novara GCW [44]	GCW	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Nubia [44]	GKZ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Nubian	BLK	—	Navy	—	O	—	—	—
Nyanza [44]	GKY	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Nymphe BLL	BLL	—	Navy	—	O	—	—	—
Oak	BLM	—	Navy	—	O	—	—	—
Oanfa	—	180	A. Holt & Co.	300, **600**	P G	—	—	—
Obra [44]	GML	170	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Obuasi [44]	MDD	150	British and African Steam Nav. Co.	300, **600**	P G	X	0.40	—
Ocean	BBV	—	Navy	—	O	—	—	—
Odin BQE	BQE	—	Navy	—	O	—	—	—
Okara [44]	GMW	170	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Okhla [44]	GNJ	170	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Olympia BQO	BQO	—	Navy	—	O	—	—	—
Olympia MHI [44]	MHI	250	Anchor Line	300, **600**	P G	X	0.40	—
Olympic [44]	MKC	350	White Star Line	300, **600**	P G	N	0.40	—
Omrah [44]	MOK	250	Orient Steam Nav. Co.	300, **600**	P G	X	0.40	—

Onda [44]	GNL	160	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Oneka [99]	GTV	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—
Onward [80]	GUM	50	South Eastern & Chatham Railway	300, 600	P G	N	0.15 [80]	1.50 [80]
Oolabaria [44]	GNU	160	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Opawa [70]	MRG	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Orama [44]	MTW	250	Orient Steam Nav. Co.	300, 600	P G	X	0.40	—
Orari [70]	MRM	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Orbita [44]	MGI	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Orca [44]	MGO	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Orcadian [44]	GQH	150	Donaldson Line	300, 600	P G	X	0.40	—
Orcoma [44]	MJF	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Orduna [44]	MGP	250	Pacific Steam Navigation Co	300, 600	P G	N	0.40	—
Oriana [44]	MJJ	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Oriental [40]	GLA	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Orion BBW	BBW	—	Navy	—	O	—	—	—
Orissa GNW [44]	GNW	160	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Orissa MJE [44]	MJE	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Orita [44]	MJG	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Ormara [44]	MVD	220	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Orna [44]	GNY	160	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Oronsa [44]	MJI	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Orontes [44]	MOZ	250	Orient Steam Nav. Co.	300, 600	P G	X	0.40	—
Oropesa [44]	MJA	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Orotava [44]	GUD	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Orsova [44]	MOF	250	Orient Steam Nav. Co.	300, 600	P G	X	0.40	—
Ortega [44]	MJK	250	Pacific Steam Navigation Co.	300, 600	P G	N	0.40	—
Orteric [44]	GLE	250	Andrew Weir & Co.	300, 600	P G	N	0.40	—
Orthia [44]	YVT	—	Donaldson Bros	300, 600	P G	—	0.40	—
Ortolan [80]	GQM	90	General Steam Nav. Co.	300, 600	P G	X	0.40	—
Oruba [44]	GUE	250	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Orvieto [44]	MOJ	250	Orient Steam Nav. Co.	300, 600	P G	X	0.40	—
Orwell	BRP	—	Navy	—	O	—	—	—
Osiris GAQ [44]	GAQ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—
Oslo [44]	MWO	250	T. Wilson, Sons & Co.	300, 600	P G	8 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15 [74]	0.90 [74]
Osprey	BRQ	—	Navy	—	O	—	—	—
Osterley [44]	MOY	250	Orient Steam Nav. Co.	300, 600	P G	X	0.40	—
Otaki [70]	MRP	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Otranto [44]	MOD	250	Orient Steam Nav. Co.	300, 600	P G	X	0.40	—
Ottawa [44]	MIV	150	Anglo-American Oil Co.	300, 600	P G	X	0.40	—
Otway [44]	MOH	250	Orient Steam Nav. Co.	300, 600	P G	X	0.40	—
Ouse	BLO	—	Navy	—	O	—	—	—
Owl	BLP	—	Navy	—	O	—	—	—
Oxfordshire [44]	MYE	250	Bibby Bros & Co.	300, 600	P G	X	0.40	—
Oxonian [44]	MHR	250	F. Leyland & Co.	300, 600	P G	N	0.40	—
Ozarda [44]	GNZ	140	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Pactolus	BOZ	—	Navy	—	O	—	—	—
Pacuare [44]	MLY	150	Elders & Fyffes	300, 600	P G	X	0.40	—
Pakeha [44]	GLG	250	Shaw, Savill & Albion	300, 600	P G	X	0.40	—
Palermo MIL [44]	MIL	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*								
							Francs.	Francs.
Palma [44]	MKD	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G ..	X	0.40	—
Panama MWB [44]	MWB	250	Pacific Steam Nav. Co.	300, **600**	P G ..	N	0.40	—
Pancras [44]	MDI	250	Booth S.S. Co.	300, **600**	P G ..	X	0.40	—
Pannonia [44]	MNA	250	Cunard Line	300, **600**	P G ..	N	0.40	—
Panther BLQ	BLQ	—	Navy	—	O	—	—	—
Paparoa [78]	MHY	250	New Zealand S.S. Co.	300, **600**	P G ..	X	0.40	—
Paragon	BLR	—	Navy	—	O	—	—	—
Paraguayo (El) [44]	GGY	250	Houlder Line	300, **600**	P G ..	X	0.40	—
Parana GLK [44]	GLK	150	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Pardo [44]	GLL	150	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Parima [44]	MBK	200	Quebec S.S. Co.	300, **600**	P G ..	N	0.40	—
Paris GLC [80]	GLC	120	L.B. & S.C. Railway Co.	300, **600**	P G ..	N	0.15 [80]	1.50 [80]
Parthenia [44]	MNS	250	Donaldson Bros.	300, **600**	P G ..	X	0.40	—
Patella [44]	MZO	150	Anglo-Saxon Petroleum Co. ..	—	—	—	—	—
Pathan [44]	MPV	150	Gellatly, Hankey & Co.	300, **600**	P G ..	X	0.40	—
Patia [44]	MVW	250	Elders & Fyffes	300, **600**	P G ..	X	0.40	—
Patrician [44]	MIR	250	T. & J. Harrison	300, **600**	P G ..	X	0.40	—
Patrol BHP	BHP	—	Navy	—	O	—	—	—
Patrol MEM [80] [122]	MEM	140	Eastern Extension Australasia China Tel. Co.	300, **600**	P	—	0.40	—
Patuca [44]	GDB	250	Elders & Fyffes	300, **600**	P G ..	X	0.40	—
Pectan [44]	MAS	300	Pectan S.S. Co.	300, **600**	P	X	0.40	—
Pegu [75]	GWM	180	British & Burmese Steam Nav. Co.	300, **600**	P G ..	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m. to 12 p.m.	0.40	—
Pelorus	BGT	—	Navy	—	O	—	—	—
Pembrokeshire [44]	MUT	170	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Penelope	BJA	—	Navy	—	O	—	—	—
Pera [44]	MGB	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G ..	X	0.40	—
Peregrine [80]	GST	90	General Steam Nav. Co.	300, **600**	P G ..	X	0.40	—
Perseus	BGU	—	Navy	—	O	—	—	—
Persia MVF [44]	MVF	—	Persia S.S. Co., Chartered by Pacific Mail S.S. Co.	300, **600**	P G ..	N	0.40	—
Persia MMQ [44]	MMQ	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G ..	N	0.40	—
Persic [44]	MQC	250	White Star Line	300, **600**	P G ..	X	0.40	—

		300, 450, 600	P G ..	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m to 1 a.m.	0.40	—
Peru GLN[44]	GLN	250	Pacific Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Perugia [44]	MAW	250	Anchor Line	300, 600	P G ..	N	0.40	—
Peshawur [44]	MIQ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Peterel	BRR	—	Navy	—	O	—	—	—
Petroleum	BQM	—	Navy	—	O	—	—	—
Phaeton	BJF	—	Navy	—	O	—	—	—
Philadelphian [44]	MNW	250	F. Leyland & Co.	300, 600	P G ..	N	0.40	—
Philomel	BGV	—	Navy	—	O	—	—	—
Phœnix	BLS	—	Navy	—	O	—	—	—
Pincher	BLU	—	Navy	—	O	—	—	—
Plassy [44]	MNJ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Poleric [44]	GCY	250	Andrew Weir & Co.	300, 600	P G ..	N	0.40	—
Politician [44]	MVZ	180	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Pomeranian [44]	GLO	250	Allan Line	300, 600	P G ..	N	0.40	—
Pomone	BJN	—	Navy	—	O	—	—	—
Ponus [93]	GTT	125	Tank Storage & Carriage Co. ..	300, 600	P	X	—	—
Poona [44]	MSO	250	Peninsular & Oriental Steam Nav. Co.	300. 600	P G ..	X	0.40	—
Porpoise	BLV	—	Navy	—	O	—	—	—
Port Albany [80]	GWI	260	Commonwealth and Dom. Line ..	300, 600	P G ..	X	0.40	—
Port Curtis [76]	GWZ	260	Commonwealth and Dom. Line ..	300, 600	P G ..	X	0.40	—
Port Kembla [75]	GWF	260	Commonwealth and Dom. Line ..	300, 600	P G ..	X	0.40	—
Port Lincoln [80]	GTZ	260	W. Milburn & Co.	300, 600	P G ..	N	0.40	—
Port Macquarrie [80]	GSB	260	Anglo Australasian Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Portuguese Prince [44]	GRS	—	Prince Line, Ltd.	—	— ..	—	—	—
Potomac GLQ [41]	GLQ	150	Anglo-American Oil Co.	300, 600	P G ..	X	0.40	—
Potosi [44]	MII	250	Pacific Steam Navigation Co. ..	300. 600	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Powhatan GTW [92]	GTW	125	Tank Storage & Carriage Co. ..	300, 600	P	X	—	—
Pretorian [44]	MFN	250	Allan Line	300, 600	P G ..	N	0.40	—
Prince George BBX	BBX	—	Navy	—	O	—	—	—
Prince George GLR [80] ..	GLR	150	Grand Trunk	300, 600	P G ..	N	0.40	4.00
Prince of Wales	BBY	—	Navy	—	O	—	—	—
Prince Rupert [80]	GLS	150	Grand Trunk	300, 600	P G ..	N	0.40	4.00
Princess Royal BCU	BCU	—	Navy	—	O	—	—	—
Princess Victoria [44]	MCM	250	Canadian Pacific Railway ..	300, 600	P G ..	N	0.40 [85]	4.00 [85]
Principello [44]	MBL	250	Uranium S.S. Co.	300, 600	P G ..	N	0.40	—
Proserpine	BGY	—	Navy	—	O	—	—	—
Protesilaus [80]	GSC	90	A. Holt & Co.	300, 450, 600	P G ..	X	0.40	4.00
Psyche	BGZ	—	Navy	—	O	—	—	—
Pyramus	BHA	—	Navy	—	O	—	—	—
Quail	BRS	—	Navy	—	O	—	—	—
Queda [44]	GOA	140	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Queen BBZ	BBZ	—	Navy	—	O	—	—	—
Queen Elizabeth	BCA	—	Navy	—	O	—	—	—
Queen GUN (The) [80]	GUN	50	South Eastern & Chatham Railway	300, 600	P G ..	N	0.15 [50]	1.50 [50]
Queen Mary	BCV	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Querimba [44]	GOB	140	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Quernmore [44]	GYT	250	W. Johnston & Co.	300, **600**	P G	X	0.40	—
Quillota [44]	MWK	250	Pacific Steam Nav. Co.	300, **600**	P G	N	0.40	—
Quiloa [44]	GOC	140	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Quilpue [44]	GLT	250	Pacific Steam Nav. Co.	300, **600**	P G	N	0.40	—
Racehorse	BLX	—	Navy	—	O	—	—	—
Racoon	BLY	—	Navy	—	O	—	—	—
Raeburn [44]	MES	160	Lamport & Holt	300, **600**	P G	X	0.40	—
Rakaia [79]	MRO	250	New Zealand Shipping Co.	300, **600**	P G	X	0.40	—
Ramos [80] [122]	GLU	140	Amazon Telegraph Co.	300, **600**	P	—	—	—
Ranella [44]	MZP	150	Anglo-Saxon Petroleum Co.	—	—	—	—	—
Rangatira [44]	GLW	250	Shaw, Savill & Albion	300, **600**	P G	X	0.40	—
Ranger MLD [80]	MLD	150	Liverpool Salvage Association	300, **600**	P	X	0.05[89]	0.50[89]
Raphael [44]	MET	140	Lamport & Holt	300, **600**	P G	X	0.40	—
Rappahannock [44]	MNO	250	Furness, Withy & Co.	300, **600**	P G	X	0.40	—
Rathmore [80]	GUT	250	London & North Western Railway Co.	300, **600**	P G	N	0.05	0.50
Rattlesnake	BLZ	—	Navy	—	O	—	—	—
Recorder [80] [122]	MEJ	140	Eastern Extension Australasia & China Telegraph Co.	300, **600**	P	—	0.40	—
Redpole	BMB	—	Navy	—	O	—	—	—
Reindeer [80]	MSD	120	Great Western Railway Co.	300, **600**	P G	N	0.05	0.50
Rembrandt MEU [44]	MEU	250	Lamport & Holt	300, **600**	P G	X	0.40	—
Remuera [79]	MKV	250	New Zealand Shipping Co.	300, **600**	P G	X	0.40	—
Renard	BMC	—	Navy	—	O	—	—	—
Restitution [80]	GSE	130	Southern Whaling & Sealing Co.	300, **600**	P	X	—	—
Restorer [80] [122]	GMA	350	Commercial Pacific Cable Co.	300, **600**	P	—	0.40	—
Reventazon [44]	MMI	150	Elders & Fyffes	300, **600**	P G	X	0.40	—
Rewa [93]	MQB	250	British India Steam Nav. Co.	300, **600**	P G	N	0.40	—
Ribble	BMD	—	Navy	—	O	—	—	—
Ricardo a Mestres [44]	MTB	160	Ricardo a Mestres, Ltd.	300, **600**	P G	X	0.40	—
Rifleman	BME	—	Navy	—	O	—	—	—
Rimouski [44]	GIZ	—	White Star Line	—	—	—	—	—
Rimutaka [79]	MBT	250	New Zealand Shipping Co.	300, **600**	P G	X	0.40	—
Riviera [80]	GUO	50	South Eastern & Chatham Railway	300, **600**	P G	N	0.15	1.50
Robin	BSJ	—	Navy	—	O	—	—	—
Roebuck [80]	MRU	120	Great Western Rly.	300, **600**	P G	N	0.05	0.50

				Co.							
Rosario BQV		BQV	—	Navy	—	O		—	—	—	
Roscommon [80]		GZZ	220	New Zealand Shipping Co.	300, 450, 600	P G		X	0.40	—	
Roseric [44]		GLY	250	Andrew Weir & Co.	300, 600	P G		N	0.40	—	
Rossetti [44]		MEY	160	Lamport & Holt	300, 600	P G		X	0.40	—	
Rother		BMI	—	Navy	—	O		—	—	—	
Rotorua [79]		MKE	250	New Zealand Shipping Co.	300, 600	P G		X	0.40	—	
Rowanmore [44]		GAS	250	W. Johnstone & Co.	300, 600	P G		X	0.40	—	
Rovenska [73]		GWB	180	Gustavus H. F. Pratt	300, 600	P		X	—	—	
Roxburgh		BEA	—	Navy	—	O		—	—	—	
Royal Arthur		BER	—	Navy	—	O		—	—	—	
Royalist		BKC	—	Navy	—	O		—	—	—	
Royston Grange [44]		GLZ	250	Houlder Line	300, 600	P G		X	0.40	—	
Ruahine [79]		MKA	250	New Zealand Shipping Co.	300, 600	P G		X	0.40	—	
Ruapehu [79]		MKB	250	New Zealand Shipping Co.	300, 600	P G		X	0.40	—	
Ruby		BMJ	—	Navy	—	O		—	—	—	
Rufford Hall [44]		MUY	135	Ellerman Lines	300, 600	P G		X	0.40	—	
Runic [44]		MWC	250	White Star Line	300, 600	P G		X	0.40	—	
Russell		BCC	—	Navy	—	O		—	—	—	
Ruthenia [44]		MLN	150	Canadian Pacific Railway	300, 600	P G		X	0.40	—	
Sablei [17]		MTZ	150	F. A. Farquhar	300, 600	P G		X	0.40	—	
Sachem [44]		MOL	250	White Diamond S.S. Co.	300, 600	P G		X	0.40	—	
Sagamore [44]		MPT	250	White Diamond S.S. Co.	300, 600	P G		X	0.40	—	
St. Andrew [80]		GYJ	120	Fishguard & Rosslare Railways & Harbours Co.	300, 600	P G		N	0.05	0.50	
St. David [80]		GYL	120	Fishguard & Rosslare Railways & Harbours Co.	300, 600	P G		N	0.05	0.50	
St. George BOU		BOU	—	Navy	—	O		—	—	—	
St. George GIB [44]		GIB	150	Canadian Pacific Railway	300, 600	P G		N	0.40	—	
St. Patrick [80]		GYM	120	Fishguard & Rosslare Railways & Harbours Co.	300, 600	P G		N	0.05	0.50	
St. Petersburg [80]		GPK	130	Great Eastern Railway	300, 450, 600 [45]	P R [47]		N	0.10	1.00	
S.. Tudno [80]		GNR	80	MacIver S.S. Co.	300, 600	P R		X	0.10	1.00	
St. Vincent		BCD	—	Navy	—	O		—	—	—	
Salamis [44]		GNA	250	Andrew Weir & Co.	300, 600	P G		N	0.40	—	
Saldanha [44]		GEG	150	Ellerman & Bucknall S.S. Co.	300, 600	P G		X	0.40	—	
Salino [44]		GYI	250	T. Wilson, Sons & Co.	300, 600	P G		8.30 a.m. to 1 p.m., 2 p.m. to 7 p.m., 8 p.m. to 12 p.m.	0.15 [74]	0.90 [74]	
Salsette [44]		MMT	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G		X	0.40	—	
Samoset [92]		GTH	125	Tank Storage & Carriage Co., Ltd.	300, 600	P		X	—	—	
Sandfly		BMK	—	Navy	—	O		—	—	—	
Sandon Hall [44]		MRY	150	Ellerman Lines	300, 600	P G		X	0.40	—	
Sandpiper		BSK	—	Navy	—	O		—	—	—	
San Dunstano [44]		MAN	250	Eagle Oil Transport Co.	300, 600	P G		X	0.40	—	
San Eduardo [44]		MJV	250	Eagle Oil Transport Co.	300, 600	P G		X	0.40	—	
San Fraterno [44]		GYN	250	Eagle Oil Transport Co.	300, 600	P G		X	0.40	—	
Sangola [44]		GOD	160	British India Steam Nav. Co.	300, 600	P G		X	0.40	—	
San Gregorio [44]		MAC	250	Eagle Oil Transport Co.	300, 600	P G		X	0.40	—	
San Hilario [44]		MIZ	250	Eagle Oil Transport Co.	300, 600	P G		X	0.40	—	
San Jeronimo [44]		MJP	250	Eagle Oil Transport Co.	300, 600	P G		X	0.40	—	
San Lorenzo [44]		MND	250	Eagle Oil Transport Co.	300, 600	P G		X	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
San Melito [44]	MRZ	250	Eagle Oil Transport Co.	300 **600**	P G	X	0.40	—
San Nazario [44]	MUH	150	Eagle Oil Transport Co.	300, **600**	P G	—	0.40	—
San Onofre [44]	GAA	170	Eagle Oil Transport Co.	300, **600**	P G	—	0.40	—
San Ricardo [44]	MBR	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Silvestre [44]	MYS	—	Eagle Oil Transport Co.	300, **600**	P G	—	0.40	—
Santhia [44]	GOE	160	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
San Tirso [44]	MAO	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Urbano [44]	MCC	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Valerio [44]	MHZ	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
San Zeferino [44]	MPS	250	Eagle Oil Transport Co.	300, **600**	P G	X	0.40	—
Sapphire BHB	BHB	—	Navy	—	O	—	—	—
Sapphire MHK [44]	MHK	200	Duke of Bedford	300, **600**	P G	X	—	—
Sappho	BGE	—	Navy	—	O	—	—	—
Saracen	BML	—	Navy	—	O	—	—	—
Sardinia GMB [44]	GMB	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Sardinian [44]	MDN	250	Allan Line	300, **600**	P G	X	0.40	—
Sarnia MKY [44]	MKY	250	London & South Western Railway	300, **600**	P G	X	0.15	1.50
Satanta [92]	GTG	125	Tank Storage & Carriage Co.	300, **600**	P	X	—	—
Saturnia [44]	MBF	250	Donaldson Bros.	300, **600**	P G	X	0.40	—
Savage BMN	BMN	—	Navy	—	O	—	—	—
Saxon [44]	MQI	250	Union Castle	300, **600**	P G	X	0.40	—
Saxonia [44]	MSA	250	Cunard Line	300, **600**	P G	X	0.40	—
Scandinavian [44]	MNC	250	Allan Line	300, **600**	P G	X	0.40	—
Scindia [44]	MHJ	250	Anchor Line	300, **600**	P G	X	0.40	—
Scorpion BMO	BMO	—	Navy	—	O	—	—	—
Scotia [90]	GRR	170	London & North Western Railway Co,	300, **600**	P G	X	0.05	0.50
Scotian [44]	MJN	250	Allan Line	300, **600**	P G	X	0.40	—
Scourge	BMP	—	Navy	—	O	—	—	—
Scylla	BGF	—	Navy	—	O	—	—	—
Sealda [44]	GOF	170	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Seistan [80]	GWY	100	Strick Line	300, **600**	P G	X	0.40	—
Sentinel BHQ	BHQ	—	Navy	—	O	—	—	—
Sentinel MFB [80] [122]	MFB	140	Eastern Telegraph Co.	300, 450, **600**	P	—	0.40	—
Sequoya [92]	GQE	130	Tank Storage & Carriage Co., Ltd.	300, **600**	P	X	—	—
Shabonee [92]	GSS	140	Tank Storage & Carriage Co., Ltd.	300, **600**	P	X	—	—
Shannon	BEB	—	Navy	—	O	—	—	—
Sheath	BMQ	—	Navy	—	O	—	—	—

Sheldrake	BMR	—	Navy	—	O	—	—	—
Shenandoah [44]	MNP	250	Furness Withy & Co.	300, 600	P G ..	X	0.40	—
Sherard Osborn [80] [122]	MFK	140	Eastern Telegraph Co.	300, 450, 600	P	—	0.40	—
Shirala [44]	GOG	170	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Shropshire [80]	GSF	330	Federal Steam Nav. Co.	300, 450, 600	P G ..	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m. 8 p.m. to 1 a.m.	0.40	—
Siamese Prince [44]	YYN	—	Prince Line	300, 600	P G ..	—	0.40	—
Sicilia GMC [44]	GMC	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Sicilian [44]	MUN	250	Allan Line	300, 600	P G ..	N	0.40	—
Silvertown [88] [122]	GMD	140	India Rubber, G.P. & Tel. Works	300, 600	P	—	—	—
Simla [41]	GME	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Singapore [44]	YYA	—	Westminster Shipping Co. ..	300, 600	P G ..	—	0.40	—
Sir Harvey Adamson [44] ..	MUK	150	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Sirius BGG	BGG	—	Navy	—	O	—	—	—
Sir Richard Awdry [80]	GQG	90	Pekin Syndicate	300, 600	P G ..	X	—	—
Skipjack	BPX	—	Navy	—	O	—	—	—
Skirmisher	BHR	—	Navy	—	O	—	—	—
Snipe	BSL	—	Navy	—	O	—	—	—
Socotra [44]	MSJ	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Sofala [44]	GOH	170	British India Steam Nav. Co. ..	300, 600	P G ..	X	0.40	—
Somali [44]	MIW	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Somerset GQD [80]	GQD	225	Federal Steam Nav. Co.	300, 600	P G ..	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Sorata [44]	MIJ	250	Pacific Steam Navigation Co. ..	300, 600	P G ..	9 a.m. to 11 a.m., 8 p.m. to 2 a.m.	0.40	—
Soudan [44]	MNB	250	Peninsular & Oriental Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Southampton	BGH	—	Navy	—	O	—	—	—
South Point [44]	GHZ	250	Norfolk & North American S.S. Co.	300, 600	P G ..	X	0.40	—
South Western Miller [44] ..	MTY	170	Norfolk and North American S.S. Co.	300, 600	P G ..	X	0.40	—
Spanker	BPY	—	Navy	—	O	—	—	—
Sparrowhawk	BMS	—	Navy	—	O	—	—	—
Spartiate	BES	—	Navy	—	O	—	—	—
Sphinx	BPI	—	Navy	—	O	—	—	—
Spitfire	BMT	—	Navy	—	O	—	—	—
Springwell [75]	GWT	130	Well Line, Ltd.	300, 600	P G ..	X	—	—
Star of Australia [44]	MAH	250	Commonwealth and Dom. Line ..	300, 600	P G ..	X	0.40	—
Star of England [44]	MAK	250	Commonwealth and Dom. Line ..	300, 600	P G ..	X	0.40	—
Star of India [44]	GYZ	250	Commonwealth and Dom. Line ..	300, 600	P G ..	X	0.40	—
Star of Ireland [44]	GMF	250	Star Line, Ltd.	300, 600	P G ..	X	0.40	—
Star of Scotland [44]	MTS	250	Commonwealth and Dom. Line ..	300, 600	P G ..	X	0.40	—
Star of Victoria [44]	MAL	250	Commonwealth and Dom. Line ..	300, 600	P G ..	X	0.40	—
Start Point [44]	GIA	250	Norfolk & North American S.S. Co.	300, 600	P G ..	X	0.40	—
Statesman [44]	MHP	250	T. & J. Harrison	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Staunch	BMU	—	Navy	—	O	—	—	—
Stephano [41]	MDY	250	Bowring Line	300, **600**	P G	N	0.40	—
Stephen [44]	MDJ	250	Booth S.S. Co.	300, **600**	P G	X	0.40	—
Stour	BMV	—	Navy	—	O	—	—	—
Strombus	MYQ	150	Anglo-Saxon Petroleum Co.	—	—	—	—	—
Submarine B5	BOK	—	Navy	—	O	—	—	—
Suevic [44]	MJC	250	White Star Line	300, **600**	P G	X	0.40	—
Suffolk BEC	BEC	—	Navy	—	O	—	—	—
Suffolk GRV [94]	GRV	300	Potter, Trinder and Gwyn	300, **600**	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Superb	BCE	—	Navy	—	O	—	—	—
Surada [44]	GOI	170	British India Steam Nav. Co.	300, **600**	P G	X	0.40	—
Surat [44]	GEL	250	A. Weir & Co.	300, **600**	P G	N	0.40	—
Surrey [89]	GVG	220	Federal Steam Nav. Co.	300, **600**	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Sussex MVC [80]	MVC	85	L.B & S.C. Rly. Co.	300, **600**	P G	N	—	—
Sussex MVS [80]	MVS	—	Federal Steam Nav. Co.	—	—	—	—	—
Sutherland Grange [44]	GMM	250	Houlder Line	300, **600**	P G	X	0.40	—
Sutlej BED	BED	—	Navy	—	O	—	—	—
Sutlej GWL [78]	GWL	115	James Nourse, Ltd.	300, **600**	P G	X	0.40	—
Suveric [44]	GMO	250	Andrew Weir & Co.	300, **600**	P G	N	0.40	—
Suwanee [44]	MIY	150	Anglo-American Oil Co.	300, **600**	P G	X	0.40	—
Swale	BMW	—	Navy	—	O	—	—	—
Swanmore [44]	MAE	250	W. Johnstone & Co.	300, **600**	P G	X	0.40	—
Swazi [44]	MAV	150	Ellerman & Bucknall S.S. Co.	300, **600**	P G	X	0.40	—
Swift	BMX	—	Navy	—	O	—	—	—
Swiftsure	BCF	—	Navy	—	O	—	—	—
Sylvia	BMY	—	Navy	—	O	—	—	—
Syren	BRT	—	Navy	—	O	—	—	—
Syria GMP [44]	GMP	250	Peninsular & Oriental Steam Nav. Co.	300, **600**	P G	X	0.40	—
Tactician [44]	MWP	180	T. and J. Harrison	300, **600**	P G	X	0.40	—
Tagus [44]	GUF	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—
Tahchee [93]	GSI	140	Tank Storage & Carriage Co., Ltd.	300, **600**	P	X	—	—
Tahiti [81]	MYN	250	Union S.S. Co. of New Zealand	300, **600**	P G	N	0.40	—

Takada [44]	..	..	..	MOR	250	British India Steam Nav. Co.	..	300, 600	P G	..	X	0.40	—
Talbot	..	..	..	BGI	—	Navy	..	—	O ..	..	—	—	—
Talthybius [88]	..	..	..	GSH	90	A. Holt & Co.	..	300, 450, 600	P G	..	X	0.40	4.00
Tamaha [92]	..	..	..	GSG	140	Tank Storage & Carriage Co., Ltd.		300, 600	P ..	..	X	—	—
Tara [44]	..	..	..	GMQ	250	British India Steam Nav. Co.	..	300, 600	P G	..	X	0.40	—
Taroba [44]	..	..	..	GMR	250	British India Steam Nav. Co.	..	300, 600	P G	..	X	0.40	—
Tarquah [44]	..	..	..	MZT	250	Elder Dempster	..	300, 600	P G	..	X	0.40	—
Tartar	..	..	..	BNA	—	Navy	..	—	O ..	..	—	—	—
Tascalusa [92]	..	..	..	GSD	140	Tank Storage & Carriage Co., Ltd.		300, 600	P ..	..	X	—	—
Tatarrax [92]	..	..	..	GSK	140	Tank Storage & Carriage Co., Ltd.		300, 600	P ..	..	X	—	—
Teal	..	..	..	BSR	—	Navy	..	—	O ..	..	—	—	—
Teesta [44]	..	..	..	GMT	250	British India Steam Nav. Co., Ltd.		300, 600	P G	..	X	0.40	—
Telconia [80] [122]	..	..	..	MCJ	140	Telegraph Construction & Maintenance Co.		300, 600	P ..	..	X	—	—
Temeraire	..	..	..	BCG	—	Navy	..	—	O ..	..	—	—	—
Tenasserim [75]	..	..	..	GQY	130	British & Burmese Steam Nav. Co.		300, 600	P G	..	10 a.m. to 12 a.m., 2 p.m. to 4 p.m., 8 p.m to 12 p.m.	0.40	—
Tennyson [34]	..	..	..	GDG	250	Lamport & Holt	..	300, 600	P G	..	N	0.40	—
Terrible	..	..	..	BET	—	Navy	..	—	O ..	..	—	—	—
Test	..	..	..	BNB	—	Navy	..	—	O ..	..	—	—	—
Teucer [80]	..	..	..	GSJ	90	A. Holt & Co.	..	300, 450, 600	P G	..	X	0.40	4.00
Teutonic [41]	..	..	..	MTC	250	White Star Line	..	300, 600	P G	..	N	0.40	—
Teviot	..	..	..	BNC	—	Navy	..	—	O ..	..	—	—	—
Thames BPJ	..	..	..	BPJ	—	Navy	..	—	O ..	..	—	—	—
Thames GUG [44]	..	..	..	GUG	250	Royal Mail Steam Packet Co.		300, 600	P G	..	N	0.40	—
Themistocles MGM [44]		..	..	MGM	250	Aberdeen Line	..	300, 600	P G	..	N	0.40	—
Theseus	..	..	..	BEU	—	Navy	..	—	O ..	..	—	—	—
Thetis BPK	..	..	..	BPK	—	Navy	..	—	O ..	..	—	—	—
Thistle	..	..	..	BPZ	—	Navy	..	—	O ..	..	—	—	—
Thongwa [44]	..	..	..	GMU	250	British India Steam Nav. Co.	..	300, 600	P G	..	X	0.40	—
Thorn	..	..	..	BRU	—	Navy	..	—	O ..	..	—	—	—
Thrasher	..	..	..	BRV	—	Navy	..	—	O ..	..	—	—	—
Thunderer	..	..	..	BCH	—	Navy	..	—	O ..	..	—	—	—
Tiger	..	..	..	BCW	—	Navy	..	—	O ..	..	—	—	—
Tigress	..	..	..	BND	—	Navy	..	—	O ..	..	—	—	—
Titan [80]	..	..	..	GSO	90	A. Holt & Co.	..	300, 450, 600	P G	..	X	0.40	4.00
Tonawanda [44]	..	..	..	GMV	150	Anglo-American Oil Co.	..	300, 600	P G	..	X	0.40	—
Tongariro [79]	..	..	..	GBD	250	New Zealand Shipping Co.	..	300, 600	P G	..	X	0.40	—
Topaze	..	..	..	BHC	—	Navy	..	—	O ..	..	—	—	—
Torch	..	..	..	BQF	—	Navy	..	—	O ..	..	—	—	—
Torilla [44]	..	..	..	GOJ	170	British India Steam Nav. Co.	..	300, 600	P G	..	X	0.40	—
Toronto GBS [44]	..	..	..	GBS	250	T. Wilson, Sons & Co.	..	300, 600	P G	..	8 a.m. to 1 p.m., 2 p.m. to 5 p.m. 6 p.m. to 10 p.m.	0.40	—
Torpedo Boat No. 1	..	..		BUU	—	Navy	..	—	O ..	..	—	—	—
Torpedo Boat No. 2	..	..		BNU	—	Navy	..	—	O ..	..	—	—	—
Torpedo Boat No. 3	..	..		BRY	—	Navy	..	—	O ..	..	—	—	—
Torpedo Boat No. 4	..	..		BNV	—	Navy	..	—	O ..	..	—	—	—
Torpedo Boat No. 5	..	..		BNW	—	Navy	..	—	O ..	..	—	—	—
Torpedo Boat No. 11	..	..		BUW	—	Navy	..	—	O ..	..	—	—	—
Torpedo Boat No. 12	..	..		BUX	—	Navy	..	—	O ..	..	—	—	—
Torpedo Boat No. 13	..	..		BUV	—	Navy	..	—	O ..	..	—	—	—

Ship Stations —*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Torpedo Boat No. 14	BNX	—	Navy	—	O	—	—	—
Torpedo Boat No. 15	BNY	—	Navy	—	O	—	—	—
Torpedo Boat No. 16	BRZ	—	Navy	—	O	—	—	—
Torpedo Boat No. 17	BUY	—	Navy	—	O	—	—	—
Torpedo Boat No. 18	BUZ	—	Navy	—	O	—	—	—
Torpedo Boat No. 19	BVA	—	Navy	—	O	—	—	—
Torpedo Boat No. 20	BVB	—	Navy	—	O	—	—	—
Torpedo Boat No. 21	BSA	—	Navy	—	O	—	—	—
Torpedo Boat No. 22	BSB	—	Navy	—	O	—	—	—
Torpedo Boat No. 23	BVC	—	Navy	—	O	—	—	—
Torpedo Boat No. 24	BSC	—	Navy	—	O	—	—	—
Torpedo Boat No. 25	BNZ	—	Navy	—	O	—	—	—
Torpedo Boat No. 28	BOA	—	Navy	—	O	—	—	—
Torpedo Boat No. 29	BOB	—	Navy	—	O	—	—	—
Torpedo Boat No. 30 ..	BOC	—	Navy	—	O	—	—	—
Torpedo Boat No. 31 ..	BOD	—	Navy	—	O	—	—	—
Torpedo Boat No. 32 ..	BOE	—	Navy	—	O	—	—	—
Torpedo Boat No. 33 ..	BOF	—	Navy	—	O	—	—	—
Torpedo Boat No. 34 ..	BOG	—	Navy	—	O	—	—	—
Torpedo Boat No. 35	BOH	—	Navy	—	O	—	—	—
Torpedo Boat No. 36	BOI	—	Navy	—	O	—	—	—
Tortuguero [44]	MMO	150	Elders & Fyffes	300, **600**	P G ..	X	0.40	—
Toro MHD (El) [44]	MHD	250	Lobitos Oilfields, Ltd.	300, **600**	P G ..	X	0.40	—
Trafford Hall [44]	MSL	250	Ellerman Lines	300, **600**	P G ..	X	0.40	—
Transmitter [86 122]	GQO	150	Eastern Telegraph Co.	300, 450, **600**	P	X	0.40	—
Transylvania [44]	MVR	220	Cunard Line	300, **600**	P G ..	X	0.40	—
Trefoil	BQP	—	Navy	—	O	—	—	—
Trent [44]	GUH	250	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—
Trinidad [44]	GBH	—	Quebec S.S. Co.	300, **600**	P G ..	N	0.40	—
Triumph	BCI	—	Navy	—	O	—	—	—
Tropic [44]	GDU	250	White Star Line	300, **600**	P G ..	X	0.40	—
Tunisian [44]	MTN	250	Allan Line	300, **600**	P G ..	N	0.40	—
Turakina [79]	MKJ	250	New Zealand Shipping Co. ..	300, **600**	P G ..	X	0.40	—
Turcoman [44]	GEA	250	Dominion Line	300, **600**	P G ..	X	0.40	—
Turmoil	BSF	—	Navy.	—	O	—	—	—
Tuscania [44]	YZE	—	Anchor Line	300, **600**	P G ..	—	0.40	—
Tyne	BQW	—	Navy	—	O	—	—	—
Tyrolia [44]	MLE	150	Canadian Pacific Railway ..	300, **600**	P G ..	X	0.40	—
Uganda [44]	GOK	170	British India Steam Nav. Co. ..	300, **600**	P G ..	X	0.40	—

Ula [44]	GOL	170	British India Steam Nav. Co. ..	300, 600	P G ..										
Ulster [44]	MCW	140	City of Dublin Steam Packet Co.	300, 600	P G ..										
Ultonia [44]	MTA	250	Cunard Line	300, 600	P G ..										
Ulysses [44]	GBU	250	A. Holt & Co.	300, 600	P G ..										
Umaria [44]	MUL	140	British India Steam Nav. Co. ..	300, 600	P G ..										
Umballa [44]	GOM	160	British India Steam Nav. Co. ..	300, 600	P G ..										
Umeta [44]	MZZ	140	British India Steam Nav. Co. ..	300, 600	P G ..										
Umta [44]	GON	170	British India Steam Nav. Co. ..	300, 600	P G ..										
Uncas GSA [92]	GSA	140	Tank Storage & Carriage Co. ..	300, 600	P G ..										
Undaunted	BKD	—	Navy	—	O										
Unity	BNF	—	Navy	—	O										
Upada [44]	GOO	160	British India Steam Nav. Co. ..	300, 600	P G ..										
Uranium [44]	MWU	250	Uranium S.S. Co.	300, 600	P G ..										
Ure	BNG	—	Navy	—	O										
Urlana [44]	GOP	160	British India Steam Nav. Co. ..	300, 600	P G ..										
Uruguayo (El) [44]	GGZ	250	British & Argentine Steam Nav. Co.	300, 600	P G ..										
Usk	BNH	—	Navy	—	O										
Vaderland	YYD	170	American Line	300, 600	P G ..										
Valiant BCR	BCB	—	Navy	—	O										
Valiant GES [44]	GES	150	Lord Pirrie	300, 600	P G ..										
Vanguard	BCJ	—	Navy	—	O										
Varela [44]	MSR	250	British India Steam Nav. Co. ..	300, 600	P G ..										
Varsova [44]	MUM	200	British India Steam Nav. Co. ..	300, 600	P G ..										
Vasari [44]	GMZ	250	Lamport & Holt	300, 600	P G ..										
Vauban [44]	MJW	250	Lamport & Holt	300, 600	P G ..										
Vedamore [44]	GYK	250	W. Johnston & Co.	300, 600	P G ..										
Vedic [44]	GDM	—	White Star	300, 600	P G ..										
Velox	BNI	—	Navy	—	O										
Venerable	BCK	—	Navy	—	O										
Vengeance	BCL	—	Navy	—	O										
Venus BGJ	BGJ	—	Navy	—	O										
Verdi [44]	GNB	250	Lamport & Holt	300, 600	P G ..										
Vernon	BOR	—	Navy	—	O										
Vestris [44]	MJZ	250	Lamport & Holt	300, 600	P G ..										
Victor	BNJ	—	Navy	—	O										
Victoria GUP [80]	GUP	50	South Eastern & Chatham Railway	300, 600	P G ..										
Victoria MWD [46]	MWD	250	Pacific Steam Nav. Co. ..	300, 600	P G ..										
Victoria and Albert [4] ..	BQH	—	Navy	—	O										
Victorian MVN [44]	MVN	250	Allan Line	300, 600	P G ..										
Victorian MYY [44]	MYY	250	F. Leyland & Co.	300, 600	P G ..										
Victorious	BCM	—	Navy	—	O										
Vienna [93]	GPL	130	Great Eastern Railway	300, 450, 600 [46]	P R [47] ..										
Vigilant	BNK	—	Navy	—	O										
Viking BNL	BNL	—	Navy	—	O										
Viking MCD [44] [122] ..	MCD	140	Amazon Telegraph Co.	300, 600	P										
Viking MVQ [44]	MVQ	66	Isle of Man Steam Packet Co. ..	300	P R [44] ..										
Vindictive	BGK	—	Navy	—	O										
Violet	BNN	—	Navy	—	O										
Virginian MGN [44]	MGN	250	Allan Line	300, 600	P G ..										
Virginia YYG [44]	YYG	—	Gow Harrison & Co.	300, 600	P G ..										
Vita [44]	MZV	220	British India Steam Nav. Co. ..	300, 600	P G ..										
Vitruvia [44]	GYS	150	Gow, Harrison & Co.	300, 600	P G ..										

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GREAT BRITAIN—*contd.*							Francs.	Francs.
Vixen	BRW	—	Navy	—	O	—	—	—
Volnay [44]	GRF	120	Gow, Harrison & Co.	—		—	—	—
Voltaire GND [44]	GND	250	Lamport & Holt	300. 600	P G	N	0.40	—
Volumnia [44]	GRM	140	Gow, Harrison & Co.	—		—	—	—
Vulcan BPB	BPB	—	Navy	—	O	—	—	—
Wabasha [88]	GTN	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—
Waimana [44]	GNE	250	Shaw, Savill & Albion	300, 600	P G	X	0.40	—
Waimate [79]	MOS	150	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Waipara [44]	GNK	250	British India Steam Nav. Co.	300, 600	P G	X	0.40	—
Waiwera [44]	MRV	250	Shaw, Savill & Albion Co.	300, 600	P G	X	0.40	—
Walmer Castle [44]	MQH	250	Union Castle	300, 600	P G	N	0.40	—
Walton Hall [44]	MTH	150	Ellerman Lines	300, 600	P G	X	0.40	—
Wapello [88]	GQL	125	Tank Storage & Carriage Co.	300, 600	P	X	—	—
Warrior BEE	BEE	—	Navy	—	O	—	—	—
Warspite	BEG	—	Navy	—	O	—	—	—
Warwickshire [41]	MYO	250	Bibby Bros. & Co.	300, 600	P G	X	0.40	—
Watchful	BPM	—	Navy	—	O	—	—	—
Waveney	BNO	—	Navy	—	O	—	—	—
Wayfarer [44]	GCI	250	T. & J. Harrison	300, 600	P G	X	0.40	—
Wear	BNQ	—	Navy	—	O	—	—	—
Welland	BNR	—	Navy	—	O	—	—	—
Welshman [44]	GEB	250	Dominion Line	300, 600	P G	X	0.40	—
Welsh Prince [44]	YYM	—	Prince Line	300, 600	P G	—	0.40	—
Westmeath [79]	MJQ	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
West Point [44]	GIK	250	Norfolk & N. American S.S. Co.	300, 600	P G	X	0.40	—
Weymouth	BGL	—	Navy	—	O	—	—	—
Whakarua [44]	GBZ	250	Commonwealth and Dom. Line	300, 600	P G	X	0.40	—
Whakatane [79]	MRI	250	New Zealand Shipping Co.	300, 600	P G	X	0.40	—
Whaler C.O.J. [80]	GSP	45	Southern Whaling & Sealing Co.	300	P	X	—	—
Whaler G.D.I. [80]	GSQ	45	Southern Whaling & Sealing Co.	300	P	X	—	—
Whaler T.W.I. [80]	GSR	45	Southern Whaling & Sealing Co.	300	P	X	—	—
Widgeon	BSP	—	Navy	—	O	—	—	—
Wiltshire [80]	GHD	330	Federal Steam Nav. Co.	300, 600	P G	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m., 4 p.m. to 6 p.m., 8 p.m. to 1 a.m.	0.40	—
Wilcannia [44]	GNH	250	Peninsular & Oriental Steam Nav Co.	300, 600	P G	X	0.40	—
Winamac [88]	GSM	140	Tank Storage & Carriage Co.	300, 600	P G	X	—	—

Winifredian [44]	.. .. ..	MFL	250	F. Leyland & Co.	300, 600	P G ..	N	0.40	—
Wolf BRX	.. .. ..	BRX	—	Navy	—	O	—	—	—
Wolverine BNS	.. ..	BNS	—	Navy	—	O	—	—	—
Woodcock	.. .. ..	BSN	—	Navy	—	O	—	—	—
Woodlark	.. .. ..	BSO	—	Navy	—	O	—	—	—
Woolwich	.. .. ..	BOV	—	Navy	—	O	—	—	—
Worcestershire [44]	.. ..	MYM	250	Bibby Bros. & Co...	300, 600	P G ..	X	0.40	—
Yarmouth BGM	.. ..	BGM	—	Navy	—	O	—	—	—
Zealandia BCN	.. ..	BCN	—	Navy	—	O	—	—	—
Zealandic [44]	.. .. ..	MUZ	250	White Star Line	300, 600	P G ..	X	0.40	—
Zeeland YYF	.. .. ..	YYF	170	American Line	300, 450, 600	P G ..	X	—	—
Zent [44]	.. ..	MMP	150	Elders & Fyffes	300, 600	P G ..	X	0.40	—
Zorro (El) [44]	.. .. ..	MHE	250	Lobitos Oilfields, Ltd.	300, 600	P G ..	X	0.40	—
Zulu	.. ..	BNT	—	Navy	—	O	—	—	—
GREECE									
Aetos	.. ..	SYO	—	Navy	—	O	—	—	—
Aigli	.. ..	SYV	—	Navy	—	O	—	—	—
Alcyon	.. ..	SYU	—	Navy	—	O	—	—	—
Amfitrite	.. .. ..	SYM	—	Navy	—	O	—	—	—
Amphitrite [4]	.. .. ..	—	—	—	—	—	—	—	—
Arethousa	.. .. ..	SYW	—	Navy	—	O	—	—	—
Aspis	.. .. ..	SYI	—	Navy	—	O	—	—	—
Athinai [12]	.. .. ..	SVA	220	Hellenic Transatlantic Steam Nav. Co.	300, 450, 600	P G ..	N	0.40	4.00
Averoff	.. ..	SYA	—	Navy	—	O	—	—	—
Daphni	.. .. ..	SYX	—	Navy	—	O	—	—	—
Doris SYY	.. .. ..	SYY	—	Navy	—	O	—	—	—
Doxa	.. .. ..	SYD	—	Navy	—	O	—	—	—
Ghoïssa [86]	.. .. ..	SVG	150	Cie Nationale Hellénique de Nav.	300, 600	P G ..	N	0.40	4.00
Helli	.. .. ..	SZA	—	—	—	—	—	—	—
Hydra SYH	.. .. ..	SYH	—	Navy	—	O	—	—	—
Ieraz	.. .. ..	SYE	—	Navy	—	O	—	—	—
Ioannina [11]	.. .. ..	SVI	200	National Steam Nav. Co. of Greece	300, 450, 600	P G ..	N	0.40	4.00
Kanaris	.. .. ..	SYJ	—	Navy	—	O	—	—	—
Keravnos	.. .. ..	SYK	—	Navy	—	O	—	—	—
Leon	.. .. ..	SYL	—	Navy	—	O	—	—	—
Lonchi	.. .. ..	SYC	—	Navy	—	O	—	—	—
Nafkratousa	.. .. ..	SYR	—	Navy	—	O	—	—	—
Nea Gennea	.. .. ..	SYG	—	Navy	—	O	—	—	—
Niki	.. .. ..	SYN	—	Navy	—	O	—	—	—
Panthir	.. .. ..	SYP	—	Navy	—	O	—	—	—
Patris [11]	.. .. ..	SVP	140	National Steam Nav. Co. of Greece	300, 450, 600	P G ..	N	0.40	4.00
Psara	.. .. ..	SYQ	—	Navy	—	O	—	—	—
Sfendoni	.. .. ..	SYF	—	Navy	—	O	—	—	—
Spetsai	.. .. ..	SYS	—	Navy	—	O	—	—	—
Themistocles SVT [11]	.. ..	SVT	220	Hellenic Transatlantic Steam Nav. Co.	300, 450, 600	P G ..	N	0.40	4.00
Thessaloniki [11]	.. ..	SVK	200	National Steam Nav. Co. of Greece	300, 450, 600	P G ..	N	0.40	4.00
Thétis SYZ	.. .. ..	SYZ	—	Navy	—	O	—	—	—
Thyella	.. .. ..	SYT	—	Navy	—	O	—	—	—
Velos	.. ..	SYB	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
GUIANA (DUTCH)							Francs.	Francs.
Commewijne [11]	PJO	600	Stoomvaartmaatschappij Coppename	300, **600**	P G ..	N	0.40	4.00
Nickerie [11]	PJN	500	Stoomvaartmaatschappij Suriname	300, **600**	P G ..	N	0.40	4.00
HOLLAND								
Arakan [11]	PHD	100–150	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	X	0.40	4.00
Atlas PIB [11 65]	PIB	75–100	Amsterdam Tug and Salvage Co.	300, 450, **600**	P G ..	X	0.40	4.00
Bandoeng [11]	PGD	100–150	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	X	0.40	4.00
Banka [11]	PHI	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Batavier II. [11]	PDG	200	Wm. H. Müller & Co.	**300**, 450, 600	P R [60] ..	N	0.05 [62]	0.50 [62]
Batavier III. [11]	PDH	200	Wm. H. Müller & Co.	**300**, 450, 600	P R [60] ..	N	0.05 [63]	0.50 [63]
Batavier IV. [11]	PDI	200	Wm. H. Müller & Co.	**300**, 450, 600	P R [60] ..	N	0.05 [63]	0.50 [63]
Batavier V. [11]	PDJ	200	Wm. H. Müller & Co.	**300**, 450, 600	P R [60] ..	N	0.05 [63]	0.50 [63]
Batjan [11]	PGV	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Bawean [11]	PHJ	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Billiton [11]	PGT	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Boeroe [11]	PHK	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Bœton [11]	PGU	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Brinio	PAV	60	Navy	300, **600**	O [61] ..	—	—	—
Bulhond	PBZ	150	Navy	300, **600**	O [61] ..	—	—	—
Celebes [11]	PGO	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Deli [11]	PGG	100–150	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	X	0.40	4.00
De Ruyter	PAC	200	Navy	300, **600**	O [61] ..	—	—	—
De Zeven Provinciën	PAA	400	Navy	300, **600**	O [61] ..	—	—	—
Djember [11]	PHF	100–150	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	X	0.40	4.00
Evertsen	PAN	100	Navy	300, **600**	O [61] ..	—	—	—
Fret	PBY	150	Navy	300, **600**	O [61] ..	—	—	—
Frisia PEF [11]	PEF	200–250	Koninklijke Hollandsche Lloyd Line	300, **600**	P G ..	N	0.40	4.00
Friso	PAW	60	Navy	300, **600**	O [61] ..	—	—	—
Gelderland	PAK	100	Navy	300, **600**	O [61] ..	—	—	—
Gelria [11]	PEG	200–250	Koninklijke Hollandsche Lloyd Line	300, 450, **600**	P G ..	N	0.40	4.00
Goentoer [11]	PFA	200	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m to 10 p.m.	0.40	4.00

Gorontalo [11]	PGC	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G ..	X	0.40	4.00
Grotius [11]	PFI	200	Nederland Line	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Gruno	PAU	60	Navy	300, 600	O [61] ..	—	—	—
Hermelijn	PBT	150	Navy	300, 600	O [61] ..	—	—	—
Hertog Hendrik	PAD	200	Navy	300, 600	O [61] ..	—	—	—
Holland PAH	PAH	200	Navy	300, 600	O [61] ..	—	—	—
Hollandia [11]	PEH	200–250	Koninklijke Hollandsche Lloyd Line	300, 600	P G ..	N	0.40	4.00
Hydra PAQ	PAQ	60	Navy	300, 600	O [61] ..	—	—	—
Insulinde [11]	PFS	150–200	Rotterdamsche Lloyd Line ..	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Jacatra [11]	PHE	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G ..	X	0.40	4.00
Jacob van Heemskerk ..	PAL	100	Navy	300, 600	O [61] ..	—	—	—
Jakhals	PBU	150	Navy	300, 600	O [61] ..	—	—	—
Jan Pieterszoon Coen [11] ..	PFL	—	Nederland Line	300, 600	P G ..	—	0.40	4.00
Kambangan [11]	PGS	100–150	Nederland Line	300, 600	P G ..	X	0.40	4.00
Kangean [11]	PGP	100–150	Nederland Line	300, 600	P G ..	X	0.40	4.00
Karimata [11]	PGQ	100–150	Nederland Line	300, 600	P G ..	X	0.40	4.00
Karimoen [11]	PGW	100–150	Nederland Line	300, 600	P G ..	X	0.40	4.00
Kawi [11]	PFD	200	Rotterdamsche Lloyd Line ..	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m to 10 p.m.	0.40	4.00
Koningin der Nederlanden [11] ..	PFO	200	Nederland Line	300, 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Koningin Emma [11]	PFR	200	Nederland Line	300, 600	P G ..	6 a.m. to 9 a.m., 10 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Koningin Regentes PAE ..	PAE	400	Navy	300, 600	O [61] ..	—	—	—
Koningin Regentes PDB [66 86] ..	PDB	150	Zeeland Co., Flushing ..	300, 500, [68] 600	P R [89] ..	N	— [62]	— [62]
Koningin Wilhelmina [86 86] ..	PDA	150	Zee and Co., Flushing ..	300, 500, [68] 600	P R [89] ..	N	— [62]	— [62]
Koning Willem III. [11]	PFJ	200	Nederland Line	300. 600	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Kortenaer	PAM	100	Navy	300, 600	O [61] ..	—	—	—
Krakatau [11]	PGL	100–150	Nederland Line	300, 600	P G ..	X	0.40	4.00
Lombok [11]	PGN	100–150	Nederland Line	300, 600	P G ..	X	0.40	4.00
Lynx PBX	PBX	150	Navy	300, 600	O [61] ..	—	—	—
Maarten Harpertz. Tromp ..	PAB	400	Navy	300, 600	O [61] ..	—	—	—
Madioen [11]	PGI	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G ..	X	0.40	4.00
Mecklenburg PDD [87 86] ..	PDD	150	Zeeland Co., Flushing ..	300, 500, [68] 600	P R [89] ..	N	— [62]	— [62]
Medan [11]	PGA	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G ..	X	0.40	4.00
Medusa PAR	PAR	60	Navy	300, 600	O [61] ..	—	—	—
Menado [11]	PGB	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G ..	X	0.40	4.00
Merauke [11]	PGE	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G ..	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
HOLLAND—*contd.*							Francs.	Francs.
New York PHN [11] ..	PHN	100–150	American Petroleum Co., Rotterdam.	300, **600**	P G ..	X	0.40	4.00
Nias [11]	PGR	100–150	Nederland Line	300, **600**	P G ..	X	0.40	4.00
Nieuw Amsterdam [11] ..	PEB	200–250	Holland-Amerika Line	300, **600**	P G ..	N	0.40	4.00
Noordam [11]	PEC	200–250	Holland-Amerika Line	300, **600**	P G ..	N	0.40	4.00
Noordbrabant	PA J	200	Navy	300, **600**	O [61] ..	—	—	—
Noorderdijk [11]	PGY	200	Holland-Amerika Line	300, 450, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Noordwijk [11]	PHG	—	Erhardt & Dekkers	300, **600**	P G ..	X	0.40	**4.00**
Onderzeeboot	PBO [65]	20	Navy	300	O [61] ..	—	—	—
Oosterdijk [11]	PGX	200	Holland-Amerika Line	300, 450, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Ophir	PFB	200	Rotterdamsche Lloyd Line ..	300, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Oranje [11]	PFP	200	Nederland Line	300, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Oranje Nassau PDE [67] [68] ..	PDE	150	Zeeland Co., Flushing	300, 500, [58] **600**	P R [59] ..	N	— [62]	— [62]
Oranje Nassau PEM [11] ..	PEM	150–200	Koninklijke West Indische Maildienst	300, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Palembang [11]	PGK	100–150	Rotterdamsche Lloyd Line ..	300 **600**	P G ..	X	0.40	4.00
Panter	PBS	150	Navy	300, **600**	O [61] ..	—	—	—
Piet Hein	PAO	100	Navy	300, **600**	O [61] ..	—	—	—
Potsdam [11]	PEE	200–250	Holland-Amerika Line	300, **600**	P G ..	N	0.40	4.00
Prins der Nederlanden PEN [11]	PEN	150–200	Koninklijke West Indische Maildienst	300, **600**	P G ..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Prins der Nederlanden PFQ [11]	PFQ	200	Nederland Line	300, **600**	P G ..	6 a.m. to 9 a.m., 10 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00

Prinses Juliana PDF [11] ..	PDF	150	Zeeland Co., Flushing	300, 500, [58] 600	P R [59]	..	N	— [62]	— [62]
Prinses Juliana PFN [11] ..	PFN	200	Nederland Line	300, 600	P G	..	6 a.m. to 8 a.m., 9 a.m to 12 a.m., 2 p.m.. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Prins Frederik Hendrik [11] ..	PEK	150–200	Koninklijke West Indische Maildienst	300, 600	P G	..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Prins Hendrik [56 96]	PDC	150	Zeeland Co., Flushing	300, 500, [58] 600	P R [59]	..	N	— [62]	— [62]
Prins Maurits [11]	PEL	150–200	Koninklijke West Indische Maidienst	300, 600	P G	..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 1 p.m. to 5 p.m.	0.40	4.00
Radja [11]	PHA	100–150	Nederland Line	300, 450, 600	P G	..	X	0.40	4.00
Rembrandt PFK [11]	PFK	200	Nederland Line	300, 600	P G	..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Rijndam [11]	PED	200–250	Holland-Amerika Line	300, 600	P G	..	N	0.40	4.00
Rindjani [11]	PFH	200	Rotterdamsche Lloyd Line ..	300, 600	P G	..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m. 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Riouw [11]	PHB	100–150	Nederland Line	300, 600	P G	..	X	0.40	4.00
Roepat [11]	PHL	100–150	Nederland Line	300, 600	P G	..	X	0.40	4.00
Rondo [11]	PHM	100–150	Nederland Line	300, 600	P G	..	X	0.40	4.00
Roode Zee [11]	PIA	100	L. Smit & Co.	300, 600	P G	..	X	0.40	4.00
Rotterdam PEA [11]	PEA	200–250	Holland-Amerika Line	300, 600	P G	..	N	0.40	4.00
Rotterdam PHH [11]	PHH	100	American Petroleum Co., Rotterdam	300, 600	P G	..	X	0.40	4.00
Rotti [11]	PHC	100–150	Nederland Line	300, 600	P G	..	X	0.40	4.00
Samarinda [11]	PGH	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G	..	X	0.40	4.00
Simson [11 114]	PIE	—	Amsterdam Tug & Salvage Co. ..	300, 600	P G	..	X	0.40	4.00
Sindoro [11]	PFE	200	Rotterdamsche Lloyd Line ..	300, 600	P G	..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Soerakarta [11]	PGJ	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G	..	X	0.40	4.00
Statendam [11]	PES	200	Holland-Amerika Line	300, 600	P G	..	N	0.40	4.00
Sumatra PGM [11]	PGM	100–150	Nederland Line	300, 600	P G	..	X	0.40	4.00
Tabanan [11]	PFF	200	Rotterdamsche Lloyd Line ..	300, 600	P G	..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Tambora [11]	PFC	200	Rotterdamsche Lloyd Line ..	300, 600	P G	..	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Ternate [11]	PGF	100–150	Rotterdamsche Lloyd Line ..	300, 600	P G	..	X	0.40	4.00
Titan [11 114]	—	—	Amsterdam Tug & Salvage Co. ..	—	—		—	—	—
Torpedoboot	PAG [64]	40	Navy	300	O [61]	..	—	—	—
Tubantia [11]	PET	200–250	Koninklijke Hollandsche Lloyd Line	300, 450, 600	P G	..	N	0.40	4.00
Turbinia [11]	—	—	W. Ruys & Zonen	—	—		—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
HOLLAND—*contd.*							Francs	Francs.
Van der Duijn [11]	PHP	100–150	Wambersie en Zoon	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Van Hogendorp [11]	PHO	100–150	Wambersie en Zoon	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Van Stirum [11]	PHQ	100–150	Wambersie en Zoon	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Vondel [11]	PFM	200	Nederland Line	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Vos	PBV	150	Navy	300, **600**	O [81]	—	—	—
Westerdijk [11]	PGZ	200	Holland-Amerika Line	300, 450, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m. 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Wilis [11]	PFG	200	Rotterdamsche Lloyd Line	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Witte Zee [11]	PIC	75-125	L. Smit & Co.	300, **600**	P G	X	0.40	4.00
Wolf PBW	PBW	150	Navy	300, **600**	O [81]	—	—	—
Zechond	PAZ	100	Navy	300, **600**	O [81]	—	—	—
Zeelandia [11]	PEI	200–250	Koninklijke Hollandsche Lloyd Line	300, **600**	P G	N	0.40	4.00
Zeeland PAF	PAF	200	Navy	300, **600**	O [81]	—	—	—
Zwarte Zee [11]	PID	75-125	L. Smit & Co.	300, **600**	P G	X	0.40	4.00
HONG KONG								
Mexico City [84]	VRG	—	Mexico S.S. Co., Ltd.	300, **600**	P G	—	—	—
Nile [44]	VRE	300	Nile Steamship Co., Ltd.	300, **600**	P G	N	0.40	4.00

HUNGARY [63]

Ferencz Ferdinánd	HDA	Day, 200 ; night, 300	Steamship Company "Adria" ..	300, 600	P G ..	8 a.m. to 12 a.m., 4 p.m. to 12 p.m.	0.40	4.00
Ferencz József Király	HBA	Day, 200 ; night, 300	Steamship Company "Adria" ..	300, 600	P G ..	8 a.m. to 12 a.m., 4 p.m. to 12 p.m.	0.40	4.00

ITALY

Agordat	IKR	—	Navy	—	—	—	—	—
Alpino	IBE	—	Navy	—	—	—	—	—
Amalfi	IHS	—	Navy	—	—	—	—	—
America IZA [66]	IZA	270	Navigazione Générale Italiana ..	300, 600	P G ..	N	0.40	—
Amerigo Vespucci	IVG	—	Navy	—	—	—	—	—
Ammiraglio Magnaghi ..	IVY	—	Navy	—	—	—	—	—
Ammiraglio Saint Bon ..	IHV	—	Navy	—	—	—	—	—
Ancona [66]	ITA	270	Italia Steam Nav. Co.	300, 600	P G ..	N	0.40	—
Andrea Doria	IHA	—	Navy	—	—	—	—	—
Animoso	IBD	—	Navy	—	—	—	—	—
Aquilone	IBF	—	Navy	—	—	—	—	—
Archimede	IVU	—	Navy	—	—	—	—	—
Ardente	IBB	—	Navy	—	—	—	—	—
Ardito	IBA	—	Navy	—	—	—	—	—
Artigliere	IBG	—	Navy	—	—	—	—	—
Audace	IBC	—	Navy	—	—	—	—	—
Basilicata	IKL	—	Navy	—	—	—	—	—
Bayonne [66]	ILB	190	Soc. Italo-Americana pel Petrolio	300, 600	P ..	X	0.40	—
Benedetto Brin	IHI	—	Navy	—	—	—	—	—
Bengasi	IVI	—	Navy	—	—	—	—	—
Bersagliere	IBH	—	Navy	—	—	—	—	—
Bologna [61]	ITB	190	La Veloce Steam Nav. Co. ..	300, 600	P G ..	N	0.40	—
Borea	IBI	—	Navy	—	—	—	—	—
Brasile [66]	IED	190	Italia Steam Nav. Co.	300, 600	P G ..	X	0.40	—
Bronte	IVA	—	Navy	—	—	—	—	—
Calabria IKN	IKN	—	Navy	—	—	—	—	—
Campania IKM	IKM	—	Navy	—	—	—	—	—
Capitano Verri	IVS	—	Navy	—	—	—	—	—
Caprera	IKW	—	Navy	—	—	—	—	—
Carabiniere	IBJ	—	Navy	—	—	—	—	—
Carlo Alberto	IKA	—	Navy	—	—	—	—	—
Caserta [66]	IYZ	190	Lloyd Italiano	300, 600	P G ..	N	0.40	—
Cavour [66]	IUC	190	Transatlantica Italiana Soc. di Nav.	300, 600	P G ..	N	0.40	—
Ciclope	IVQ	—	Navy	—	—	—	—	—
Città di Catania [66]	IET	190	State Railway Administration ..	300, 600	P G ..	N	0.40	—
Città di Messina [66]	IEM	190	State Railway Administration ..	300, 600	P G ..	N	0.40	—
Città di Milano	IVJ	—	Navy	—	—	—	—	—
Città di Palermo [66]	IEP	190	State Railway Administration ..	300, 600	P G ..	N	0.40	—
Città di Siracusa [66]	IES	190	State Railway Administration ..	300, 600	P G ..	N	0.40	—
Coatit	IKS	—	Navy	—	—	—	—	—
Conte di Cavour	IHD	—	Navy	—	—	—	—	—
Corazziere	IBK	—	Navy	—	—	—	—	—
Cordova IYJ [66]	IYJ	190	Lloyd Italiano	300, 600	P G ..	X	0.40	—
Curtatone	IVL	—	Navy	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
ITALY—*contd.*.							Francs.	Francs.
Dandolo	IHH	—	Navy	—	—	—	—	—
Dante Alighieri	IHC	—	Navy	—	—	—	—	—
Dardo	IBL	—	Navy	—	—	—	—	—
Duca d'Aosta [66]	IZT	270	Navigazione Générale Italiana	300, **600**	P G	N	0.40	—
Duca degli Abruzzi [66]	IZZ	270	Navigazione Générale Italiana	300, **600**	P G	N	0.40	—
Duca di Genova [66]	IZG	270	La Veloce Steam Nav. Co.	300, **600**	P G	N	0.40	—
Duilio	IHB	—	Navy	—	—	—	—	—
Elba	IKI	—	Navy	—	—	—	—	—
Emanuele Filiberto	IHW	—	Navy	—	—	—	—	—
Eridano	IVO	—	Navy	—	—	—	—	—
Eritrea	IVX	—	Navy	—	—	—	—	—
Espero	IBM	—	Navy	—	—	—	—	—
Etna	IKG	—	Navy	—	—	—	—	—
Etruria	IKP	—	Navy	—	—	—	—	—
Euro	IBN	—	Navy	—	—	—	—	—
Europa IEE [66]	IEE	270	La Veloce Steam Nav. Co	300, **600**	P G	N	0.40	—
Firenze [66]	INZ	110	Compagnia Marittima Italiana	300, **600**	P G	X	0.40	—
Flavio Gioja	IVE	—	Navy	—	—	—	—	—
Francesco Ferruccio	IHZ	—	Navy	—	—	—	—	—
Fuciliere	IBO	—	Navy	—	—	—	—	—
Fulmine	IBP	—	Navy	—	—	—	—	—
Galileo Galilei	IVP	—	Navy	—	—	—	—	—
Garibaldi IUA [66]	IUA	190	Transatlantica Italiano Soc.di Nav.	300, **600**	P G	N	0.40	—
Garibaldino	IBQ	—	Navy	—	—	—	—	—
Giovanni Bausan	IVD	—	Navy	—	—	—	—	—
Giuliana	IVT	—	Navy	—	—	—	—	—
Ginlio Cesare	IHE	—	Navy	—	—	—	—	—
Giuseppe Garibaldi	IHX	—	Navy	—	—	—	—	—
Goito	IKU	—	Navy	—	—	—	—	—
Governolo	IVN	—	Navy	—	—	—	—	—
Granatiere	IBR	—	Navy	—	—	—	—	—
Iela [66]	IMA	162	His Majesty the King of Italy	300, 600	P	—	—	—
Impavido	IBV	—	Navy	—	—	—	—	—
Impetuoso	IBW	—	Navy	—	—	—	—	—
Indiana IYI [66]	IYI	190	Lloyd Italiano	300, **600**	P G	N	0.40	—
Indomito	IBS	—	Navy	—	—	—	—	—
Insidioso	IBT	—	Navy	—	—	—	—	—
Intrepido	IBU	—	Navy	—	—	—	—	—
Iride	IKT	—	Navy	—	—	—	—	—

Irrequieto	IBX	—	Navy	—	—	—	—	—	—	—	—	—
Italia IHG	IHG	—	Navy	—	—	—	—	—	—	—	—	—
Italia IZI "	IZI	190	Italia Steam Nav. Co.	300, 600	P G	..	X	0.40	—	—	—	—
Lampo IBY	IBY	—	Navy	—	—	—	—	—	—	—	—	—
Lampo ILL "	ILL	190	Soc. Italio-Americana pel Petrolio, Genoa	300, 600	P	..	X	0.40	—	—	—	—
Lanciere	IBZ	—	Navy	—	—	—	—	—	—	—	—	—
Leonardo da Vinci	IHF	—	Navy	—	—	—	—	—	—	—	—	—
Libia	IKH	—	Navy	—	—	—	—	—	—	—	—	—
Liguria	IKQ	—	Navy	—	—	—	—	—	—	—	—	—
Lombardia	IKO	—	Navy	—	—	—	—	—	—	—	—	—
Luisiana "	IYL	190	Lloyd Italiano	300, 600	P G	..	N	0.40	—	—	—	—
M. A. Colonna	IVR	—	Navy	—	—	—	—	—	—	—	—	—
Marco Polo	IKC	—	Navy	—	—	—	—	—	—	—	—	—
Marsala	IKE	—	Navy	—	—	—	—	—	—	—	—	—
Milano "	INM	110	Soc. Italiana di servizi Marittimi	300, 600	P G	..	X	0.40	—	—	—	—
Minas "	IUE	190	Soc. Anon. Angelo Parodi fu Bartolomeo, Genoa.	300, 600	P G	..	X	0.40	—	—	—	—
Minerva IKX	IKX	—	Navy	—	—	—	—	—	—	—	—	—
Misurata	IVV	—	Navy	—	—	—	—	—	—	—	—	—
Montebello	IKZ	—	Navy	—	—	—	—	—	—	—	—	—
Napoli IHO	IHO	—	Navy	—	—	—	—	—	—	—	—	—
Napoli IZS "	IZS	190	Italia Steam Nav. Co.	300, 600	P G	..	N	0.40	—	—	—	—
Nembo	IDA	—	Navy	—	—	—	—	—	—	—	—	—
Nino Bixio	IKF	—	Navy	—	—	—	—	—	—	—	—	—
Ostro	IDB	—	Navy	—	—	—	—	—	—	—	—	—
Palermo IZL "	IZL	190	Nav. Gén. Italiana (Genoa-Boston Line)	300, 600	P G	..	N	0.40	—	—	—	—
Partenope	IKY	—	Navy	—	—	—	—	—	—	—	—	—
Piemonte	IKJ	—	Navy	—	—	—	—	—	—	—	—	—
Pisa IHR	IHR	—	Navy	—	—	—	—	—	—	—	—	—
Pontiere	IDC	—	Navy	—	—	—	—	—	—	—	—	—
Porto di Adalia "	INA	110	Compagnia Marittima Italiana ..	300, 600	P G	..	10 a.m. to 5 p.m.	0.40	—	—	—	—
Porto di Alessandretta ..	INT	110	Compagnia Marittima Italiana ..	300, 600	P G	..	10 a.m. to 5 p.m.	0.40	—	—	—	—
Porto di Savona "	INV	110	Compagnia Marittima Italiana ..	300, 600	P G		10 a.m. to 5 p.m.	0.40	—	—	—	—
Porto Said "	IND	110	Compagnia Marittima Italiana ..	300, 600	P G	..	X	0.40	—	—	—	—
Principe di Udine "	IYU	270	Lloyd Sabaudo	300, 600	P G	..	N	0.40	—	—	—	—
Principessa Mafalda " ..	IYM	270	Lloyd Italiano	300, 600	P G	..	N	0.40	—	—	—	—
Principe Umberto "	IZU	270	Navigazione Générale Italiana ..	300, 600	P G	..	N	0.40	—	—	—	—
Puglia	IKK	—	Navy	—	—	—	—	—	—	—	—	—
Quarto	IKD	—	Navy	—	—	—	—	—	—	—	—	—
Ravenna "	ITR	190	Italia Steam Nav. Co.	300, 600	P G	..	N	0.40	—	—	—	—
Re d'Italia "	IYR	190	Lloyd Sabaudo	300, 600	P G	..	N	0.40	—	—	—	—
Regina d'Italia "	INI	190	Compagnia Marittima Italiana ..	300, 600	P G	..	N	0.40	—	—	—	—
Regina Elena IHQ	IHQ	—	Navy	—	—	—	—	—	—	—	—	—
Regina Elena IZE "	IZE	270	Navigazione Générale Italiana ..	300, 600	P G	..	N	0.40	—	—	—	—
Regina Margherita	IHJ	—	Navy	—	—	—	—	—	—	—	—	—
Re Umberto IHK	IHK	—	Navy	—	—	—	—	—	—	—	—	—
Re Umberto IUU "	IUU	110	Soc. Anon. Angelo Parodi fu Bartolomeo	300, 600	P G	..	X	0.40	—	—	—	—
Re Vittorio "	IZV	270	Navigazione Générale Italiana ..	300, 600	P G	..	N	0.40	—	—	—	—
Roma IHP	IHP	—	Navy	—	—	—	—	—	—	—	—	—
Roma INR "	INR	110	Compagnia Marittima Italiana ..	300, 600	P G	..	X	0.40	—	—	—	—
Sardegna IHM	IHM	—	Navy	—	—	—	—	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge	
							Per Word.	Minimum Charge.
ITALY—*contd.*							Francs.	Francs.
Sardegna INS [66]	INS	110	Soc. Italiana di Servizi Marittimi	300, **600**	P G	X	0.40	—
Savoia [66]	IEH	190	La Veloce Steam Nav. Co.	300, **600**	P G	N	0.40	—
Sebastiano Caboto	IVZ	—	Navy	—	—	—	—	—
Sicilia IHL	IHL	—	Navy	—	—	—	—	—
Sicilia INL [66]	INL	110	Soc. Italiana di Servizi Marittimi	300, **600**	P G	X	0.40	—
Siena [66]	ITS	190	La Veloce Steam Nav. Co.	300, **600**	P G	N	0.40	—
Splendor [66]	ILS	190	Soc. Italo-Americana pel Petrolio	300, **600**	P	X	0.40	—
Staffetta	IVK	—	Navy	—	—	—	—	—
Stampalia[66]	IEF	270	La Veloce Steam Nav. Co.	300, **600**	P G	N	0.40	—
Sterope	IVB	—	Navy	—	—	—	—	—
Strale	IDD	—	Navy	—	—	—	—	—
S. Giorgio IEA [66]	IEA	190	Sicula Americana Nav. Co.	300, **600**	P G	N	0.40	—
S. Giorgio IHU	IHU	—	Navy	—	—	—	—	—
S. Giovanni [66]	IEC	190	Sicula Americana Nav. Co.	300, **600**	P G	N	0.40	—
S. Guglielmo [66]	IEB	190	Sicula Americana Nav. Co.	300, **600**	P G	N	0.40	—
S. Marco	IHT	—	Navy	—	—	—	—	—
Taormina [66]	IYT	270	Lloyd Italiano	300, **600**	P G	N	0.40	—
Tobruk	IVW	—	Navy	—	—	—	—	—
Tomaso di Savoia [66]	IYS	190	Lloyd Sabaudo	300, **600**	P G	N	0.40	—
Torino [66]	INO	110	Soc. Italiana di Servizi Marittimi	300, **600**	P G	X	0.40	—
Toscana [66]	ITT	190	La Veloce Steam Nav. Co.	300, **600**	P G	N	0.40	—
Trinacria	IVC	—	Navy	—	—	—	—	—
Tripoli	IKV	—	Navy	—	—	—	—	—
Turbine	IDE	—	Navy	—	—	—	—	—
Umbria	ITU	190	Soc. Italiana di Servizi Marittimi	300, **600**	PG	X	0.40	—
Varese	IHY	—	Navy	—	—	—	—	—
Verona [66]	ITV	270	Navagazione Générale Italiana	300, **600**	P G	N	0.40	—
Vettor Pisani	IKB	—	Navy	—	—	—	—	—
Vittorio Emanuele	IHN	—	Navy	—	—	—	—	—
Volta	IVH	—	Navy	—	—	—	—	—
Volturno	IVM	—	Navy	—	—	—	—	—
Vulcano	IVF	—	Navy	—	—	—	—	—
Zeffiro	IDF	—	Navy	—	—	—	—	—
JAPAN								
Aki Maru [66]	JAI	Day, 500; night, 1000	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, **600**	P G	N	0.40	—

Engine and Instrument Cart.

Mast and Supply Cart.

Marconi 1½ kw. Field Cart Station.

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Akashi	JLM	—	Navy	—	O	—	—	—
Aki	JGK	—	Navy	—	O	—	—	—
Akitsushima	JUQ	—	Navy	—	O	—	—	—
Amakusa Maru **	JAM	Day, 300; night, 1000	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
America Maru **	JAC	Day, 400; night, 1000	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Anyo Maru **	JAY	Day, 450; night, 900	Oriental S.S. Co.	300, 600	P G	N	0.40	—
Asahi	JGB	—	Navy	—	O	—	—	—
Asama	JRA	—	Navy	—	O	—	—	—
Aso	JRL	—	Navy	—	O	—	—	—
Atsuta Maru **	JAT	Day, 450; night, 1,200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Awa Maru **	JAW	Day, 300; night, 1000	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Bingo Maru **	JBG	Day, 300; night, 1000	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Canada Maru *	JCD	Day, 350; night, 1200	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Chicago Maru **	JCC	Day, 350; night, 1200	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Chihaya	JWB	—	Navy	—	O	—	—	—
Chikuma	JLG	—	Navy	—	O	—	—	—
Chitose	JLB	—	Navy	—	O	—	—	—
Chiyoda	JUP	—	Navy	—	O	—	—	—
Chiyo Maru **	JCY	Day, 450; night, 1500	Oriental S.S. Co.	300, 600	P G	N	0.40	—
Fuji	JUC	—	Navy	—	O	—	—	—
Fushimi	JWI	—	Navy	—	O	—	—	—
Fuso	JGN	—	Navy	—	—	—	—	—
Hashidate	JUO	—	Navy	—	O	—	—	—
Hayatori Maru **	JHY	100	Ministry of Agriculture and Commerce	300, 600	P G	N	0.40	—
Hiei	JGV	—	Navy	—	O	—	—	—
Hirato	JLJ	—	Navy	—	O	—	—	—
Hizen	JGD	—	Navy	—	O	—	—	—
Hokoku Maru **	JHK	Day, 450; night, 1200	Minami Manshu Kisen Kaisha	300, 600	P G	N	0.40	—
Hongkong Maru **	JHN	Day, 300; night, 1000	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Ibuki	JGT	—	Navy	—	O	—	—	—
Idzumo	JRG	—	Navy	—	O	—	—	—
Iki	JUA	—	Navy	—	O	—	—	—
Ikoma	JGQ	—	Navy	—	O	—	—	—
Itsukushima	JUN	—	Navy	—	O	—	—	—
Iwami	JUD	—	Navy	—	O	—	—	—
Iwate	JRF	—	Navy	—	O	—	—	—
Kagi Maru **	JKG	Day, 300; night, 1000	Osaka Mercantile S.S. Co.	300, 600	P G	N	0.40	—
Kamo Maru **	JKA	Day, 450; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G	N	0.40	—
Karasaki	JUV	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
JAPAN—*contd.*							Francs.	Francs.
Kasado Maru [99]	JKT	Day, 300; night, 1000	Osaka Mercantile S.S. Co.	300, **600**	P G	N	0.40	—
Kasagi	JLA	—	Navy	—	O	—	—	—
Kashima	JGG	—	Navy	—	O	—	—	—
Kashima Maru [99]	JKX	Day, 450; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, **600**	P G	N	0.40	—
Kasuga	JRJ	—	Navy	—	O	—	—	—
Katori	JGF	—	Navy	—	O	—	—	—
Katori Maru [99]	JKR	Day, 450; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, **600**	P G	N	0.40	—
Kawachi	JGL	—	Navy	—	O	—	—	—
Kayo Maru [99]	JKO	Day, 250; night, 800	K. Oaki	300, **600**	P G	N	0.40	—
Kiyo Maru [99]	JKY	Day, 250; night, 800	Oriental S.S Co.	300, **600**	P G	N	0.40	—
Kobe Maru [99]	JKB	Day, 300; night, 1000	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, **600**	P G	N	0.40	—
Komahashi	JUU	—	Navy	—	O	—	—	—
Kongo	JGU	—	Navy	—	O	—	—	—
Kosai Maru	JKS	Day, 120; night, 200	Chosen Government	—	— [99]	N	—	—
Kurama	JGR	—	Navy	—	O	—	—	—
Manshu	JUT	—	Navy	—	O	—	—	—
Matsuye	JUZ	—	Navy	—	O	—	—	—
Mexico Maru [99]	JMX	Day, 350; night, 1200	Osaka Mercantile S.S. Co.	300, **600**	P G	N	0.40	—
Mikasa	JGC	—	Navy	—	O	—	—	—
Mishima	JUL	—	Navy	—	O	—	—	—
Mishima Maru [99]	JMQ	Day, 450; night, 1200	Minami Manshu Kisen (Japan Mail S.S. Co.)	300, **600**	P G	N	0.40	—
Mogami	JWD	—	Navy	—	O	—	—	—
Musashi	JUY	—	Navy	—	O	—	—	—
Niitaka	JLN	—	Navy	—	O	—	—	—
Nippon Maru [99]	JNP	Day, 300; night, 1000	Oriental S.S. Co.	300, **600**	P G	N	0.40	—
Nisshin	JRK	—	Navy	—	O	—	—	—
Ogasawara Maru	JOG	Day, 300; night, 800	Ministry of Communications	300, **600**	— [99]	—	—	—

Okinawa Maru	JON	Day, 350; night, 1000	Ministry of Communications ..	300, 600	—	..	—	—	—
Okinoshima	JUK	—	Navy	—	O	—	—	—
Otowa	JLP	—	Navy	—	O	—	—	—
Panama Maru [99]	JPM	Day, 350; night, 1200	Osaka Mercantile S.S. Co. ..	300, 600	P G ..	N	0.40	—
Sado Maru [99]	JSD	Day, 300; night, 1000	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G ..	N	0.40	—
Saga JWL	JWL	—	Navy	—	O	—	—	—
Sagami	JUF	—	Navy	—	O	—	—	—
Sakaki Maru [99]	JKI	Day, 400; night, 1200	Minami Manshu Tetsudo Kaisha	300, 600	P G ..	N	0.40	—
Satsuma	JGJ	—	Navy	300, 600	O ..	—	—	—
Seattle Maru [99]	JST	Day, 350; night, 1200	Osaka Mercantile S.S. Co. ..	300, 600	P G ..	N	0.40	—
Seiyo Maru [99]	JSY	Day, 400; night, 1000	Oriental S.S. Co.	300, 600	P G ..	N	0.40	—
Settsu	JGM	—	Navy	—	O	—	—	—
Shidzuoka Maru [99]	JSZ	Day, 350; night, 1200	NipponYusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G ..	N	0.40	—
Shikishima	JGA	—	Navy	—	O	—	—	—
Shinano Maru [99]	JSN	Day, 350; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G ..	N	0.40	—
Shinyo Maru [99]	JSH	Day, 450; night, 1500	Oriental S.S. Co.	300, 600	P G ..	N	0.40	—
Soya	JLD	—	Navy	—	O	—	—	—
Suma	JLL	—	Navy	—	O	—	—	—
Sumida	JWG	—	Navy	—	O	—	—	—
Suwa Maru [99]	JSU	Day, 450; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G ..	N	0.40	—
Suwo	JUG	—	Navy	—	O	—	—	—
Tacoma Maru [99]	JTA	Day, 350; night, 1200	Osaka Mercantile S.S. Co. ..	300, 600	P G ..	N	0.40	—
Taichu Maru [99]	JTC	Day, 300; night, 1000	Osaka Mercantile S.S. Co. ..	300, 600	P G ..	N	0.40	—
Tainan Maru [99]	JTN	Day, 300; night, 1000	Osaka Mercantile S.S. Co. ..	300, 600	P G ..	N	0.40	—
Taisei Maru [24] [99]	JTM	Day, 300; night, 1000	Mercantile Marine School	300, 600	P G ..	N	0.40	—
Takachiho	JUM	—	Navy	—	O	—	—	—
Tamba Maru [99]	JTB	Day, 300; night, 1000	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, 600	P G ..	N	0.40	—
Tango	JUB	—	Navy	—	O	—	—	—
Tatsuta	JWA	—	Navy	—	O	—	—	—
Teikoku Maru [99]	JTK	Day, 350; night, 900	Minami Manshu Kisen Kaisha ..	300, 600	P G ..	N	0.40	—
Tenyo Maru [99]	JTY	Day, 450; night, 1500	Oriental S.S. Co.	300, 600	P G ..	N	0.40	—
Toba	JWK	—	Navy	—	O	—	—	—
Tokiwa	JRB	—	Navy	—	O	—	—	—
Tone	JLF	—	Navy	—	O	—	—	—
Tsugaru	JLC	—	Navy	—	O	—	—	—
Tsukuba	JGP	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service	Ship Charge.	
							Per Word.	Minimum Charge.
JAPAN—*contd.*							Francs.	Francs.
Tsushima	JLO	—	Navy	—	O	—	—	—
Uji	JWF	—	Navy	—	O	—	—	—
Yahagi	JLK	—	Navy	—	O	—	—	—
Yakumo	JRC	—	Navy	—	O	—	—	—
Yamato	JUX	—	Navy	—	O	—	—	—
Yodo	JWC	—	Navy	—	O	—	—	—
Yokohama Maru [66]	JYH	Day, 350; night, 1200	Nippon Yusen Kaisha (Japan Mail S.S. Co.)	300, **600**	P G	N	0.40	—
MEXICO								
General Zaragoza	XCA	—	Navy	600	O	2 a.m. to 6 a.m., 6 p.m. to 10 p.m.	—	—
Korrigan III [44]	XBF	200	Cia du Boleo	300, **600**	P G	X	0.40	—
Mazatlan [66]	XBH	200	Lloyd Mexicana, S.A.	300, **600**	P G	X	0.40	—
Mexico XBB [44]	XBB	120	Compania Mexicana de Nav. S.A.	300, **600**	P G	X	0.40	—
Mexicana [76]	XBC	250	Cia Mexicana de Combustible	300, **600**	P G	X	0.40	—
San Antonio [44]	XBE	130	Cia Mexicana de Vap. "San Antonio" S.A.	300, **600**	P G	X	0.40	—
San Bernardo [44]	XBA	170	Cia Mexicana de Petroleo "El Aguila," S.A.	300, **600**	P G	X	0.40	—
MONACO								
Hirondelle [44]	CQA	380	Prince of Monaco	**600**	P	X	—	—
MOROCCO								
Faci	CNJ	120	Customs Administration	300	O	N	—	—
Marrakchi	CNM	120	Customs Administration	300	O	N	—	—
Meknassi	CNK	120	Customs Administration	300	O	N	—	—
Taroudant	CNT	120	Customs Administration	300	O	N	—	—
NEW ZEALAND								
Aorangi [81]	VLI	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Arahura [81]	VMA	Day, 150; night, 400	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.20	—
Atua [81]	VLU	325	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Hauroto	VLH	250	Union S.S. Co. of New Zealand	300, **600**	P G	X		

Hitiemoa	VLS	Day, 300; night, 700	Government	—	—	—	—	—
Maheno [81]	VLE	325	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Maitai [81]	VLT	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Makura [81]	VLK	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Maori VLZ [81]	VLZ	Day, 250; night, 500	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Manapouri [81]	VLP	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Manuka [81]	VLN	325	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Maraina [81]	VLR	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Maunganui [81]	VLG	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Moana [81]	VLO	325	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Moeraki [81]	VLM	325	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Mokoia [81]	VMK	Day, 250; night, 500	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Monowai [81]	VMM	Day, 250; night, 500	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.20	—
Navua [81]	VLV	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Paloona [81]	VLY	Day, 250; night, 500	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Pateena [81]	VMP	Day, 150; night, 400	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.20	—
Talune [81]	VLL	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Tarawera [81]	VMT	Day, 150; night, 400	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.20	—
Tofua [81]	VLF	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Tutanekai [122]	VLX	325	Government	300, **600**	O	X	—	—
Wahine [81]	VLJ	Day, 250; night, 500	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—
Warrimoo [81]	VLQ	250	Union S.S. Co. of New Zealand	300, **600**	P G	X	0.40	—

NORWAY

A 1	LAU	—	Navy	—	O	—	—	—
A 2	LAV	—	Navy	—	O	—	—	—
A 3	LAW	—	Navy	—	O	—	—	—
A 4	LAX	—	Navy	—	O	—	—	—
A 5	LAY	—	Navy	—	O	—	—	—
America LEU [80]	LEU	150	Wilhelm Wilhelmsen	300, 450, **600**	P G	X	0.40	4.00
Atle Jarl [80]	LEY	100-150	Det Nordenfjeldske Dampskibsselskab	300, **600**	P G	X	0.20	2.00
Belridge [80]	LEF	100-150	Wilhelm Wilhelmsen	300, **600**	P G	X	0.40	4.00
Benguela [80]	LEV	300	Wilhelm Wilhelmsen	300, **600**	P G	X	0.40	4.00
Bergensfjord [11]	LFB	200	Den Norske-Amerika-Linje	300, 450, **600**	P G	N	0.40	4.00
Bessheim [80]	LDA	160	A/S Ganger Rolf	300, 450, **600**	P G	N	0.28	2.80
Björgvin	LBB	—	Navy	—	O	—	—	—
Borgestad [11]	LDZ	150	A/S Borgestad (G. Knudsen), Porsgrund	300, 450, **600**	P G	X	0.40	4.00
Caloric [80]	LED	150-200	Wilhelm Jebsen, Bergen	300, **600**	—	X	0.40	4.00
Chr. Knudsen [100]	LES	—	Aktieselskabet Borgestad	300, **600**	—	—	—	—
City of Mexico [100]	LEJ	200	Harloff & Rödseth. Chartered by Wolvin Line	300, **600**	P G	N	0.40	4.00
City of Tampico [100]	—	—	Harloff & Rödseth. Chartered by Wolvin Line	300, **600**	—	—	—	—

Ship Stations—*Continued*

Name.	Call Sign'l.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
NORWAY—*contd.*							Francs.	Francs.
Cometa [11]	LDS	125-175	Det Bergenske Dampskibsselskab	300, **600**	P G	X	0.40	4.00
Commonwealth LDD [80]	LDD	40	Chr. Nielsen & Co., Larvik	300, 450, **600**	P G	X	—	—
Correct [80]	LEA	120	Sibirian S.S. Manufacturing & Trading Co., Ltd.	300, **600**	P G	X	No ship charge	
Cuzco	LEG	150	A/S Cuzco, Tönsberg	300, **600**	P G	6 a.m. to 8 a.m., 9 a.m. to 12 a.m., 2 p.m. to 6 p.m., 8 p.m. to 10 p.m.	0.40	4.00
Draug	LAI	—	Navy	—	O	—	—	—
Eidsvold	LAA	—	Navy	—	O	—	—	—
Ellida	LAG	—	Navy	—	O	—	—	—
Estrella [11]	LDT	125-175	Det Bergenske Dampskibsselskab	300, **600**	P G	X	0.40	4.00
Falkland [80]	LDC	150-250	H. Frederiksen Christiania	300, **600**	P G	X	0.40	4.00
Fritbjof LAE	LAE	—	Navy	—	O	—	—	—
Garm	LBC	—	Navy	—	O	—	—	—
Haakon VII. [80]	LDL	160	Det Nordenfjeldske Dampskibsselskab	300, 450, **600**	P G	1 a.m. to 3 a.m., 7 a.m. to 9 a.m., 1 p.m. to 3 p.m., 7 p.m. to 9 p.m.	0.20	2.00
Harald Haarfagre	LAB	—	Navy	—	O	—	—	—
Heimdal	LAZ	—	Navy	—	O	—	—	—
Hektoria	LCA	Day, 270; night, 540	N. Bugge, Tönsberg	300, **600**	P G	X	0.30	3.00
Hval	LAN	—	Navy	—	O	—	—	—
Irma	LDQ	Day, 240; night, 480	Det Bergenske Dampskibsselskab	300, 450, **600**	P G	X	0.20	2.00
Jason LEL [80]	LEL	110	A/S Norsk Bjergningskompani	300, **600**	P G	X	—	—
Jo	LAQ	—	Navy	—	O	—	—	—
Johan Brijde	—	—	Ostkystens Hvalfangerskab	300, **600**	—	—	0.40	4.00
Karrakatta [80]	LDE	40	Chr. Nielsen & Co., Larvik	300, 450, **600**	P G	X	—	—
Kjell	LAT	—	Navy	—	O	—	—	—
Klein [80]	LDI	40	Chr. Nielsen & Co., Larvik	300, 450, **600**	P G	X	—	—
Kong Harald [80]	LDK	160	Det Nordenfjeldske Dampskibsselskab	300, 450, **600**	P G	1 a.m. to 3 a.m., 7 a.m. to 9 a.m., 1 p.m. to 3 p.m., 7 p.m. to 9 p.m.	0.20	2.00
Kristianiafjord [11]	LFK	200	Den Norske Amerika-Linje	300, 450, **600**	P G	N	0.40	4.00
Loin	LAP	—	Navy	—	O	—	—	—
Maricopa [80]	LEE	100–150	Wilhelm Wilhelmsen	300, **600**	P G	X	0.40	4.00

Mexicano [11]	LDH	270–320	Norway-Mexico Gulf Line	300, 600	P G	8 a.m. to 12 p.m.	0.40	4.00
Nidaros LBA	LBA	—	Navy	—	O	—	—	—
Nidaros LEK [00]	LEK	110	A/S Norsk Bjergningskompani	300, 600	P G	X	—	—
Norge	LAC	—	Navy	—	O	—	—	—
Noruega [11]	LDG	180	Norway-Mexico Gulf Line	300, 600	P G	8 a.m. to 12 p.m.	0.40	4.00
Orn II.[11]	LDV	160–270	A/S Ornen	300, 450, 600	P G	X	0.40	4.00
Ragnvald Jarl [00]	LDJ	160	Det Nordenfjeldske Dampskibssel-skab	300, 450, 600	P G	1 a.m to 3 a.m., 7 a.m. to 9 a.m., 1 p.m. to 3 p.m., 7 p.m. to 9 p.m.	0.20	2.00
Rio de Janeiro LDM [00]	LDM	200	Det Nordenfjeldske Dampskibssel-skab	300, 600	P G	X	0.40	4.00
Rio de la Plata LDN [00]	LDN	200	Det Nordenfjeldske Dampskibssel-skab	300, 600	P G	X	0.40	4.00
Ronald	LCB	Day, 270; night, 540	N. Bugge, Tönsberg	300, 600	P G	X	0.30	3.00
Sæl	LAL	—	Navy	—	O	—	—	—
Salerno [00]	LEP	150	Otto Thoresen	300, 600	P G	X	0.40	4.00
Skarv	LAR	—	Navy	—	O	—	—	—
Skrei	LAM	—	Navy	—	O	—	—	—
Sterling [00]	LDB	160	A/S Ganger Rolf	300, 600	P G	N	0.28	2.80
Svend Foyn I. [00]	LEC	Day, 215; night, 540	A/S Sydhavet (P. Bogen), Sandef-jord	300, 600	P G	X	0.40	4.00
Teist	LAS	—	Navy	—	O	—	—	—
Tordenskjold	LAD	—	Navy	—	O	—	—	—
Tore Jarl [00]	LEZ	100-150	Det Nordenfjeldske Dampskibssel-skab	300, 600	P G	X	0.20	2.00
Trods	LAO	—	Navy	—	O	—	—	—
Troll	LAJ	—	Navy	—	O	—	—	—
Tyr	LAH	—	Navy	—	O	—	—	—
Valkyrien LAK	LAK	—	Navy	—	O	—	—	—
Vega	LDP	Day, 240; night, 480	Det Bergenske Dampskibsselskab	300, 450, 600	P G	X	0.20	2.00
Venus LDO	LDO	Day, 240; night, 480	Det Bergenske Dampskibsselskab	300, 450, 600	P G	X	0.20	2.00
Viking LAF	LAF	—	Navy	—	O	—	—	—
Zeta [00]	LDR	Day, 80; night, 160	Det Bergenske Dampskibsselskab	300, 450, 600	P G	X	0.20	2.00
PERU								
Huallaga [70]	—	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—
Mantaro [70]	—	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—
Pachitea [70]	—	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—
Ucayali [70]	—	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—
Umbamba [70]	—	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—
PORTUGAL								
Adamastor	CTC	150	Navy	300, 450, 600	O	N	—	—
Africa CSA [11]	CSA	160	Empreza Nacional de Navegaçao à vapor, Lisbon	300, 450, 600	P G	N	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
PORTUGAL—*contd.*							Francs.	Francs.
Almirante Reis	CTA	150	Navy	300, 450, **600**	O	N	—	—
Ambaca [11]	CSY	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	X	0.40	4.00
Beira [11]	CSB	160	Empreza Nacional de Navegaçao à vapor, Lisbon	**300**, 450, 600	P G	N	0.40	4.00
Bolama [11]	CSO	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	X	0.40	4.00
Cabo Verde [12]	CSV	—	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	—	—	—
Cazengo [11]	CSC	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	X	0.40	4.00
Funchal [11]	CSF	100–150	Empreza Insulana de Navegaçao, Lisbon	300, **600**	P G	X	0.40	4.00
Guine [11]	CSG	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	X	0.40	4.00
Loanda [11]	CSL	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	X	0.40	4.00
Malange [11]	CSN	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	X	0.40	4.00
Moçambique [11]	CSM	160	Empreza Nacional de Navegaçao à vapor, Lisbon	**300**, 450, 600	P G	N	0.40	4.00
Peninsular [11]	CSR	—	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	—	—	—
Portugal CSP [11]	CSP	160	Empreza Nacional de Navegaçao à vapor, Lisbon	**300**, 450, 600	P G	N	0.40	4.00
S. Gabriel	CTD	150	Navy	300, 450, **600**	O	N	—	—
San Miguel [11]	CSS	100–150	Empreza Insulana de Navegaçao, Lisbon	300, **600**	P G	X	0.40	4.00
Vasco da Gama	CTB	150	Navy	300, 450, **600**	O	N	—	—
Zaire [11]	CSZ	100–150	Empreza Nacional de Navegaçao à vapor, Lisbon	300, **600**	P G	X	0.40	4.00
ROUMANIA								
Arthur von Gwinner [31]	CVG	200	Steaua de Romano	300, **600**	P G	X	0.40	4.00
Dacia CVD [80]	CVD	240	Government Marine Department	600	P R [67]	N	0.30	3.00
Imparatul Traian [80]	CVF	240	Government Marine Department	600	P R [67]	N	0.30	3.00
Principesa Maria [80]	CVM	240	Government Marine Department	600	P R [67]	N	0.30	3.00
Regele Carol I. [80]	CVC	240	Government Marine Department	600	P R [67]	N	0.30	3.00
Romania [80]	CVR	240	Government Marine Department	600	P R [67]	N	0.30	3.00

RUSSIA

Admiral Makharoff	RGK	—	Navy	—	O	Time of Petrograd	—	—
Admiral Zavoiko [80]	RNZ	325	Administration of the Province of Kamchatka	300, 600	P G ..	8 a.m. to 9 a.m., 3 p.m. to 4 p.m., 10 p.m. to 11 p.m.	0.40	—
Afon [80]	RPA	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [68]	—[80]
Aleksandria	RFI	—	Navy	—	O	—	—	—
Almaz	RKU	—	Navy	—	O	—	—	—
Amour	RGP	—	Navy	—	O	—	—	—
Anadyr	RJS	—	Navy	—	O	—	—	—
Andrei Pervozvannyi ..	RGB	—	Navy	—	O	—	—	—
Angara	RIB	—	Navy	—	O	—	—	—
Askold	RMA	—	Navy	—	O	—	—	—
Avrora	RGO	—	Navy	—	O	—	—	—
Baian	RGJ	—	Navy	—	O	—	—	—
Berezan	RKZ	—	Navy	—	O	—	—	—
Bobr	RGW	—	Navy	—	O	—	—	—
Bogatyr	RGM	—	Navy	—	O	—	—	—
Cherson [80]	RNJ	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [68]	—[68]
Dobrovolets	RHO	—	Navy	—	O	—	—	—
Donetz	RKO	—	Navy	—	O	—	—	—
Donskoi Kazak	RHW	—	Navy	—	O	—	—	—
Dounaii	RKW	—	Navy	—	O	—	—	—
Dwinsk [11]	RDK	—	Russian East Asiatic Co. ..	300, 600	—	—	—	—
Eclips [80]	REE	430	Department of Marine	300, 600, 900	P	X	0.40 [68]	—[68]
Emir Boukharskii	RHK	—	Navy	—	O	—	—	—
Ennissey	RGQ	—	Navy	—	O	—	—	—
Etakerina [11]	RNA	—	J. Whishaw	300, 600	—	—	—	—
Etakérinoslav [80]	RNH	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [68]	—[68]
Euphrate RPD [80]	RPD	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	2 a.m. to 4 a.m.,[70] 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [68]	—[68]
Evstafi	RKA	—	Navy	—	O	—	—	—
Finn	RHL	—	Navy	—	O	—	—	—
Gaidamak	RHQ	—	Navy	—	O	—	—	—
General Kondratienko ..	RHC	—	Navy	—	O	—	—	—
Gheorgii Pobedonosetz ..	RKI	—	Navy	—	O	—	—	—
Gromoboi	RGI	—	Navy	—	O	—	—	—
Guiliak	RGZ	—	Navy	—	O	—	—	—
Herta [80]	RHE	430	Department of Marine	300, 600, 900	P	X	0.40 [68]	—[68]
Iaroslavl [80]	RNO	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [68]	—[68]
Imperator Alexandre III. [80] ..	RPU	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	2 a.m. to 4 a.m., 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [68]	—[68]

Ship Stations—*Continued*

Name.	Call Signal	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
RUSSIA—*contd.*								
						Time of Petrograd	Francs.	Francs.
Imperator Nicholai I.[60] ..	RPM	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	2 a.m. to 4 a.m., 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [69]	— [69]
Imperator Nicolai II. [60] ..	RPB	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [69]	— [69]
Imperator Pavel I.	RGC	—	Navy	—	O	—	—	—
Imperator Piotre Véliki [60] ..	RPP	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	PG ..	2 a.m. to 4 a.m., 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [69]	— [69]
Imperatrizi Etakérina II. ..	RPS	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	2 a m.. to 4 a.m., 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [69]	— [69]
Ioann Zlatooust	RKC	—	Navy	—	O	—	—	—
Iolanda [6]	—	200	Madame Elisabeth Terestchenko..	300, 600	P G ..	X	0.40	—
Jérusalem [60]	RPI	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.[70]	0.40 [69]	— [69]
Kagoul	RKM	—	Navy	—	O	—	—	—
Kama	RID	—	Navy	—	O	—	—	—
Kapitan Leitenant Baranoff ..	RLE	—	Navy	—	O	—	—	—
Kapitan Saken..	RLC	—	Navy	—	O	—	—	—
Kazanets	RHU	—	Navy	—	O	—	—	—
Khrabryi	RGU	—	Navy	—	O	—	—	—
Kiev [60]	RNK	250	Volunteer Fleet	300, 600	P .. .. (provisionally)	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [69]	— [69]
Kishinev [60]	RNC	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [69]	— [69]
Korvets	RGV	—	Navy	—	O	—	—	—
Koroléva Olga [63]	RPL	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [69]	— [69]
Koubanetz	RKS	—	Navy	—	O	—	—	—
Koursk RNY [60]	RNY	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [69]	— [69]

Koursk RSK [80]	RSK	180	Cie Russe de Nav. à vapeur de l'Asie Orientale	300, 600	P G ..	N	0.40 [69]	— [69]
Kronstadt	RKX	—	Navy	—	O	—	—	—
Leitenant Chestakoff	RLB	—	Navy	—	O	—	—	—
Leitenant Zatsarennyi ..	RLD	—	Navy	—	O	—	—	—
Mandjour	RMF	—	Navy	—	O	—	—	—
Mangougai	RME	—	Navy	—	O	—	—	—
Mezen	RIJ	—	Navy	—	O	—	—	—
Mitawa [80]	RSA	200	Cie Russe de Nav. à vapeur de l'Asie Orientale	300, 600	P G ..	N	0.40 [69]	— [69]
Mohilev [80]	RNM	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [69]	— [69]
Moskvitianin	RHN	—	Navy	—	O	—	—	—
Neva	RFF	—	Navy	—	O	—	—	—
Nijni Novgorod [80]	RNE	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [69]	— [69]
Nikolæff	RGT	—	Navy	—	O	—	—	—
Novgorod [80]	RNP	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m, 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [69]	— [69]
Novik	RHA	—	Navy	—	O	—	—	—
Odessa [80]	RPE	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [69]	— [69]
Oka	RIC	—	Navy	—	O	—	—	—
Okean	RGR	—	Navy	—	O	—	—	—
Okhotnik	RHF	—	Navy	—	O	—	—	—
Oleg	RGN	—	Navy	—	O	—	—	—
Oukraina	RHT	—	Navy	—	O	—	—	—
Ouraletz	RKP	—	Navy	—	O	—	—	—
Oussouriets	RHR	—	Navy	—	O	—	—	—
Oussourri	RMD	—	Navy	—	O	—	—	—
Pallada	RGS	—	Navy	—	O	—	—	—
Pamiat Merkouria .. .	RKL	—	Navy	—	O	—	—	—
Panteleimon	RKD	—	Navy	—	O	—	—	—
Pechora	RIE	—	Navy	—	O	—	—	—
Perm [80]	RNU	250	Volunteer Fleet	300, 600	P G ..	5 a.m. to 8 a.m., 1 p.m. to 2 p.m., 8 p.m. to 11 p.m.	0.40 [68]	— [68]
Piotre Véliki [80]	RPR	110	Committee of the Riga Stock Exchange	300, 600	P G ..	—[71]	0.40	—
Pogranitchnik	RHJ	—	Navy	—	O	—	—	—
Polezny [80]	RPZ	100	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.[70]	0.40 [69]	— [69]
Poliarnaya Zviezda	RFD	—	Navy	—	O	—	—	—
Prinzessa Evguénia Oldenbourgskaia [80]	RPH	300	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G ..	12 a.m. to 2 p.m.,[70] 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [69]	— [69]
Prout	RKV	—	Navy	—	O	—	—	—
Riga	RIK	—	Navy	—	O	—	—	—
Rossia RGL	RGL	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
RUSSIA—*contd.*								
Rossia RSR [80]	RSR	250	Cie Russe de Nav. à vapeur de l'Asie Orientale	300, **600**	P G	N	Francs. 0.40 [80]	Francs. — [80]
Rostislav	RKF	—	Navy	—	O	—	—	—
Rurik	RGA	—	Navy	—	O	—	—	—
Sibirskii strelok	RHB	—	Navy	—	O	—	—	—
Sinop	RKG	—	Navy	—	O	—	—	—
Sivouch	RGX	—	Navy	—	O	—	—	—
Slava	RGH	—	Navy	—	O	—	—	—
Soukhona	RIG	—	Navy	—	O	—	—	—
Ssaratov [80]	RNG	250	Volunteer Fleet	300, **600**	P G	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [80]	— [80]
Standart	RFB	—	Navy	—	O	—	—	—
Stavropol [80]	RNS	100	Volunteer Fleet	300, **600**	P G	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [80]	— [80]
Steregouchtii	RHZ	—	Navy	—	O	—	—	—
Strachnyi	RHV	—	Navy	—	O	—	—	—
Stréla	RFG	—	Navy	—	O	—	—	—
Sviatoi Nicolai [80]	RPX	300	Cie Russe de Nav. à vapeur et de Commerce.	300, **600**	P G	12 a.m. to 2 p.m.,[70] 6 p.m. to 8 p.m., 2 a.m to 4 a.m.	0.40 [80]	— [80]
Taimir	RMH	—	Navy	—	O	—	—	—
Tambov [80]	RNW	250	Volunteer Fleet	300 **600**	P G	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [80]	— [80]
Tchikhatcheff	RPC	450	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G	12 a.m. to 2 p.m., 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [80]	— [80]
Teretz	RKT	—	Navy	—	O	—	—	—
Tigre [80]	RPT	450	Cie Russe de Nav. à vapeur et de Commerce	300, **600**	P G	2 a.m. to 4 a.m., 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [80]	— [80]
Toula [80]	RNB	250	Volunteer Fleet	300, **600**	P G	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [80]	— [80]
Tourkmen Stavropolskii	RHS	—	Navy	—	O	—	—	—
Tri Sviatitelia	RKE	—	Navy	—	O	—	—	—

Tsar Mikhail Fédorovitch [80]	RPV	450	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	2 a.m. to 4 a.m., 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [80]	— [80]
Tsesarevitch	RGF	—	Navy	—	O	—	—	—
Tséssarevitch Aléxey Nikolaievitch [80]	RPY	300	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	2 a.m. to 4 a.m., 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [80]	— [80]
Tséssarévitch Gueorgui [80]	RPF	300	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	2 a.m. to 4 a.m.,[70] 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [80]	—[80]
Tver [80]	RNT	210	Volunteer Fleet	300, 600	P G	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [80]	—[80]
Vaiguatch	RML	—	Navy	—	O	—	—	—
Vélikaïa-Kniaguinia-Xénia [80]	RPG	300	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	12 a.m. to 2 p.m.,[76] 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [80]	—[80]
Vélikaïa Kniaguinia Xénia Alexandrovna	ROD	300	Commercial Nav. School, Odessa	300, 600	P G	2 p.m. to 3 p.m., 8 p.m. to 9 p.m.	—	—
Vélikaia Kniajna Maria Nikolaievna	RNI	200	Volunteer Fleet (Training ship)	600	P	X	0.40 [80]	— [80]
Véliki-Kniaz Alexandre [80]	RPW	300	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	12 a.m. to 2 p.m.,[76] 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [80]	—[80]
Véliki-Kniaz Alexii [80]	RPQ	300	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	12 a.m. to 2 p.m.,[76] 6 p.m. to 8 p.m., 2 a.m. to 4 a.m.	0.40 [80]	—[80]
Véliki Kniaz Constantine [80]	RPO	300	Cie Russe de Nav. à vapeur et de Commerce	300, 600	P G	2 a.m. to 4 a.m.,[70] 12 a.m. to 2 p.m., 6 p.m. to 8 p.m.	0.40 [80]	—[80]
Vladimir [80]	RNV	250	Volunteer Fleet	300, 600	P G	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [80]	—[80]
Voiskovoi	RIA	—	Navy	—	O	—	—	—
Voronège [80]	RNX	250	Volunteer Fleet	300, 600	P G	5 a.m. to 8 a.m., 1 p.m. to 3 p.m., 8 p.m. to 11 p.m.	0.40 [80]	— [80]
Vsadnik	RHP	—	Navy	—	O	—	—	—
Zabaikalets	RHX	—	Navy	—	O	—	—	—
SIAM								
Bali	HGC	—	Government	300, 600	O	—	—	—
Sua Kamrensindhu	HGE	—	Government	300, 600	O	—	—	—
Sua Tayanchol	HGD	—	Government	300, 600	O	—	—	—
SOUTH AFRICA (UNION OF								
Ludwig Wiener [116]	VNA	100	Government	300, 600	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
SPAIN							Francs.	Francs.
A. Lazaro [80]	EEL	180	Cie Valencia de Vap. Corress de Africa	300, 450, 600	P G	— [78]	0.30	3.00
Alcira [80]	EEQ	100	Cie Valencia de Vap. Corress de Africa	300, 600	P G	— [78]	0.30	3.00
Alfonso XII. [11]	EDD	269	Compañia Trasatlántica	300, 600	P G	N	0.30	3.00
Alfonso XIII. [11]	EDT	269	Compañia Trasatlántica	300, 600	P G	N	0.30	3.00
Alicante [11]	EDA	269	Compañia Trasatlántica	300, 600	P G	N	0.30	3.00
Alvaro de Bazán	EBM	81	Navy	300, 600	O	N	—	—
Antonio Lopez [11]	EDL	269	Compañia Trasatlántica	300, 600	P G	N	0.30	3.00
Atlante [11]	EFA	—	Navegacio é Industria	300, 600	P G	—	0.30	3.00
Auxias March [80]	EEA	180	Cia Valencia de Vap. Corress de Africa	300, 450, 600	P G	—[78]	0.30	3.00
Balear [61]	EFR	100	Cia Isleña Marítima	300, 450, 600	P	X	—	—
Balmes [11]	ECA	275	Pinillos Izquierdo y Compañia	300, 450, 600	P G	N	0.30	3.00
Barcelo [80]	EEB	180	Cia Valencia de Vap. Corress de Africa	300, 450, 600	P G	—[78]	0.30	3.00
Barcelona ECB [11]	ECB	300	Pinillos Izquierdo y Compañia	300, 450, 600	P G	N	0.30	3.00
Bellver [61]	EFB	200	Cia Isleña Marítima	300, 400, 600	P	X	—	—
Buenos Aires EDB [11]	EDB	269	Compañia Trasatlántica	300, 600	P G	N	0.30	3.00
Cabañal [80]	EEC	180	Cia Valencia de Vap. Corress de Africa	300, 450, 600	P G	—[78]	0.30	3.00
Cadiz [11]	ECC	300	Pinillos Izquierdo y Compañia	300, 450, 600	P G	N	0.30	3.00
Canalejas [80]	EEK	100	Cia Valencia de Vap. Corress de Africa	300, 600	P G	—[78]	0.30	3.00
Catalina [11]	ECT	300	Pinillos Izquierdo y Compañia	300, 450, 600	P G	N	0.30	3.00
Cataluña EBF	EBF	216	Navy	300, 450, 550	O	N	—	—
Cataluña EDC [11]	EDC	108	Cia Trasatlántica	300, 600	P G	N	0.30	3.00
Cataluña EFC	EFC	100	Cia Isleña Marítima	300, 400, 600	P	X	—	—
C. de Eizaguirre [11]	EDE	269	Cia Trasatlántica	300, 600	P G	N	0.30	3.00
Ciudad de Cadiz [11]	EDZ	108	Cia Trasatlántica	300, 600	P G	N	0.30	3.00
C. Lopez y Lopez [11]	EDH	269	Cia Trasatlántica	300, 600	P G	N	0.30	3.00
Conde Wifredo [11]	ECW	300	Pinillos Izquierdo y Compañia	300, 450, 600	P G	N	0.30	3.00
Delfin	EFD	—	Navegacio é Industria	300, 600	P G	—	0.30	3.00
Denia [80]	EED	100	Cia Valencia de Vap. Corress de Africa	300, 600	P G	—[78]	0.30	3.00
Emperador Carlos V.	EBE	243	Navy	300, 750	O	N	—	—
Extremadura	EBJ	43	Navy	300, 525	O	N	—	—
[illegible]	[illegible]	[illegible]	Cia Trasatlántica	300, 600	P G	N	0.30	3.00

Giralda	EBI	270	Navy	300, 500, 600 1,000	O.. ..	8 p.m. to 12 p.m. N	—	—
Grao [80]	EEG	100	Cia Valencia de Vap. Corress de Africa	300, 600	P G ..	—[72]	0.30	3.00
Hesperides EFH [11]	EFH	300	Navegacio é Industria	300, 450, 600	P G ..	N	0.30	3.00
Infanta Isabel de Borbon [11]	EDI	431	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Infanta Isabel EBL	EBL	216	Navy	300, 450, 600	O	N	—	—
Infanta Isabel ECY [11] ..	ECY	300	Pinillos Iziquierdo y Compañia ..	300, 450, 600	P G ..	N	0.30	3.00
Isla de Menorca [80]	EFO	—	La Maritima cia Mahonesa ..	300, 600	P G ..	—	0.30	3.00
Isla de Panay [12]	EDP	269	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Isleño	EFI	100	Cia Isleña Marítima	300, 450, 600	P	X	—	—
Jativa [80]	EEI	100	Cia Valencia de Vap. Corress de Africa	300, 600	P G ..	—[72]	0.30	3.00
J. B. Llovera [80]	EEH	100	Cia Valencia de Vap. Corress de Africa	300, 600	P G ..	—[72]	0.30	3.00
Jorge Juan [80]	EEJ	180	Cia Valencia de Vap. Corress de Africa	300, 600	P G ..	—[72]	0.30	3.00
J. S. Sister [80]	EES	180	Cia Valencia de Vap. Corress de Africa	300, 600	P G ..	—[72]	0.30	3.00
Legazpi [12]	EDG	269	Cia Trasatlántica	300, 450, 600	P G ..	N	0.30	3.00
Leon XIII. [11]	EDO	431	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Luis Vives [80]	EEV	180	Cia Valencia de Vap. Corress de Africa	300, 600	P G ..	—[72]	0.30	3.00
Lulio	EFL	100	Cia Isleña Marítima	300, 450, 600	P	X	—	—
Mahon [80]	EFT	—	La Maritima cia Mahonesa ..	300, 600	P G ..	—	0.30	3.00
Manuel Calvo [11]	EDM	269	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Manuel L. Villaverde [12] ..	EDW	108	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Martin Sænz [11]	ECZ	300	Pinillos Izquierdo y Compañia ..	300, 450, 600	P G ..	N	0.30	3.00
M. Benlluire [80]	EEM	180	Cia Valencia de Vap. Corress de Africa	300, 600	P G ..	—[72]	0.30	3.00
Menorquin [80]	EFN	—	La Maritima cia Mahonesa ..	300, 600	P G ..	—	0.30	3.00
Miguel M. Pinillos [11]	ECP	300	Pinillos Izquierdo y Compañia ..	300, 450, 600	P G ..	N	0.30	3.00
Miramar EFM [11]	EFM	200	Cia Isleña Marítima	300, 400, 600	P	X	—	—
Monté Toro [80]	EFQ	—	La Maritima cia Mahonesa ..	300, 600	P G ..	—	0.30	3.00
Montevideo EDV [12]	EDV	269	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Montserrat [12]	EDN	269	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Norden [80]	EFZ	100	Achalandabaso Gascué y Compañia	300, 600	P	X	—	—
Pelayo	EBD	270	Navy	300, 600, 900 1,200	O	N	—	—
Pio IX. [11]	ECN	300	Pinillos Izquierdo y Compañia ..	300, 450, 600	P G ..	N	0.30	3.00
Princesa Asturias	EBG	324	Navy	300, 600, 800 1,000	O	N	—	—
Principe de Asturias [11] ..	ECS	325	Pinillos Iziquierdo y Compañia ..	300, 600	P G ..	N	0.30	3.00
P. Satrustegui [11]	EDS	431	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Reina Maria Cristina [11] ..	EDK	431	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Reina Regente	EBH	270	Navy	300, 600, 700 1,000	O	N	—	—
Reina Victoria [11]	EFV	300	Navegacio é Industria	300, 450, 600	P G ..	N	0.30	3.00
Reina Victoria Eugenia [12] ..	EDU	431	Cia Trasatlántica	300, 600	P G ..	N	0.30	3.00
Rey Jaime I.	EFJ	200	Cia Isleña Marítima	300, 400, 600	P	X	—	—
Rey Jaime II.	EFS	200	Cia Isleña Marítima	300, 450, 600	P	X	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
SPAIN—*contd.*							Francs.	Francs.
Rio de la Plata EBK	EBK	—	Navy	—	O	N	—	—
Sagunto [80]	EEO	180	Cia Valencia de Vap. Corress de Africa	300, **600**	P G	—[72]	0.30	3.00
Sitges [11]	EFG	150	Sitges Freres	300, 450, **600**	P G	N	0.30	3.00
Telmo [11]	EFZ	—	Linea de Vap. Tintoré	—	—	—	—	—
Teodoro Llorente [80]	EET	100	Cia Valencia de Vap. Corress de Africa	300, **600**	P G	—[72]	0.30	3.00
Torreblanca [11]	EFP	—	Linea de Vap. Tintoré	300, **600**	P G	—	0.30	3.00
Turia [11]	EFU	250	Linea de Vap. Tintoré	300, 450, **600**	P G	N	0.30	3.00
Valbanera [11]	ECV	300	Pinillos Izquierdo y Compañia	300, 450, **600**	P G	N	0.30	3.00
Vicente Ferrer [80]	EEF	100	Cia Valencia de Vap. Corress de Africa	300, **600**	P G	—[72]	0.30	3.00
Vicente La Roda [80]	EER	180	Cia Valencia de Vap. Corress de Africa	300, **600**	P G	—[72]	0.30	3.00
Vicente Sanz [80]	EEZ	100	Cia Valencia de Vap. Corress de Africa	300, **600**	P G	—[72]	0.30	3.00
Villarreal [80]	EEW	180	Cia Valencia de Vap. Corress de Africa	300, **600**	P G	—[72]	0.30	3.00
V. Puchol [80]	EEP	180	Cia Valencia de Vap. Corress de Africa	300, **600**	P G	—[72]	0.30	3.00
SWEDEN								
Abisko [81]	SFL	150	Reder. Lulea-Ofoten	300, 450, **600**	P	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Africanic [88]	SFS	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Äran	SBH	—	Navy	—	O	—	—	—
Atlantic [88]	SFT	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m.,	0.28	2.80

Australic [80]	SFH	250	Reder. Transatlantic, Gothenburg (Gothenburg-Australia Line)	300, **600**, 1,800	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Baltic SFU [86]	SFU	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Bia [80]	SFR	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Blenda	SBX	—	Navy	—	O	—	—	—
Boden [68]	SFW	150	Reder. Lulea-Ofoten	300, **600**	P	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Claes Horn	SBQ	—	Navy	—	O	—	—	—
Claes Flemming	SCI	—	Navy	—	O	—	—	—
Clas Uggla	SBR	—	Navy	—	O	—	—	—
Dristigheten	SBG	—	Navy	—	O	—	—	—
Drottning Viktoria [86] [88] ..	SEB	100	State Railways (Sassnitz-Trälleborg Line)	300, **375**, 600	P R, [85] O [84]	X	— [87]	— [87]
Edda	SBV	—	Navy	—	O	—	—	—
Fylgia	SBM	—	Navy	—	O	—	—	—
Göta	SBB	—	Navy	—	O	—	—	—
Hellenic [80]	SFF	250	Reder. Transatlantic, Gothenburg (Gothenburg-Australia Line)	300, **600**, 1,800	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Hugin	SCE	—	Navy	—	O	—	—	—
Indianic [80]	SFE	250	Reder. Transatlantic, Gothenburg (Gothenburg-Australia Line)	300, **600**, 1,800	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Jacob Bagge	SBP	—	Navy	—	O	—	—	—
John Ericsson	SBN	—	Navy	—	O	—	—	—
Kalix [13]	—	—	Reder. Lulea-Ofoten	300, **600**	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
SWEDEN—*contd.*							Francs.	Francs.
Kiruna [61]	SFN	150	Reder. Lulea-Ofoten	300, 450, **600**	P ..	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Konung Gustaf V.[56 60]	SEA	100	State Railways (Sassnitz-Trälleborg Line)	300, **375**, 600	P R,[55] O [56]	X	— [57]	— [57]
Kratos [60]	SFQ	250	Reder. Transatlantic, Gothenburg (Gothenburg-South Africa Line)	300, **600**	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Kronprinsessan Margareta [60] ..	SFY	300	Rederiaktiebolaget Nordstjernan (Johnson Line)	300, **600**	P	6 a.m. to 7 a.m., 11 a.m. to 12 a.m., 2 p.m. to 3 p.m., 6 p.m. to 7 p.m.	0.28	2.80
Kronprins Gustaf Adolf [60] ..	SFV	350	Rederiaktiebolaget Nordstjernan (Johnson Line)	300, **600**	P	6 a.m. to 7 a.m., 11 a.m. to 12 a.m., 2 p.m. to 3 p.m., 6 p.m. to 7 p.m.	0.28	2.80
Magne	SBZ	—	Navy	—	O	—	—	—
Manligheten	SBK	—	Navy	—	O	—	—	—
Mode	SBY	—	Navy	—	O	—	—	—
Munin	SCF	—	Navy	—	O	—	—	—
Murjek [68]	SFI	150	Reder. Lulea-Ofoten	300, 450, **600**	P ..	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Narvik [68]	SFX	150	Reder. Lulea-Ofoten	300, **600**	P	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
New Sweden [65]	—	—	Swedish America Mexico Line ..	—	—	—	—	—
Niord	SBF	—	Navy	—	O	—	—	—
Norrbotten [61]	SFK	150	Reder. Lulea-Ofoten	300, 450, **600**	P ..	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to	0.40	4.00

Oden	SBD	—	Navy	—	O	—	—	—	—
Ornen	SBO	—	Navy	—	O	—	—	—	—
Oscar II. SBL	SBL	—	Navy	—	O	—	—	—	—
Psilander	SBS	—	Navy	—	O	—	—	—	—
Ragnar	SCB	—	Navy	—	O	—	—	—	—
Rota	SBT	—	Navy	—	O	—	—	—	—
Saga SFB [80]	SFB	150	Angfartygsaktiebolaget Thule, (Gothenburg-London Line)	300, 600	P G	N	0.28	2.80
Sigurd	SCC	—	Navy	—	O	—	—	—
Sir Ernest Cassel [63]	SFP	150	Reder. Lulea-Ofoten	300, 600	P	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Skäggald	SCJ	—	Navy	—	O	—	—	—
Skuld	SBU	—	Navy	—	O	—	—	—
Sumatra [68]	—	—	Swedish East Asiatic Co.	—		—	—	—
Svea	SBA	—	Navy	—	O	—	—	—
Svensksund	SCK	—	Navy	—	O	—	—	—
Sverige	SCL	—	Navy	—	O	—	—	—
Tapperheten	SBJ	—	Navy	—	O	—	—	—
Tasmanic [80]	SFG	250	Reder. Transatlantic, Gothenburg (Gothenburg-Australia Line)	300, 600, 1,800	P	3 a.m. to 4 a.m., 7 a.m. to 8 a.m., 11 a.m. to 12 a.m., 3 p.m. to 4 p.m., 7 p.m. to 8 p.m., 11 p.m. to 12 p.m.	0.28	2.80
Texas SFD [68]	SFD	200	Svenska Amerika-Mexico Linjen	300, 600	P G	4 p.m. to 8 a.m., [77] 6 p.m. to 6 a.m. [78]	0.40	4.00
Thor	SBE	—	Navy	—	O	—	—	—
Thordön	SCH	—	Navy	—	O	—	—	—
Thule SBC	SBC	—	Navy	—	O	—	—	—
Thule SFC [80]	SFC	150	Angfartygsaktiebolaget Thule, Gothenburg (Gothenburg-London Line)	300, 600	P G	N	0.28	2.80
Tirfing	SCG	—	Navy	—	O	—	—	—
Torne [63]	SFJ	150	Reder. Lulea-Ofoten	300, 450, 600	P	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Vidar	SCD	—	Navy	—	O	—	—	—
Vollrath Tham [68]	SFO	150	Reder. Lulea-Ofoten	300, 600	P	8 a.m. to 8.15 a.m., 12 a.m. to 12.15 p.m., 4 p.m. to 4.15 p.m., 8 p.m. to 8.15 p.m.	0.40	4.00
Wale	SCA	—	Navy	—	O	—	—	—
Wasa	SBI	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
							Francs.	Francs.
***UNITED STATES OF AMERICA**								
Abangarez [113]	KDI	—	Tropical Fruit Co.	300, **600**	P G	—	—	—
Abarenda	NOB	—	Navy	600	P R [73]	—	0.20	2.00
Acushnet	NRU	75	Revenue-Cutter	300	P R [73]	N	0.20	2.00
Adeline Smith [76]	WHS	—	Inter-Ocean Transportation Co.	300, **600**	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Admiral Dewey [76]	KUV	200	Pacific Alaska Nav. Co.	300, **600**	P G	N	0.10 [103]	1.00 [103]
							0.40 [104]	4.00 [104]
Admiral Evans	WAB	350	Alaska-Pacific S.S. Co.	300, **600**	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Admiral Farragut [76]	WAF	100	Pacific-Alaska Nav. Co.	300, **600**	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Admiral Sampson [76]	WAS	200	Alaska-Pacific S.S. Co.	300, **600**	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Admiral Schley [76]	KUX	200	Pacific-Alaska Nav. Co.	300, **600**	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Admiral Watson [76]	WAW	350	Alaska-Pacific S.S. Co.	300, **600**	P G	N	0.10 [102]	1.00 [101]
							0.40 [103]	4.00 [103]
Advance	KMV	200	Panama Railroad Co.	300, **600**	P G	N	0.20	2.00
Adventuress [76]	KYV	—	John Borden	300	P	—	—	—
Aileen	—	—	Naval Militia	—	—	—	—	—
Ajax NBH	NBH	—	Navy	600	P R [73]	—	0.20	2.00
Alabama KUN [76]	KUN	—	Texas S.S. Co.	300, **600**	P G	—	—	—
Alabama NBI	NBI	—	Navy	600	P R [73]	—	0.20	2.00
Alabama WFB [105] [76]	WFB	100	Goodrich Transit Co.	300, **600**	P G	N	0.10	1.00
Alameda [76]	WAA	300	Alaska S.S. Co.	300, **600**	P G	N	0.10	1.00
Alamo [76]	KEJ	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
Alaskan	WKA	—	American Hawaiian S.S. Co.	300, **600**	—	—	—	—
Alba (El) [76]	KKL	200	Southern Pacific Co.	300, **600**	P G	X	0.20	2.00
Albany NBJ	NBJ	—	Navy	600	P R [73]	—	0.20	2.00
Alert NBL	NBL	—	Navy	600	P R [73]	—	0.20	2.00
Algonquin KVG [76]	KVG	200	Clyde S.S. Co.	300, **600**	P G	N	0.20	2.00
Algonquin NRA	NRA	150	Revenue-Cutter	300, **600**	P R [73]	N	0.20	2.00
Al-Ki [76]	WNK	200	H. C. Strong (Northland S.S. Co.)	300, **600**	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Allianca	KMA	200	Panama Railroad Co.	300, **600**	P G	N	0.20	2.00
Alliance [76]	WRV	—	North Pacific S.S. Co.	—	—	—	—	—
Almirante [113]	KLD	—	Tropical Fruit Co.	300, **600**	P G	—	—	—
Alvina	WEY	—	Thomas F. Cole	—	—	—	—	—
				300, **600**	P G	—	0.20	2.00

American	WKF	—	American Hawaiian S.S. Co.	300, 600	—	—	—	—	—
Ammen	NBP	—	Navy	600	P R [75]	—	—	—	—
Ancon	KMS	200	Panama Railroad Co.	300, 600	P G	N	0.20	2.00	
Androscoggin	NRD	150	Revenue-Cutter	300, 600	P R [75]	N	0.20	2.00	
Annapolis	NBR	—	Navy	600	P R [75]	—	0.20	2.00	
Ann Arbor No. 3 [105 122 76]	WDN	Short range	Ann Arbor Railroad Co.	300, 470, 600	P G [106]	X	0.10	1.00	
Ann Arbor No. 4 [105 122 76]	WDO	Short range	Ann Arbor Railroad Co.	300, 600	P G [106]	X	0.10	1.00	
Ann Arbor No. 5 [105 122 76]	WDP	Short range	Ann Arbor Railroad Co.	300, 600	P G [106]	X	0.10	1.00	
Antilles [76]	KKA	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00	
Apache KVA [76]	KVA	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00	
Apache NRP	NRP	100	Revenue-Cutter	300, 600	P R [75]	N	0.20	2.00	
Arapahoe [76]	KVB	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00	
Arethusa NBC	NBC	—	Navy	300, 600	P G	—	0.20	2.00	
Argyll WTB [76]	WTB	—	Union S.S. Co.	—	—	—	0.40[1.1]	1.00[101]	
							0.40[102]	4.00[102]	
Arizona [76]	WFG	90	Goodrich Transit Co.	300, 600	P G	N	0.10	1.00	
Arizonan	WKB	—	American Hawaiian S.S. Co.	300, 600	—	—	—	—	
Arkansas	NBV	—	Navy	600	P R [75]	—	0.20	2.00	
Aroline [76]	WRJ	200	Aroline S.S. Co.	300, 600	P G	N	0.10[101]	1.00[101]	
							0.40[102]	4.00[102]	
Ashtabula WEZ [107 76]	WEZ	110	Penn. & Ontario Transportation Co.	300, 600	P G	X	0.10	1.00	
Astral	KSA	—	Standard Oil Co.	300, 600	P G	—	—	—	
Asuncion WTX [76]	WTX	150	Standard Oil Co.	300, 600	P G	X	0.10[101]	1.00[101]	
							0.40[102]	4.00[102]	
Atalanta [4 76]	KVA	—	George J. Gould	—	—	—	—	—	
Atenas [116]	KDK	—	Tropical Fruit Co.	300, 600	P G	—	—	—	
Atlantic [76]	KJK	—	Emery S.S. Co.	300, 600	P G	—	—	—	
Atlantic City [76]	KMN	—	Atlantic City Transportation Co.	—	—	—	—	—	
Atlas WTT [76]	WTT	250	Standard Oil Co.	300, 600	P G	X	0.10[2.1]	1.00[2.1]	
							0.40[102]	4.00[102]	
Aztec [76]	WWQ	—	Pacific Mail S.S. Co.	300, 600	P G	X	0.10[101]	1.00[101]	
							0.40[102]	4.00[102]	
Bache	NLK	100	Department of Commerce	300, 400, 600	O	X	—	—	
Bailey	NCF	—	Navy	600	P R [76]	—	0.20	2.00	
Bainbridge	NIA	—	Navy	300, 600	P G	—	0.20	2.00	
Balch	NI I	—	Navy	300, 600	P G	—	0.20	2.00	
Baltimore	NCH	—	Navy	600	P R [75]	—	0.20	2.00	
Bantu [76]	KLM	—	United States Steel Products Co.	300, 600	—	—	—	—	
Bay State [76]	KRE	200	Eastern S.S. Corporation	300, 600	P G	X	0.20	2.00	
Beale	NCL	—	Navy	600	P R [75]	—	0.20	2.00	
Bear NRB	NRB	150	Revenue-Cutter	300, 600	P R [75]	N	0.20	2.00	
Bear WWD [76]	WWD	200	San Francisco & Portland S.S. Co.	300, 600	P G	N	0.10[101]	1.00[101]	
							0.40[102]	4.00[102]	
Beaver WWB [76]	WWB	300	San Francisco & Portland S.S. Co.	300, 600	P G	N	0.10[101]	1.00[101]	
							0.40[102]	4.00[102]	
Belfast [76]	KRD	100	Eastern S.S. Corporation	300, 600	P G	X	0.20	2.00	
Beluga [76]	WLB	—	American Deep Sea Exploration Co.	—	—	—	—	—	
Benham	NIJ	—	Navy	300, 600	P G	—	0.20	2.00	
Berkshire [76]	KQB	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00	
Berlin WRB [76 26]	WRB	—	Alaska-Portland Packers' Association	—	—	—	—	—	

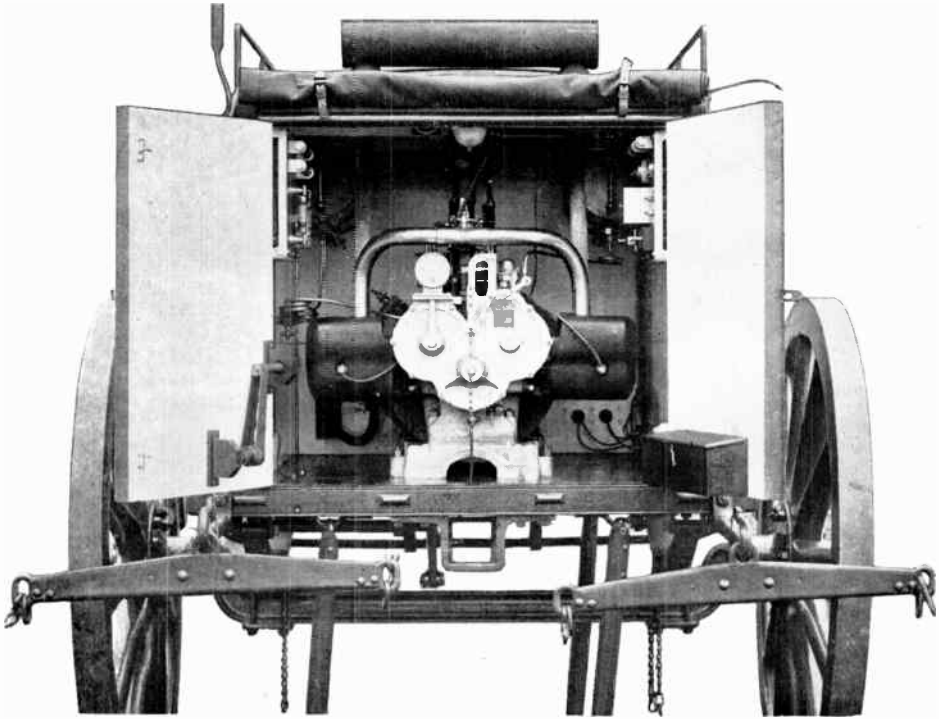
Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*cont.*							Francs.	Francs.
Bertha [76]	WBR	—	Alaska Coast Co.	—	—	—	—	—
Beverly	KND	—	Colonial Nav. Co.	—	—	—	—	—
Birmingham NCN	NCN	—	Navy	600	P R [73]	—	0.20	2.00
Boston KXA	KXA	50	New England S.S. Co.	300, 450, 500 550, **600**	P G	N	0.15	1.50
Brabant [76]	KUU	—	Texas S.S. Co.	300, **600**	—	—	—	—
Brazos [76]	KEZ	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
Breakwater [76]	WBK	—	Southern Pacific Co.	—	—	—	—	—
Brilliant KTI [76]	KTI	—	Standard Oil Co.	300, **600**	P G	—	0.20	2.00
Brindilla	KTZ	—	Standard Oil Co.	300, **600**	P G	—	—	—
Brooklyn	NFA	—	Navy	300, **600**	P G	—	0.20	2.00
Brunswick [76]	KOS	200	Gulf & Southern S.S. Co.	300, **600**	P G	N	0.20	2.00
Brutus	NNA	—	Navy	600	P R [73]	—	0.20	2.00
Buenaventura [76]	KWA	—	United States Steel Products Co.	300, **600**	—	—	—	—
Buffalo NCU	NCU	—	Navy	600	P R [73]	—	0.20	2.00
Buford	WXA	300	Army	600	P G	N	0.20	2.00
Bunker Hill [76]	KJB	—	Eastern S.S. Corporation	—	—	—	—	—
Burnside [122]	WXR	300	Army	600	O, P G [108]	—	—	—
Burrows	NCV	—	Navy	600	P R [73]	—	0.20	2.00
Cabrillo [76]	WBV	150	Wilmington Transportation Co.	300, 500, **600**	P G	X	—	—
C. A. Canfield [76]	WIH	—	Petroleum Transport Co.	300, **600**	P G	—	0.20	2.00
Cæsar NCY	NCY	—	Navy	600	P R [73]	—	0.20	2.00
Calamares [122]	KLC	—	Tropical Fruit Co.	300, **600**	—	—	—	—
California KYQ [4 76]	KYQ	—	H. R. Stocker, Esq.	—	—	—	—	—
California NCZ	NCZ	—	Navy	600	P R [73]	—	0.20	2.00
Californian WKC	WKC	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—
Caloria [76]	KSP	—	Standard Oil Co.	300, **600**	P G	—	0.20	2.00
Calvin Austin [76]	KRN	150	Eastern S.S. Corporation	300, **600**	P G	N	0.20	2.00
Camden [76]	KRC	100	Eastern S.S. Corporation	300, **600**	P G	X	0.20	2.00
Camino [76]	WQC	150	Western Steam Nav. Co.	300, **600**	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Cape Cod	KPW	—	George R. West	—	—	—	—	—
Captain A. F. Lucas [76]	WTV	150	Standard Oil Co.	300, **600**	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Captain A. M. Wetherill [114]	WYT	35	Army	300	O	—	—	—
Captain Barrett [114]	WYP	35	Army	300	O	—	—	—
Captain Chas. W. Rowell [114]	WYI	35	Army	300	O	—	—	—
Captain James Fornance [114]	WYM	35	Army	300	O	—	—	—
[illegible]	[illegible]	[illegible]	Atlantic & Caribbean St[illegible]	300, **600**	P G	N	0.20	2.00

Carlos [76]	WNC	150	Olson & Mahony	300, 600	P G	X	0.10[101] 0.40[102]	1.00[101] 4.00[102]
Carolina KGB [76]	KGB	—	New York & Porto Rico S.S. Co.	300, 600	P G	—	—	—
Carolina WFE [76]	WFE	150	Goodrich Transit Co.	300, 600	P G	N	0.10	1.00
Carrillo [113]	KDE	—	Tropical Fruit Co.	300, 600	—	—	—	—
Cartago [113]	KDD	—	Tropical Fruit Co.	300, 600	P G	—	—	—
Cassandra KYE [6 76]	KYE	—	George J. Whalen	—	—	—	—	—
Cassin	NIK	—	Navy	300, 600	P G	—	0.20	2.00
Castine	NDA	—	Navy	600	P R [73]	—	0.20	2.00
Celilo [76]	WMF	—	C. R. McCormick & Co.	300, 600	P G	N	0.10[101] 0.40[102]	1.00[101] 4.00[102]
Celtic NDB	NDB	—	Navy	600	P R [73]	—	0.20	2.00
Centralia [76]	WSN	150	T. Pollard	300, 600	P G	N	0.10[101] 0.40[102]	1.00[101] 4.00[102]
Chalmette [76]	KKC	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Charles E. Harwood [76]	WID	—	Petroleum Transport Co.	300, 600	P G	—	0.20	2.00
Charleston	NFE	—	Navy	600	P R [73]	—	0.20	2.00
Charlton Hall [76]	KLU	—	Isthmian S.S. Line	300, 600	P G	—	0.20	2.00
Chattanooga	NGI	—	Navy	600	P R [73]	—	0.20	2.00
Cherokee [76]	KVK	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00
Chester	NDG	—	Navy	600	P R [73]	—	0.20	2.00
Chester W. Chapin	KXQ	50	New England S.S. Co.	300, 450, 500 550, 600	P G	N	0.15	1.50
Cheyenne NDH	NDH	—	Navy	600	P R [73]	—	0.20	2.00
Chicago NDI	NDI	—	Naval Militia	600	P R [73]	—	0.20	2.00
Chicago WAC [76]	WAC	—	Booth Fisheries Co.	—	—	—	—	—
Chicago WFI [76]	WFI	—	Goodrich Transit Co.	—	—	—	—	—
China WWA [76]	WWA	400	Pacific Mail S.S. Co.	300, 600	P G	N	0.10[101] 0.40[102]	1.00[101] 4.00[102]
Chippewa WBH	WBH	—	Puget Sound Nav. Co.	—	—	—	—	—
Christopher Columbus [76]	WFJ	—	Goodrich Transit Co.	—	—	—	—	—
Cid (El) [76]	KKT	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Cincinnati NDL	NDL	—	Navy	600	P R [73]	—	0.20	2.00
City of Alpena II. [76]	WEH	—	Detroit & Cleveland Nav. Co.	300, 600	P G	N	0.10	1.00
City of Atlanta [76]	KFB	200	Ocean SS. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
City of Augusta [76]	KFJ	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
City of Bangor [76]	KRH	—	Eastern S.S. Corporation	—	—	—	—	—
City of Benton Harbor [76]	WDV	150	Graham & Morton Transportation Co.	300, 600	P G	N	0.10	1.00
City of Buffalo [77]	WFQ	100	Cleveland & Buffalo Transit Co.	300, 600	P G	N	0.10	1.00
City of Chicago [76]	WDT	—	Graham & Morton Transportation Co.	—	—	—	—	—
City of Cleveland III. [76]	WEA	125	Detroit & Cleveland Nav. Co.	300, 600	P G	N	0.10	1.00
City of Columbus [76]	KFA	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
City of Detroit II. [76]	WEC	100	Detroit & Cleveland Nav. Co.	300, 600	P G	N	0.10	1.00
City of Detroit III. [76]	WEF	120	Detroit & Cleveland Nav. Co.	300, 600	P G	N	0.10	1.00
City of Erie [76]	WFP	100	Cleveland & Buffalo Transit Co.	300, 600	P G	N	0.10	1.00
City of Grand Rapids [76]	WDS	—	Graham & Morton Transportation Co.	—	—	—	—	—
City of Lowell	KXB	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
City of Mackinnac II. [76]	WEB	125	Detroit & Cleveland Nav. Co.	300, 600	P G	N	0.10	1.00
City of Macon [76]	KFC	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
City of Memphis [76]	KFD	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
City of Montgomery [76]	KFY	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
City of Panama	WWP	—	Pacific Mail S.S. Co.	—	—	—	—	—
City of Para [76]	WWF	—	Pacific Mail S.S. Co.	—	—	—	—	—
City of Puebla [76]	WGQ	200	Pacific Coast Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
City of Rockland [76]	KRI	150	Eastern S.S. Corporation	300, 600	P G	X	0.20	2.00
City of St. Ignace [76]	WEG	—	Detroit & Cleveland Nav. Co.	300, 600	P G	N	0.10	1.00
City of St. Louis [76]	KFX	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
City of Savannah [76]	KFK	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
City of Seattle [76]	WGA	—	Pacific Coast S.S. Co.	300, 600	P G	N	0.10	1.00
City of South Haven [76]	WDI	—	Dunkley, Williams Co.	—	—	—	—	—
City of Sydney [76]	WWG	200	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
City of Taunton	KXL	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
City of Topeka [76]	WGY	200	Pacific Coast Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Cleveland NDM	NDM	—	Navy	600	P R [78]	—	0.20	2.00
Coamo [76]	KGA	200	New York & Porto Rico S.S. Co.	300, 600	P G	N	0.20	2.00
Col. E. L. Drake [76]	WTS	150	Standard Oil Co.	300, 600	P G	X	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Col. James M. Schoonmaker [76]	WEQ	—	Shenango S.S. Co.	300, 600	P G	X	0.10	1.00
Colon KMX	KMX	250	Panama Railroad Co.	300, 600	P G	N	0.20	2.00
Colon WHO [76]	WHO	—	American-Mexican S.S. & Trading Co.	300, 600	P G	—	0.20	2.00
Colorado KEA [76]	KEA	—	Mallory S.S. Co.	—	—	—	—	—
Colorado NDN	NDN	—	Navy	600	P R [78]	—	0.20	2.00
Columbia KRO [76]	KRO	—	Chesapeake S.S. Co.	—	—	—	—	—
Columbia KYM [6]	KYM	200	J. Harvey Ladew	300, 550	P	X	—	—
Columbia NGA	NGA	—	Navy	300, 600	P G	—	0.20	2.00
Columbian WKS	WKS	—	American-Hawaiian S.S. Co.	300, 600	P G	—	—	—
Columbia WHC [76]	WHC	150	J. H. Wilson	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Columbia WPW [76]	WPW	—	Port of Portland	—	—	—	—	—
Comal [76]	KEM	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Comanche [76]	KVC	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00
Comet KTJ [76]	KTJ	—	Standard Oil Co.	300, 600	P G	—	0.20	2.00
Commonwealth KXC	KXC	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50



Engine Cart, Marconi 1½ kw. Cart-type Station.

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Comus KKD [76]	KKD	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Concho [76]	KEC	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Concord	KNC	50	Colonial Nav. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
Congress [76]	WGT	300	Pacific Coast S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Connecticut	NDQ	—	Navy	600	PR [78]	—	0.20	2.00
Coppename [113]	KDF	—	Tropical Fruit Co.	300, 600	P G	—	—	—
Cordova WAR [76]	WAR	200	Alaska S.S. Co.	300, 600	P G	N	0.10	1.00
Coronado [76]	WSO	—	T. Pollard	—	—	—	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Corsair [4 76]	KYC	—	J. Pierpont Morgan estate	—	—	—	—	—
Creole [76]	KKR	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Cretan [76]	KQC	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Cristobal	KMD	200	Panama Railroad Co.	300, 600	P G	N	0.20	2.00
Crofton Hall [76]	KLR	—	United States Steel Products Co.	300, 600	—	—	—	—
Crook	WXB	300	Army	600	P G	N	0.20	2.00
Cuba [76]	KPK	—	Merritt & Chapman Derrick & Wrecking Co.	—	—	—	—	—
Culgoa	NDU	—	Navy	600	P R [78]	—	0.20	2.00
Cummings	NIL	—	Navy	300, 600	P G	—	0.20	2.00
Curaçao [76]	WGK	—	Pacific Coast Co.	—	—	—	—	—
Currier [76]	KNU	200	Cuba Distilling Co.	300, 600	P G	X	0.20	2.00
Cushing	NIM	—	Navy	300, 600	P G	—	0.20	2.00
C. W. Morse [114 76]	KMO	—	McAllister Bros.	—	—	—	—	—
Cyclops NDY	NDY	—	Navy	600	P R [78]	—	0.20	2.00
Cyprus [4 76]	KYD	—	Daniel C. Jackling	—	—	—	—	—
Dacia KGD [76]	KGD	—	Edward M. Breitung	—	—	—	0.20	2.00
Dakotan [76]	WKD	200	American-Hawaiian S.S. Co.	300, 600	P G	N	0.20	2.00
Damara [76]	WNM	—	Edgar F. Luckenbach	—	—	—	—	—
Decatur	NIC	—	Navy	300, 600	P G	—	0.20	2.00
Delaware NEK	NEK	—	Navy	600	P R [78]	—	0.20	2.00
Delaware Sun [76]	KTW	250	Sun Co.	300, 600	P G	8 a.m. to 12 p.m.	0.20	2.00
Delhi [76]	WGD	—	Pacific Coast S.S. Co.	—	—	—	—	—
Denver KED [76]	KED	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Denver NEM	NEM	—	Navy	600	P R [78]	—	0.20	2.00
Des Moines	NEN	—	Navy	600	P R [78]	—	0.20	2.00
Dia (El) [76]	KKY	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Diamond Head	WNL	—	Tyee Co.	—	—	—	—	—
Dirigo [76]	WAO	—	Alaska S.S. Co.	—	—	—	—	—
Dix	WXC	300	Army	600	P G	N	0.20	2.00
Dixie	NEP	—	Navy	600	P R [78]	—	0.20	2.00
Dolphin NEQ	NEQ	—	Navy	600	P R [78]	—	0.20	2.00
Dolphin WAU [76]	WAU	200	Alaska S.S. Co.	300, 600	P G	N	0.10	1.00
Don Juan de Austria	—	—	Naval Militia	—	—	—	—	—
Dora [76]	WAH	—	Alaska S.S. Co.	—	—	—	—	—
Dorchester [76]	KQD	150	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Dorothea	—	—	Naval Militia	—	—	—	—	—
Dorothy Bradford [76]	KNA	100	Cape Cod S.S. Co.	300, 600	P G	X	0.20	2.00
Downes	NIN	—	Navy	300, 600	P G	—	0.20	2.00
Drayton	NET	—	Navy	600	P R [78]	—	0.20	2.00
Dubuque	NEU	—	Naval Militia	300, 600	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Duncan NIR	NIR	—	Navy	300, 600	P G	—	0.20	2.00
E-1	NXS	—	Navy	600	P R [73]	—	0.20	2.00
E-2	NXT	—	Navy	600	P R [73]	—	0.20	2.00
E. G. Crosby [76]	WEL	—	Crosby Transportation Co.	—	—	—	—	—
Eagle NFC	NFC	—	Navy	600	P R [73]	—	0.20	2.00
Eastern States [76]	WEE	125	Detroit & Cleveland Nav. Co.	300, 600	P G	N	0.10	1.00
Eastland [76]	WFN	—	Eastland Nav. Co.	300, 600	P G	N	0.10	1.00
Edgar H. Vance [76]	WQE	—	Nehalem S.S. Co.	—	—	—	—	—
Edith [76]	WAE	—	Alaska S.S. Co.	—	—	—	—	—
Edward L. Doheny [76]	WIE	—	Petroleum Transport Co.	300, 600	P G	—	0.20	2.00
Elcano	NFD	—	Navy	600	P R [73]	—	0.20	2.00
Elfrida	—	—	Naval Militia	—	—	—	—	—
Elmer A. Keeler	KVU	—	Elmer A. Keeler	—	—	—	—	—
Enterprise [74]	WMN	200	Matson Nav. Co.	300, 600	P G	X	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Erskine M. Phelps [76]	WTA	—	A. Sewall & Co.	—	—	—	—	—
E. R. Sterling [86]	WIS	—	Sterling Ship Co.	300, 600	—	—	—	—
Esparta [119]	KDL	—	Tropical Fruit Co.	300, 600	P G	—	0.10 [101]	1.00 [101]
							0.40 [1 2]	4.00 [102]
Esperanza [76]	KWZ	200	New York & Cuba Mail S.S. Co.	300, 600	P G	N	0.20	2.00
Essex	—	—	Naval Militia	—	—	—	—	—
Essex KQE [76]	KQE	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Excelsior KKO [77]	KKO	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Explorer [109]	NLI	100	Navy	300, 600	O	X	—	—
F-1	NXU	—	Navy	300, 600	P G	—	0.20	2.00
F-2	NXV	—	Navy	300, 600	P G	—	0.20	2.00
F-3	NXW	—	Navy	300, 600	P G	—	0.20	2.00
F-4	NXX	—	Navy	300, 600	P G	—	0.20	2.00
F. A. Kilburn [76]	WRW	300	North Pacific S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Fanning	NFM	—	Navy	600	P R [73]	—	0.20	2.00
Farragut	NVS	—	Navy	300, 600	P G	—	0.20	2.00
Favorite [76]	WCF	—	Great Lakes Towing Co.	—	—	N	0.10	1.00
Finland [76]	KSF	—	American Line	—	—	—	—	—
Florence KYF [4 76]	KYF	—	Alphonse H. Alker	—	—	—	—	—
Florida KUS [76]	KUS	—	Texas S.S. Co.	—	—	—	—	—
Florida NFR	NFR	—	Navy	600	P R [73]	—	0.20	2.00

Flusser	NFS	—	Navy	600	P R [73]	—	0.20	2.00
Fort Bragg [76]	WST	—	C. H. Higgins & Co.	—	—	—	—	—
Forward KPF	KPF	—	Yankee Salvage Association	—	—	—	—	—
Francis Hanify [76]	KRA	—	J. R. Hanify Co.	300, 600	P G	—	0.20	2.00
Frank H. Buck [76]	WTO	—	Associated Oil Co.	—	—	—	—	—
Frieda [76]	KFF	100	Union Sulphur Co.	300, 600	P G	N	0.20	2.00
G-1	NXY	—	Navy	300, 600	P G	—	0.20	2.00
G-2	NXZ	—	Navy	300, 600	P G	—	0.20	2.00
G-3	NYA	—	Navy	300, 600	P G	—	0.20	2.00
G-4	NYB	—	Navy	300, 600	P G	—	0.20	2.00
Galveston	NGD	—	Navy	600	P R [73]	N	0.20	2.00
General A. M. Randol [116]	WYJ	35	Army	300	O	—	—	—
General E. A. C. Ord [116]	WYF	35	Army	400, 600	O	—	—	—
General Harvey Brown [116]	WYK	35	Army	300	O	—	—	—
General Henry J. Hunt [116]	WYD	35	Army	400	O	—	—	—
General Henry Knox [116]	WYE	35	Army	400	O	—	—	—
General Hubbard [76]	WMT	—	Hubbard S.S. Co.	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
General R. B. Ayres [114]	WYL	35	Army	300	O	—	—	—
General Robert Anderson [114]	WYH	35	Army	300	O	—	—	—
General Royal T. Frank [116]	WYA	35	Army	300	O	—	—	—
General S. N. Mills [114]	WYB	200	Army	300, 600	O	—	—	—
Geo. W. Elder [76]	WRT	—	North Pacific S.S. Co.	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
George W. Fenwick [76]	WNG	—	Fenwick S.S. Co.	—	—	—	—	—
Georgia NGF	NGF	—	Navy	600	P R [73]	—	0.20	2.00
Georgia WFA [76]	WFA	—	Goodrich Transit Co.	—	—	—	—	—
Georgian WKG [76]	WKG	150	American-Hawaiian S.S. Co.	300, 600	P G	X	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Glacier	NGH	—	Navy	600	P R [73]	—	0.20	2.00
Glory of the Seas [76]	WBZ	—	Glacier Fisheries Co.	—	—	—	—	—
Gloucester KQG [76]	KQG	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Gloucester NSL	NSL	—	Naval Militia	—	—	—	—	—
Goldsborough	NGJ	—	Navy	600	P R [73]	—	0.20	2.00
Gopher	—	—	Naval Militia	—	—	—	—	—
Governor [76]	WGR	200	Pacific Coast S.S. Co.	300, 600	P G	N	0.10	1.00
Governor Cobb [76]	KRB	100	Eastern S.S. Corporation	300, 600	P G	N	0.20	2.00
Governor Dingley [76]	KRV	200	Eastern S.S. Corporation	300, 600	P G	N	0.20	2.00
Grace Dollar [76]	WSF	250	Grace Dollar S.S. Co.	300, 600	P G	X	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Great Northern [76]	WIR	—	Great Northern Pacific S.S. Co.	300, 600	P G	—	0.20	2.00
Grecian [76]	KQR	200	Merchants and Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Greenwood [76]	WQG	—	Greenwood S.S. Co.	—	—	—	—	—
Gresham	NRG	300	Revenue-Cutter	300, 600, 750	P R [73]	N	0.20	2.00
Guardian [76] [129]	WGZ	—	Central & South American Telegraph Co.	—	—	—	—	—
Gulflight [76]	KUA	—	Gulf Refining Co.	300, 600	P G	—	—	—
Gulfoil [76]	KTG	200	Gulf Refining Co.	300, 600	P G	X	0.20	2.00
Gulfstream [76]	KTB	—	Gulf Refining Co.	300, 600	P G	—	—	—
H-1	NYC	—	Navy	300, 600	P G	—	0.20	2.00
H-2	NYD	—	Navy	300, 600	P G	—	0.20	2.00
H-3	NYE	—	Navy	300, 600	P G	—	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Hamilton [76]	KOA	200	Old Dominion S.S. Co.	300, 600	P G	N	0.20	2.00
Hancock	NHI	—	Navy	300, 600	P G	—	0.20	2.00
Hannibal NGU	NGU	—	Navy	600	P R [73]	—	0.20	2.00
Harvester (The)	WCR	—	Wisconsin Steel Company	300, 600	P G	—	0.10	1.00
Havana [76]	KWH	200	New York & Cuba Mail S.S. Co.	300, 600	P G	N	0.20	2.00
Hawaiian	WKU	—	American Hawaiian S.S. Co.	300, 600	—	—	—	—
Hawk	—	—	Naval Militia	—	—	—	—	—
Hector	NGX	—	Navy	600	P R [73]	—	0.20	2.00
Helena —[76]	—	—	Armour Grain Co.	—	—	—	—	—
Helena NGY	NGY	—	Navy	600	P R [73]	—	0.20	2.00
Henley	NHA	—	Navy	600	P R [73]	—	0.20	2.00
Henry M. Flagler [76]	KOX	—	Florida East Coast Railway Co.	300, 600	—	—	—	—
Henry T. Scott [76]	WRA	—	Eschen & Minor, Ltd.	—	—	—	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Herbert G. Wylie [76]	WIF	—	Petroleum Transport Co.	300, 600	P G	—	0.20	2.00
Heredia [119]	KDH	—	Tropical Fruit Co.	300, 600	P G	—	—	—
Hermosa [76]	WBP	—	Wilmington Transportation Co.	—	—	—	—	—
Hilonian [76]	WMM	150	Matson Nav. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Holland WDW [76]	WDW	—	Graham & Morton Transportation Co.	—	—	—	—	—
Honolulan [76]	WKH	200	American-Hawaiian S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Hopkins	NHC	—	Navy	600	P R [73]	—	0.20	2.00
Howard [76]	KQH	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Howick Hall [76]	KLT	—	—	—	—	—	—	—
Hull	NHE	—	Navy	600	P R [73]	—	0.20	2.00
Humboldt [76]	WHX	200	Humboldt S.S. Co.	300, 600	P G	N	0.10	1.00
Huron [76]	KVH	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00
Hyades [76]	WMK	200	Matson Nav. Co.	300, 600	P G	X	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Iaqua	WLI	100	John A. McGregor	300, 600	P G	X	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Idaho NHN	NHN	—	Navy	600	P R [73]	—	0.20	2.00
I. D. Fletcher [86] [76]	KFI	—	Coast Transit Co.	—	—	—	—	—
I. J. Merritt	KRQ	—	Merritt & Chapman Derrick & Wrecking Co.	—	—	—	—	—
Illinois KTH [76]	KTH	—	Texas S.S. Co.	—	—	—	—	—

Illinois NHO	NHO	—	Navy	600	P R [78]	—	0.20	2.00
Illinois WCZ [76]	WCZ	—	Northern Michigan Transportation Co.	—	—	—	—	—
Independent [78]	WPI	—	Weiding & Independent Fisheries Co.	—	—	—	—	—
Indian KQI [76]	KQI	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Indiana NHQ	NHQ	—	Navy	600	P R [78]	—	0.20	2.00
Indiana WFC [126 76]	WFC	100	Goodrich Transit Co.	300, 600	P G	N	0.10	1.00
Iowan	WKJ	—	American-Hawaiian S.S. Co.	300, 600	P G	9 a.m. to 12 a.m., 2 p.m. to 5 p.m., 8 p.m. to 10.30 p.m.	0.20 [101] 0.40 [102]	2.00 [101] 4.00 [102]
Iowa NHT	NHT	—	Navy	600	P R [78]	—	0.20	2.00
Iowa WFD [107 76]	WFD	90	Goodrich Transit Co.	300, 600	P G	N	0.10	1.00
Iris NHU	NHU	—	Navy	600	P R [78]	—	0.20	2.00
Iroquois KVF [76]	KVF	—	Clyde S.S. Co.	—	—	—	—	—
Iroquois NHV	NHV	—	Navy	600	P R [78]	—	0.20	2.00
Iroquois WBG [76]	WBG	—	Puget Sound Nav. Co.	—	—	—	—	—
Isthmian	WKI	—	American-Hawaiian S.S. Co.	300, 600	P G	—	—	—
Itasca	NRI	150	Revenue-Cutter	300, 600	P R [78]	N	0.20	2.00
J. A. Chanslor [76]	WTK	—	Associated Oil Co.	—	—	—	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
James Duane	KIJ	—	New York City Fire Department	—	—	—	—	—
Jamestown [76]	KOC	200	Old Dominion S.S. Co.	300, 600	P G	N	0.20	2.00
Jarvis	NIB	—	Navy	600	P R [78]	—	0.20	2.00
Jason NNB	NNB	—	Navy	300, 600	P G	—	0.20	2.00
J. B. Stetson [76]	WRC	150	Hicks Hauptman Lumber Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Jefferson KOD [76]	KOD	200	Old Dominion S.S. Co.	300, 600	P G	N	0.20	2.00
Jefferson WAJ [76]	WAJ	150	Alaska S.S. Co.	300, 600	P G	N	0.10	1.00
Jenkins	NID	—	Navy	600	P R [78]	—	0.20	2.00
J. L. Luckenbach [76]	KGT	—	Edgar F. Luckenbach	300, 600	—	—	—	—
J. M. Guffey [76]	KTF	200	Gulf Refining Co.	300, 600	P G	X	0.20	2.00
John A. Hooper [78]	WSJ	150	Sudden & Christenson	300, 600	P G	X	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
John D. Rockefeller [76]	KTO	—	Standard Oil Co.	300, 600	—	—	—	—
Joseph Henry	WXT	130	Army	600	O, P G [106]	—	—	—
Joseph Pulitzer [76]	WPZ	—	Port of Portland	—	—	—	—	—
Jouett	NIE	—	Navy	600	P R [78]	—	0.20	2.00
Juniata KQJ [76]	KQJ	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Juniata WCB [76]	WCB	150	Anchor Line (Erie & Western Transportation Co.)	300, 600	P G	N	0.10	1.00
Jupiter NNC	NNC	—	Navy	300, 600	P G	—	0.20	2.00
Justin	NNJ	—	Navy	300, 600	P G	—	0.20	2.00
K—1	NYF	—	Navy	300, 600	P G	—	0.20	2.00
K—2	NYG	—	Navy	300, 600	P G	—	0.20	2.00
K—3	NYH	—	Navy	300, 600	P G	—	0.20	2.00
K—4	NYI	—	Navy	300, 600	P G	—	0.20	2.00
K—5	NYJ	—	Navy	300, 600	P G	—	0.20	2.00
K—6	NYK	—	Navy	300, 600	P G	—	0.20	2.00
K—7	NYL	—	Navy	300, 600	P G	—	0.20	2.00
K—8	NYM	—	Navy	300, 600	P G	—	0.20	2.00
Kansan	WKK	—	American-Hawaiian S.S. Co.	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
							Francs.	Francs
Kansas City [76]	WWS	—	San Francisco & Portland S.S. Co.	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Kansas NIO	NIO	—	Navy	600	P R [78]	—	0.20	2.00
Karina KYR [6 76]	KYR	—	Robert E. Todd	—	—	—	—	—
Kearsarge	NIP	—	Navy	600	P R [78]	—	0.20	2.00
Kentra [76]	KLN	—	United States Steel Products Co.	300, 600	—	—	—	—
Kentuckian	WKE	—	American-Hawaiian S.S. Co.	300, 600	P G	—	—	—
Kentucky NIQ	NIQ	—	Navy	600	P R [78]	—	0.20	2.00
Kershaw [76]	KQK	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Kilpatrick	WXD	300	Army	600	P G	N	0.20	2.00
Kingfisher	WPK	—	New England Fish Co.	—	—	—	—	—
Kismet [6]	KYK	—	Bob Myers Babcock	—	—	—	—	—
Klamath [76]	WSX	150	C. R. McCormick & Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Korea [76]	WWK	400	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Kroonland [76]	KSH	—	American Line	—	—	—	—	—
Kukui [118]	NLF	100	Navy	300, 600	O	X	—	—
Kvichak [76]	WNS	—	Alaska Packers' Association	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Lakeland [76]	WDL	—	Port Huron & Duluth S.S. Co.	300, 600	P G	N	0.10	1.00
Lakeport [76]	WDJ	—	Port Huron & Duluth S.S. Co.	—	—	—	—	—
Lakewood [76]	WDK	—	Port Huron & Duluth S.S. Co.	—	—	—	—	—
Lama	KSI	—	Standard Oil Co.	—	—	—	—	—
Lampasas [76]	KEP	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Lamson	NIW	—	Navy	600	P R [78]	—	0.20	2.00
Lansing [76]	WTC	150	Union S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Larimer [76]	KTA	200	Gulf Refining Co.	300, 600	P G	X	0.20	2.00
Latouche [76]	WAI	—	Alaska S.S. Co.	300, 600	P G	X	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Lawrence	NIY	—	Navy	600	P R [78]	—	0.20	2.00
Lebanon	NIZ	—	Navy	600	P R [78]	—	0.20	2.00
Leelanaw [76]	WNI	200	Leelanaw S.S. Co.	300, 600	P G	X	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Lenape [76]	KVL	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00
Leonidas NNH	NNH	—	Navy	300, 600	P G	N	0.20	2.00
Lewis Luckenbach [76]	WNH	—	Edgar F. Luckenbach	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]

Lexington KNB [110]	KNB	50	Colonial Nav. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
Lexington KQL [76]	KQL	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Ligonier [76]	KTD	150	Gulf Refining Co.	300, 600	P G	X	0.20	2.00
Liscum	WXE	300	Army	600	P G	N	0.20	2.00
Logan	WXF	300	Army	600	P G	N	0.20	2.00
Louise [76]	KRL	—	Tolchester Beach Improvement Co.	—	—	—	—	—
Louisiana KUL [76]	KUL	—	Texas S.S. Co.	300, 600	P G	—	—	—
Louisiana NJB	NJB	—	Navy	600	P R [72]	—	0.20	2.00
Lundin Power [115, 76]	KVX	—	Welin Marine Equipment Co.	—	—	—	—	—
Lurline [76]	WML	300	Matson Nav. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Lydonia [4, 76]	WDY	—	W. A. Lydon	—	—	—	—	—
Lyra WNF [76]	WNF	300	Edgar F. Luckenbach	300, 600	P G	X	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Lysistrata [6, 74]	KYL	—	James Gordon Bennett	—	—	—	—	—
Macdonough	NJH	—	Navy	600	P R [72]	—	0.20	2.00
Machias	NQL	—	Naval Militia	300, 600	P G	—	0.20	2.00
Mackinaw [76]	WHW	300	Schubach-Hamilton S.S. Co.	300, 600	P G	X	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Madison [76]	KOG	200	Old Dominion S.S. Co.	300, 600	P G	N	0.20	2.00
Maine KXD	KXD	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
Maine NJL	NJL	—	Navy	600	P R [72]	—	0.20	2.00
Major Evan Thomas [114]	WYO	35	Army	300	O	—	—	—
Major Samuel Ringgold [116]	WYC	35	Army	300	O	—	—	—
Manchuria [76]	WWE	250	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Manitou WFW [76]	WFW	125	Northern Michigan Transportation Co.	300, 600	P G	N	0.10	1.00
Manning	NRN	150	Revenue-Cutter	300, 600	P R [73]	N	0.20	2.00
Manoa [76]	WMQ	200	Matson Nav. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Maracaibo [76]	KDM	200	Atlantic & Caribbean Steam Nav. Co.	300, 600	P G	N	0.20	2.00
Maracas [76]	KMR	—	New York Transatlantic S.S. Co.	300, 600	P G	—	0.40	4.00
Marblehead	—	—	Naval Militia	—	—	—	—	—
Marietta	NJQ	—	Navy	600	P R [72]	—	0.20	2.00
Mariposa [76]	WHP	200	Alaska S.S. Co.	300, 600	P G	N	0.10	1.00
Marowijne [113]	KDR	—	Tropical Fruit Co.	300, 600	P G	—	—	—
Marquette & Bessemer No. 1 [76]	WEW	125	Marquette & Bessemer Dock & Nav. Co.	300, 600	P G	X	0.10	1.00
Marquette & Bessemer No. 2 [76]	WEX	125	Marquette & Bessemer Dock & Nav. Co.	300, 600	P G	N	0.10	1.00
Mars NJR	NJR	—	Navy	600	P R [72]	—	0.20	2.00
Maryland NJS	NJS	—	Navy	600	P R [72]	—	0.20	2.00
Mascotte [76]	KOW	—	Peninsular & Occidental S.S. Co.	—	—	—	—	—
Massachusetts KJM [76]	KJM	—	Eastern S.S. Corporation	—	—	—	—	—
Massachusetts NJT	NJT	—	Navy	600	P R [72]	—	0.20	2.00
Matsonia [76]	WMP	250	Matson Nav. Co.	300, 600	P G	X	0.40 0.10 [101] 0.40 [102]	4.00 1.00 [101] 4.00 [102]
Maverick [76]	WTW	—	Standard Oil Co.	—	—	—	—	—
Mayflower	NJV	—	Navy	600	P R [72]	—	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Mayrant	NJU	—	Navy	600	P R [78]	—	0.20	2.00
McCall	NJW	—	Navy	600	P R [78]	—	0.20	2.00
McClellan	WXH	300	Army	600	P G	N	0.20	2.00
McCulloch	NRH	150	Revenue-Cutter	300, **600**	P R	N	0.20	2.00
McDougal	NIT	—	Navy	300, **600**	P G	—	0.20	2.00
Meade	WXG	300	Army	600	P G	N	0.20	2.00
Medina KEI [76]	KEI	—	Mallory S.S. Co.	300, **600**	—	—	—	—
Merrimack [76]	KQM	200	Merchants & Miners Transportation Co.	300, **600**	P G	N	0.20	2.00
Merritt	WXI	300	Army	600	P G	N	0.20	2.00
Metapan [118]	KLF	—	Tropical Fruit Co.	300, **600**	—	—	—	—
Mexican	WKL	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—
Mexico KWX [76]	KWX	200	New York & Cuba Mail S.S. Co.	300, **600**	P G	N	0.20	2.00
Miami KOZ [76]	KOZ	—	Peninsular & Occidental S.S. Co.	—	—	—	—	—
Miami NRQ	NRQ	300	Revenue-Cutter	300, **600**, 750	P R [73]	N	0.20	2.00
Michigan NJZ	NJZ	—	Navy	600	P R [78]	—	0.20	2.00
Millinocket [76]	KNM	200	A. H. Bull S.S. Co.	300, **600**	P G	N	0.20	2.00
Mills [76]	KRR	—	Ogden Mills	—	—	—	—	—
Milwaukee NFB	NFB	—	Navy	300, **600**	P G	—	0.20	2.00
Minneapolis NGB	NGB	—	Navy	300, **600**	P G	—	0.20	2.00
Minnesota—[76]	—	—	Chicago and Duluth Trans. Co.	—	—	—	—	—
Minnesotan [76]	WKM	200	American Hawaiian S.S. Co.	300, **600**	P G	X	0.20	2.00
Minnesota NKD	NKD	—	Navy	600	P R [78]	—	0.20	2.00
Minnesota WEK [76]	WEK	—	Crosby Transportation Co.	—	—	—	—	—
Minnesota WMI [76]	WMI	250	Great Northern S.S. Co.	300, **600**	P G	N	0.10	1.00
Mississippi NKE	NKE	—	Navy	600	P R [78]	—	0.20	2.00
Missourian	WKX	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—
Missouri NKF	NKF	—	Navy	600	P R [78]	—	0.20	2.00
Missouri WFX [76]	WFX	—	Northern Michigan S.S. Co.	—	—	—	—	—
Mohawk KXE	KXE	50	New England S.S. Co.	300, 450, 500, 550, **600**	P G	N	0.15	1.50
Mohawk KVM [76]	KVM	200	Clyde S.S. Co.	300, **600**	P G	N	0.20	2.00
Mohawk KYU [4]	KYU	10	Ralph E. Barry	300	P	X	—	—
Mohawk NRM	NRM	150	Revenue-Cutter	300, **600**	P R [78]	N	0.20	2.00
Mohegan [120]	KXM	50	New England S.S. Co.	300, 450, 500, 550, **600**	P G	N	0.15	1.50
Momus [76]	KKM	200	Southern Pacific Railway	300, **600**	P G	N	0.20	2.00
Monadnock	NKJ	—	Navy	600	P R [78]	—	0.20	2.00
Monaghan	NKL	—	Navy	600	P R [78]	—	0.20	2.00

Mongolia WWN [76]	WWN	—	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Monocacy	NQQ	—	Navy	300, 600	P G	—	0.20	2.00
Montana	NKM	—	Navy	600	P R [75]	—	0.20	2.00
Montanan	WKN	—	American-Hawaiian S.S. Co.	—	—	—	—	—
Montauk	KNT	—	Montauk S.S. Co.	—	—	—	—	—
Monterey KWY [76]	KWY	200	New York & Cuba Mail S.S. Co.	300, 600	P G	N	0.20	2.00
Monterey NKN	NKN	—	Navy	600	P R [75]	—	0.20	2.00
Montgomery	NKO	—	Navy	600	P R [75]	—	0.20	2.00
Morrill	NRC	75	Revenue-Cutter	300	P R [75]	N	0.20	2.00
Morro Castle [76]	KWC	200	New York & Cuba Mail S.S. Co.	300, 600	P G	N	0.20	2.00
Multnomah [76]	WMA	—	Chas. R. McCormick & Co.	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Nacoochee [76]	KFP	200	Ocean S.S. Co. (Savannah Line)	300, 600	P G	N	0.20	2.00
Nann Smith [76]	WBO	150	Inter-Ocean Transportation Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [10-]	4.00 [102]
Nanshan	NNK	—	Navy	600	P R [75]	—	0.20	2.00
Nashville	NKY	—	Navy	600	P R [75]	—	0.20	2.00
Navajo NKZ	NKZ	—	Navy	600	P R [75]	—	0.20	2.00
Navajo WNJ [76]	WNJ	—	Western Steam Nav. Co.	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Navesink [117]	WXU	100	Army	400, 600, 800	O	—	—	—
Nebraska	NMA	—	Navy	600	P R [75]	—	0.20	2.00
Nebraskan	WKY	200	American-Hawaiian S.S. Co.	300, 600	P G	—	0.20 [101]	2.00 [101]
							0.40 [102]	4.00 [102]
Neches [76]	KEE	—	Mallory S.S. Co.	300, 600	—	—	—	—
Nelson [76]	KNL	250	Cuba Distilling Co.	300, 600	P G	X	0.20	2.00
Nemo	KZE	—	Emil J. Simon	300, 450, 600	P	—	—	—
Neptune NMS	NMS	—	Navy	600	P R [75]	—	0.20	2.00
Nereus	NNF	—	Navy	300, 600	P G	—	0.20	2.00
Nero	NMB	—	Navy	600	P R [75]	—	0.20	2.00
Nevadan	WKZ	—	American Hawaiian S.S. Co.	300, 600	P G	—	—	—
New Hampshire KXF	KXF	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
New Hampshire NME	NME	—	Navy	600	P R [75]	—	0.20	2.00
New Haven KXN [116]	KXN	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
New Jersey NMF	NMF	—	Navy	600	P R [75]	—	0.20	2.00
New Orleans	NMG	—	Navy	600	P R [75]	—	0.20	2.00
Newport NMH	NMH	—	Navy	300, 600	P G	—	0.20	2.00
Newport WWH [76]	WWH	300	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
New York KSN [76]	KSN	—	American Line	—	—	—	—	—
New York NCC	NCC	—	Navy	300, 600	P G	—	0.20	2.00
Niagara KYN [4] [76]	KYN	—	Howard Gould	—	—	—	—	—
Nicholson	NIU	—	Navy	300, 600	P G	—	0.20	2.00
Noma [6] [76]	KYO	—	Vincent Astor	—	—	—	—	—
Norman Bridge [76]	WIG	—	Petroleum Transport Co.	300, 600	P G	—	0.20	2.00
Norte (El) [76]	KKN	—	Southern Pacific Co.	—	—	—	—	—
North American [76]	WEN	110	Chicago, Duluth & Georgian Bay Transit Co.	300, 600	P G	N	0.10	1.00
North Carolina	NMN	—	Navy	600	P R [75]	—	0.20	2.00
North Dakota	NMO	—	Navy	600	P R [75]	—	0.20	2.00
Northern Pacific [76]	WIM	—	Great North Pacific S.S. Co.	300, 600	P G	—	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
North Land KJD [76]	KJD	200	Eastern S.S. Corporation	300, **600**	P G	N	0.20	2.00
North Land WCN [76]	WCN	150	Northern S.S. Co.	300, **600**	P G	N	0.10	1.00
Northland WNX [76]	WNX	—	E. J. Dodge Co.	—	—	—	—	—
North Star KJS [76]	KJS	200	Eastern S.S. Corporation	300, **600**	P G	N	0.20	2.00
North Star KYZ [4] [76]	KYZ	—	Cornelius Vanderbilt	—	—	—	—	—
North Star WHR [76]	WHR	—	Libby, McNeill and Libby	—	—	—	—	—
Northwestern KUO [76]	KUO	—	Texas S.S. Co.	300, **600**	—	—	—	—
Northwestern WAN [76]	WAN	250	Alaska S.S. Co.	300, **600**	P G	N	0.10	1.00
North Wind [4]	KYB	75	Chas. M. Clark	300	P	X	—	—
Norwood [76]	WSG	150	Sudden & Christenson	300, **600**	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Nueces [76]	KEH	200	Mallory S.S. Co.	300, **600**	P G	N	0.20	2.00
Nushagak [76]	WNE	—	Alaska Packers' Association	—	—	—	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Nyack [76]	WEJ	—	Crosby Transportation Co.	—	—	—	—	—
O'Brien NIV	NIV	—	Navy	300, **600**	P G	—	0.20	2.00
Occidente (El) [76]	KKX	200	Southern Pacific Co.	300, **600**	P G	N	0.20	2.00
Oceana [76]	KNV	—	Bermuda America S.S. Corporation	300, **600**	—	—	—	—
Octorara [76]	WCD	150	Anchor Line (Erie & Western Transportation Co.)	300, **600**	P G	N	0.10	1.00
Ohio	NMW	—	Navy	600	P R [78]	—	0.20	2.00
Ohioan	WKQ	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—
Old Colony [76]	KJO	—	Eastern S.S. Corporation	—	—	—	—	—
Oleum [76]	WTD	—	Union Oil Co.	—	—	—	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Oliver J. Olson [76]	WNB	150	Olson & Mahony	300, **600**	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Olivette [76]	KOV	150	Peninsular & Occidental S.S. Co.	300, **600**	P G	N	0.20	2.00
Oneida [4]	KYP	—	E. C. Benedict	—	P	X	—	—
Oneonta [76]	WPX	—	Port of Portland	—	—	—	—	—
Onondaga	NRO	300	Revenue-Cutter	300, **600**, 750	P R [78]	N	0.20	2.00
Ontario NTA	NTA	—	Navy	600	P R [78]	—	0.20	2.00
Ontario KQO [76]	KQO	200	Merchants & Miners Transportation Co.	300, **600**	P G	N	0.20	2.00
Oregon	NMZ	—	Navy	600	P R [78]	—	0.20	2.00
Oregonian	WKO	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—
Oriente (El) [76]	KKV	200	Southern Pacific Co.	300, **600**	P G	N	0.20	2.00
Orion NOC	NOC	—	Navy	600	P R [78]	—	0.20	2.00
[illegible]	[illegible]	[illegible]	[illegible]	600	P R [78]	—	0.20	2.00

Ossabaw [78]	KEO	—	Atlantic, Gulf & West Indies S.S. Lines	—	—	—	—	—
Ozark	NHH	—	Naval Militia	300, 600	P G	—	—	—
Pacific [76]	KIL	—	Emery S.S. Co.	300, 600	P G	—	—	—
P. R. R. 707	KPR	—	Pennsylvania Railroad Co.	—	—	—	—	—
Paducah	NOG	—	Navy	600	P R [78]	—	0.20	2.00
Palos	NQS	—	Navy	300, 600	P G	—	—	—
Pamlico	NRR	50	Revenue Cutter	300	P R [78]	N	0.20	2.00
Panama KMH	KMH	200	Panama Railroad Co.	300, 600	P G	N	0.20	2.00
Panaman	WKR	—	Navy	300. 600	P G	—	—	—
Pan American [76]	KUT	—	Texas S.S. Co.	—	—	—	—	—
Panther NOJ	NOJ	—	Navy	600	P R [78]	—	0.20	2.00
Panuco [76]	KMM	—	Freeport & Tampico Fuel Oil Corporation	300, 600	—	—	—	—
Paraguay [76]	KTT	—	Sun Co.	—	—	—	—	—
Paraiso [76]	WRI	—	Swayne & Hoyt (Long Beach S.S. Co.)	—	—	—	—	—
Parismina [113]	KDG	—	Tropical Fruit Co.	300, 600	—	—	—	—
Parker	NIX	—	Navy	300, 600	P G	—	0.20	2.00
Parthian [76]	KQP	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Pastores [113]	KLA	—	Tropical Fruit Co.	300, 600	—	—	—	—
Patapsco	NOL	—	Navy	600	P R [78]	—	0.20	2.00
Patterson NLH [109]	NLH	100	Navy	300, 600	O	X	—	—
Patterson NOK	NOK	—	Navy	600	P R [78]	—	0.20	2.00
Patuxent	NOM	—	Navy	600	P R [78]	—	0.20	2.00
Paulding	NON	—	Navy	600	P R [78]	—	0.20	2.00
Paul Jones	NOP	—	Navy	600	P R [78]	—	0.20	2.00
Pennsylvanian	WKP	—	American Hawaiian S.S. Co.	300, 600	P G	—	—	—
Pennsylvania WWI [76]	WWI	200	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Peoria	NOW	—	Navy	600	P R [78]	—	0.20	2.00
Pequonnock	KXP	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
Pere Marquette [107 123 76]	WDA	125	Pere Marquette Railroad Co.	300, 600	P R [111]	X	0.10	1.00
Pere Marquette 17 [107 123 76]	WDC	100	Pere Marquette Railroad Co.	300, 600	P G	X	0.10	1.00
Pere Marquette 18 [107 123 76]	WDD	100	Pere Marquette Railroad Co.	300, 600	P G	X	0.10	1.00
Pere Marquette 19 [107 123 76]	WDB	125	Pere Marquette Railroad Co.	120, 345, 600	P R [111]	X	0.10	1.00
Pere Marquette 20 [107 123 76]	WDE	100	Pere Marquette Railroad Co.	300, 375, 600	P G	X	0.10	1.00
Perfection [76]	KTN	—	Standard Oil Co	300, 600	P G	—	0.20	2.00
Perkins	NOX	—	Navy	600	P R [78]	—	0.20	2.00
Perry	NOY	—	Navy	600	P R [78]	—	0.20	2.00
Persian [76]	KQX	200	Merchants & Miners Transportation Co.	300, 600	P G	N	0.20	2.00
Peru WWJ [76]	WWJ	150	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Petrel	NOZ	—	Navy	600	P R [78]	—	0.20	2.00
Philadelphia KDA [76]	KDA	200	Atlantic & Caribbean Steam Nav. Co.	300, 600	P G	N	0.20	2.00
Philadelphia KSM [76]	KSM	100	American Line	300, 600	P G	N	0.40	4.00
Pilgrim	KXG	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
Pilotboy [76]	KPL	—	Texas & Gulf S.S. Co.	300, 600	P G	—	0.20	2.00
Pittsburgh	NOT	—	Navy	600	P R [78]	—	0.20	2.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs
Platuria	KSE	—	Standard Oil Co.	300, **600**	—	—	—	—
Pleiades [76]	WNP	150	Edgar F. Luckenbach	300, **600**	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Plymouth [110]	KXH	50	New England S.S. Co.	300, 450, 500, 550, **600**	P G	N	0.15	0.50
Pompey	NQF	—	Navy	600	P R [75]	—	0.20	2.00
Ponce [76]	KGP	200	New York & Porto Rico S.S. Co.	300, **600**	P G	N	0.20	2.00
Portland [76]	WNV	200	Lotus S.S. Co.	300, **600**	P G	X	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Potomac NQK	NQK	—	Navy	600	P R [75]	—	0.20	2.00
Powhatan KQY [76]	KQY	200	Merchants & Miners Transportation Co.	300, **600**	P G	N	0.20	2.00
Prairie	NQM	—	Navy	600	P R [75]	—	0.20	2.00
Preble	NQN	—	Navy	600	P R [75]	—	0.20	2.00
President [76]	WGP	300	Pacific Coast S.S. Co.	300, **600**	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Preston	NQO	—	Navy	600	P R [75]	—	0.20	2.00
Princess Anne [76]	KOB	200	Old Dominion S.S. Co.	300, **600**	P G	N	0.20	2.00
Princeton	NQP	—	Navy	600	P R [75]	—	0.20	2.00
Priscilla	KXI	50	New England S.S. Co.	300, 450, 500, 550, **600**	P G	N	0.15	1.50
Prometheus NQR	NQR	—	Navy	600	P R [75]	—	0.20	2.00
Proteus [76]	KKP	200	Southern Pacific Co.	300, **600**	P G	N	0.20	2.00
Providence [110]	KXJ	50	New England S.S. Co.	300, 450, 500, 550, **600**	P G	N	0.15	1.50
Puritan KXK	KXK	50	New England S.S. Co.	300, 450, 500, 550, **600**	P G	N	0.15	1.50
Puritan WDU [76]	WDU	100	Graham & Morton Transportation Co.	300, **600**	P G	N	0.10	1.00
Quantico [76]	KQQ	200	Merchants & Miners Transportation Co.	300, **600**	P G	N	0.20	2.00
Queen WGX [76]	WGX	150	Pacific Coast S.S. Co.	300, **600**	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Radiant [76]	KTR	—	Standard Oil Co.	300, **600**	P G	—	0.20	2.00
Rainbow NTD	NTD	—	Navy	600	P R [75]	—	0.20	2.00
Raleigh	NTE	—	Navy	600	P R [75]	—	0.20	2.00
Ranger NFU	NFU	—	Navy	300, **600**	P G	—	0.20	2.00
Ransom B. Fuller [76]	KRF	200	Eastern S.S. Corporation	300, **600**	P G	X	0.20	2.00

Red Cross [80]	KRX	—	American Red Cross Society	300, 600	P G	—	—	—
Redondo [76]	WBM	200	Inter-Ocean Transportation Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Reid	NTU	—	Navy	600	P R [73]	—	0.20	2.00
Relay [76] [103]	KVZ	200	Mexican Telegraph Co.	300, 600	P R	N	—	—
Reno [110]	WYN	35	Army	300	O	—	—	—
Reuce [84] [76]	WSR	—	Columbia River Packers' Assn.	—	—	—	—	—
Rhode Island	NTX	—	Navy	600	P R [73]	—	0.20	2.00
Richard Peck	KXR	50	New England S.S. Co.	300, 450, 500, 550, 600	P G	N	0.15	1.50
Richmond [76]	WTR	200	Standard Oil Co.	300, 600	P G	X	0.10	1.00
Rio (El) [76]	KKZ	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Rio Grande KEG [76]	KEG	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Riverside [76]	WRM	—	Charles Nelson Co.	—	—	—	—	—
Roanoke [76]	WRR	150	North Pacific S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Robert Dollar [76]	WSM	—	Robert Dollar Co.	300, 600	—	—	—	—
Roe	NTZ	—	Navy	600	P R [73]	—	0.20	2.00
Roma WTE [76]	WTE	—	Union S.S. Co.	—	—	—	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Rose City [76]	WWR	150	San Francisco & Portland S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Sabine [76]	KEB	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
Sacramento	NQV	—	Navy	300, 600	P G	—	0.20	2.00
St. Frances [84] [76]	WHH	—	Libby, McNeill & Libby Co.	—	—	—	—	—
St. Helens [76]	WNY	150	E. J. Dodge Co.	300, 600	P G	X	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
St. Louis KSL [76]	KSL	—	American Line	—	—	—	—	—
St. Louis NTF	NTF	—	Navy	600	P R [73]	—	0.20	2.00
St. Nicholas [26] [76]	WSS	—	Columbia River Packers' Association	—	—	—	—	—
St. Paul [76]	KSO	—	American Line	—	—	—	—	—
Salem	NTP	—	Navy	600	P R [73]	—	0.20	2.00
Samson WOS	WOS	—	Columbia Construction Co.	—	—	—	—	—
Sandoval	—	—	Naval Militia	—	—	—	—	—
San Francisco KRT [76]	KRT	—	United States Steel Products Co.	300, 600	—	—	—	—
San Francisco NTQ	NTQ	—	Navy	600	P R [73]	—	0.20	2.00
San Jacinto [76]	KES	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
San Jose [76]	WWL	150	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
San Juan KGJ [76]	KGJ	200	New York & Porto Rico S.S. Co.	300, 600	P G	N	0.20	2.00
San Juan WWM [76]	WWM	150	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
San Marcos [76]	KEK	200	Mallory S.S. Co.	300, 600	P G	N	0.20	2.00
San Ramon [76]	WNW	150	E. J. Dodge Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]
Santa Ana [76]	WAL	200	Alaska S.S. Co.	300, 600	P G	X	0.10	1.00
Santa Cecilia [76]	WBB	—	W. R. Grace & Co.	—	—	—	—	—
Santa Clara WBA [76]	WBA	—	Atlantic & Pacific S.S. Co.	300, 600	P G	—	—	—
Santa Clara WRS [76]	WRS	200	North Pacific S.S. Co.	300, 600	P G	N	0.10	1.00
Santa Cruz WBD [76]	WBD	—	W. R. Grace & Co.	—	—	—	—	—
Santa Cruz WPA [76]	WPA	—	Puget Sound Salvage Co.	—	—	—	—	—
Santa Maria WTF [76]	WTF	150	United S.S. Co.	300, 600	P G	N	0.10 [101] 0.40 [102]	1.00 [101] 4.00 [102]

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Santa Marta [115]	KLG	—	Tropical Fruit Co.	300, 600	—	—	—	—
Santanta [80]	KZS	—	Osborne Howes	300, 600	—	—	—	—
Santa Rita WTG [76]	WTG	—	United S.S. Co.	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Santa Rosa	WGN	—	Pacific Coast Co.	—	—	—	—	—
Santa Rosalia [76]	KLO	—	United States Steel Products Co.	300, 600	—	—	—	—
Saramacca [113]	KLH	—	Tropical Fruit Co.	300, 600	—	—	—	—
Saratoga KWS [76]	KWS	200	New York & Cuba Mail S.S. Co.	300, 600	P G	N	0.20	2.00
Saratoga NTR	NTR	—	Navy	600	P R [73]	—	0.20	2.00
Satellite KPS	KPS	—	Alfred S. Sorensen et al	—	—	—	—	—
Satilla [76]	KEN	—	Atlantic, Gulf and West Indies S.S. Lines	—	—	—	—	—
Saturn	NNM	—	Navy	300, 600	P G	—	0.20	2.00
Savage KRS [76]	KRS	—	Consolidation Coal Co.	—	—	—	—	—
Sayonara [4 60]	KYT	—	A. J. Drexel	—	—	—	—	—
Scorpion NTT	NTT	—	Navy	600	P R [73]	—	0.20	2.00
Sea Otter [4]	KYS	—	Hugh L. Willoughby	—	—	—	—	—
Seeandbee [76]	WFS	100	Cleveland & Buffalo Transit Co.	300, 600	P G	N	0.10	1.00
Segundo (El) [76]	WTQ	—	Standard Oil Co.	300, 600	P G	—	—	—
Seguranca [76]	KWG	200	New York & Cuba Mail S.S. Co.	300, 600	P G	N	0.20	2.00
Seminole KVJ [76]	KVJ	200	Clyde S.S. Co.	300, 600	P G	N	0.20	2.00
Seminole NRS	NRS	150	Revenue-Cutter	300, 600	P R [73]	N	0.20	2.00
Senator [76]	WGS	—	Pacific Coast S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Senator Bailey [114]	KGS	100	Steele Towing & Wrecking Co.	300, 600	P G	N	0.20	2.00
Seneca	NRE	300	Revenue-Cutter	300, 600, 750	P R [73]	N	0.20	2.00
Seward [76]	WAV	—	Alaska S.S. Co.	—	—	—	—	—
Sheboygan [76]	WFL	—	Goodrich Transit Co.	—	—	—	—	—
Shenango KTC [24 76]	KTC	150	Gulf Refining Co.	300, 600	P G	X	0.20	2.00
Shenango WET [76]	WET	—	Shenango S.S. Co.	300, 600	P G	X	0.10	1.00
Sheridan	WXJ	300	Army	600	P G	N	0.20	2.00
Sherman	WXK	300	Army	600	P G	N	0.20	2.00
Shinnecock	KNS	—	Montauk S.S. Co.	—	—	—	—	—
Sialia	WFY	—	J. K. Stewart	—	—	—	—	—
Siberia [76]	WWU	300	Pacific Mail S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Sixaola [113]	KDS	—	Tropical Fruit Co.	300, 600	—	—	—	—
Smith	NSQ	—	Navy	600	P R [73]	—	0.20	2.00
Snohomish	NRF	75	Revenue-Cutter	300	P R [73]	N	0.20	2.00

	S. O. Co. No. 91 [24] [76]	WTO	—	Standard Oil Co.	—	—	—	0.10 [101]	1.00 [101]
								0.40 [102]	4.00 [102]
	S. O. Co. No. 92 [24]	KTY	—	Standard Oil Co.	—	—	—	—	—
	S. O. Co. No. 93 [24] [76]	WTY	—	Standard Oil Co.	—	—	—	0.10 [101]	1.00 [101]
								0.40 [102]	4.00 [102]
	S. O. Co. No. 94 [24] [76]	KTP	—	Standard Oil Co.	—	—	—	—	—
	Socony	KTX	—	Standard Oil Co.	—	—	—	—	—
	Sol (El) [76]	KKB	200	Southern Pacific Co.	300, 600	P G ..	N	0.20	2.00
	Solace	NST	—	Navy	600	P R [78] ..	—	0.20	2.00
	Somerset KQS [76]	KQS	200	Merchants & Miners Transportation Co.	300, 600	P G ..	N	0.20	2.00
	Sonoma NTG	NTG	—	Navy	600	P R [78] ..	—	0.20	2.00
	Sonoma WHM [76]	WHM	400	Oceanic S.S. Co.	300, 600	P G ..	N	0.10 [101]	1.00 [101]
								0.40 [102]	4.00 [102]
	Sotoyomo	NUX	—	Navy	300, 600	P G ..	—	0.20	2.00
	South American KVW [76] ..	KVW	—	Texas S.S. Co.	—	—	—	—	—
— —	South American WEO [76] ..	WEO	—	Chicago, Duluth & Georgian Bay S.S. Co.	300, 600	P G ..	—	—	—
	South Carolina..	NSW	—	Navy	600	P R [78] ..	—	0.20	2.00
	South Dakota	NSX	—	Navy	600	P R [78] ..	—	0.20	2.00
	Speedwell [76]	WQS	200	Southern Oregon Transportation Co.	300, 600	P G ..	N	0.10 [101]	1.00 [101]
								0.40 [102]	4.00 [102]
	Spokane [76]	WGE	—	Pacific Coast S.S. Co.	300, 600	P G ..	N	0.10	1.00
	Stanley Dollar [76]	WSD	—	Robt. Dollar Co.	—	—	—	0.10 [101]	1.00 [101]
								0.40 [102]	4.00 [102]
	Starr [76]	WPS	—	San Juan Fishing and Packing Co.	—	—	—	—	—
— —	State of Ohio [76]	WFR	125	Cleveland & Buffalo Transit Co...	300, 600	P G ..	X	0.10	1.00
	Sterrett	NTB	—	Navy	600	P R [78] ..	—	0.20	2.00
	Stewart..	NTC	—	Navy	600	P R [78] ..	—	0.20	2.00
	Stranger	NSR	—	Naval Militia	—	—	—	—	—
	Sud (El) [76]	KKQ	200	Southern Pacific Co.	300, 600	P G ..	N	0.20	2.00
	Sumner	WXL	300	Army	600	P G ..	N	0.20	2.00
	Sun [76]	KTU	—	Sun Co.	300, 600	P G ..	8 a.m. to 12 p.m.	0.20	2.00
	Supply	NTK	—	Navy	600	P R [78] ..	—	0.20	2.00
	Suriname [113]	KLI	—	Tropical Fruit Co...	300, 600	—	—	—	—
	Suwannee [76]	KQZ	200	Merchants & Miners Transportation Co.	300, 600	P G ..	N	0.20	2.00
	S. V. Luckenbach [76]	KGU	—	Edgar F. Luckenbach	300, 600	—	—	—	—
	Sylph	NTL	—	Navy	600	P R [78] ..	—	0.20	2.00
	Tacoma	NUA	—	Navy	600	P R [78] ..	—	0.20	2.00
	Tahoma..	NRK	150	Revenue-Cutter	300, 600	P R [78] ..	N	0.20	2.00
	Tallahassee	NUC	—	Navy	600	P R [78] ..	—	0.20	2.00
	Tarragon [118]	NZZ	100	Department of Commerce, Bureau of Navigation	200, 300, 450, 600	O [113] ..	X	—	—
	Tasco [76]	KFT	50	T. A. Scott Co.	300, 400, 480, 600	P [212] ..	X	—	—
	Tenadores [118]	KLB	—	Tropical Fruit Co.	300, 600	— ..	—	—	—
	Tennessee	NUG	—	Navy	600	P R [78] ..	—	0.20	2.00
	Terry	NUI	—	Navy	600	P R [78] ..	—	0.20	2.00
	Texan	WKT	—	American-Hawaiian S.S. Co. ..	300, 600	P G ..	—	—	—
	Texas KUR [76]	KUR	—	Texas S.S. Co.	300, 600	P G ..	—	—	—
	Texas NCD	NCD	—	Navy	300, 600	P G ..	—	0.20	2.00
	Theodore Roosevelt [76] ..	WCT	—	Indiana Transportation Co. ..	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.
Thetis NRT	NRT	150	Revenue-Cutter	300, 600	P R [78]	N	0.20	2.00
Thomas	WXM	300	Army	600	P G	N	0.20	2.00
Tionesta [76]	WCA	150	Anchor Line (Erie & Western Transportation Co.)	300, 600	P G	N	0.10	1.00
Tivives [118]	KMI	—	Tropical Fruit Co.	300, 600	P G	—	—	—
Toledo [76]	KTV	—	Sun Co.	—	—	—	—	—
Tonopah	NUN	—	Navy	600	P R [78]	—	0.20	2.00
Topila [76]	KKE	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Trinidadian [76]	KNO	—	Gulf Refining Co.	300, 600	—	—	—	—
Trippe	NUQ	—	Navy	600	P R [78]	—	0.20	2.00
Truxton	NUS	—	Navy	600	P R [78]	—	0.20	2.00
Turrialba [118]	KDT	—	Tropical Fruit Co.	300, 600	—	—	—	—
Tuscan [76]	KQT	200	Merchants & Miners Transportation Co.	300, 600	P G	X	0.20	2.00
Tuscarora	NRL	100	Revenue-Cutter	300, 600	P R	N	0.20	2.00
Tyee Junior [76]	WPB	—	Tyee Co.	—	—	—	—	—
Umatilla [76]	WGU	200	Pacific Coast S.S. Co.	300, 600	P G	N	0.10	1.00
Unalga	NRX	300	Revenue-Cutter	300, 600, 800	P R [78]	N	0.20	2.00
Uncas NVF	NVF	—	Navy	300, 600	P G	—	0.20	2.00
United States WIT [76]	WIT	—	Indiana Transportation Co.	—	—	—	—	—
Utah	NVE	—	Navy	600	P R [78]	—	0.20	2.00
Valle (El) [76]	KKW	200	Southern Pacific Co.	300, 600	P G	N	0.20	2.00
Vanadis [6]	KYT	—	C. K. G. Billings	—	—	—	—	—
Venetia [4 76]	WOV	—	J. D. Spreckels	—	—	—	—	—
Ventura [76]	WHL	300	Oceanic S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Vermont	NVK	—	Navy	600	P R [78]	—	0.20	2.00
Vesta [76]	KTS	—	Standard Oil Co.	300, 600	P G	—	0.20	2.00
Vesuvius	NVM	—	Navy	600	P R [78]	—	0.20	2.00
Vicksburg	NVN	—	Navy	600	P R [78]	—	0.20	2.00
Victoria WAD [76]	WAD	250	Alaska S.S. Co.	300, 600	P G	N	0.10	1.00
Vigilancia [76]	KWV	200	New York & Cuba Mail S.S. Co.	300, 600	P G	N	0.20	2.00
Villalobos	NVP	—	Navy	600	P R [78]	—	0.20	2.00
Virginia NVR	NVR	—	Navy	600	P R [78]	—	0.20	2.00
Virginia WFH [76]	WFH	110	Goodrich Transit Co.	300, 600	P G	N	0.10	1.00
Virginian WKV	WKV	—	American-Hawaiian S.S. Co.	300, 600	P G	—	—	—
Vixen	NSU	—	Naval Militia	300, 600	—	—	—	—
Vulcan NVT	NVT	—	Navy	600	P R [78]	—	0.20	2.00
[illegible]	[illegible]	[illegible]	Astoria Savings Bank	—	—	—	—	—

W. B. Keene [114 76]	KWK	—	Hilton Dodge Lumber Co.	300, 600	P G	—	0.20	2.00
Wakiva [4 76]	WLA	—	Lamon V. Harkness	—	—	—	—	—
Walke	NWL	—	Navy	600	P R [73]	—	0.20	2.00
Wallula [76]	WPY	—	Port of Portland	—	—	—	—	—
Wana [4 76]	KYX	100	George C. Sherman	300, 600	P	X	—	—
Warren	WXN	300	Army	600	P G	N	0.20	2.00
Warrington	NWD	—	Navy	600	P R [73]	—	0.20	2.00
Warrior KYW [4 76]	KYW	—	Frederick William Vanderbilt	—	—	—	—	—
Washington NWE	NWE	—	Navy	600	P R [73]	—	0.20	2.00
Washtenaw [74]	WTH	150	Union S.S. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Western States [76]	WED	100	Detroit & Cleveland Nav. Co.	300, 600	P G	N	0.10	1.00
West Virginia	NWG	—	Navy	600	P R [73]	—	0.20	2.00
Wheeling	NWH	—	Navy	600	P R [73]	—	0.20	2.00
Whipple	NWI	—	Navy	600	P R [73]	—	0.20	2.00
Whittier [74]	WHT	300	Union Transportation Co.	300, 600	P G	X	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Wico [76]	KNN	—	Standard Oil Co.	300, 600	P G	—	0.20	2.00
Wild Duck [76]	KYG	—		—	—	—	—	—
Wilhelmina [76]	WMO	300	Matson Nav. Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Willamette [76]	WSW	—	C. R. McCormick & Co.	—	—	—	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
William B. Davock [76]	—	—	Vulcan S.S. Co.	—	—	—	—	—
William Chatham [76]	WMC	150	William Chatham Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
William O'Brien [76]	KPN	—	East Coast Transportation Co.	300, 600	P G	—	0.20	2.00
William P. Snyder [76]	WER	—	Shenango S.S. Co.	300, 600	P G	X	0.10	1.00
William P. Snyder, Junr. [76]	WES	110	Shenango S.S. Co.	300, 600	P G	X	0.10	1.00
Wilmington	NWK	—	Navy	600	P R [73]	—	0.20	2.00
Wilpen [76]	WEU	—	Shenango S.S. Co.	—	—	—	—	—
Winchester [4 76]	KZD	—	Irving Cox	—	—	—	—	—
Windber [76]	WND	—	Pacific-American Fisheries	—	—	—	—	—
Windom	NRW	100	Revenue-Cutter	300, 600	P R [73]	N	0.20	2.00
Winifred [74]	KTE	—	Gulf Refining Co.	—	—	—	—	—
Winona	NRV	75	Revenue-Cutter	300, 600	P R [73]	N	0.20	2.00
Winslow	NJA	—	Navy	300, 600	P G	—	0.20	2.00
Wisconsin	NWM	—	Navy	600	P R [73]	—	0.20	2.00
Wm. F. Herrin [76]	WTN	200	Associated Oil Co.	300, 600	P G	X	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Wolverine	—	—	Naval Militia	—	—	—	—	—
Woodbury	NRJ	75	Revenue-Cutter	300, 600	P R [73]	N	0.20	2.00
Worden	NWP	—	Navy	300, 600	P G	—	0.20	2.00
W. S. Porter [76]	WTM	300	Associated Oil Co.	300, 600	P G	X	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]
Wyandotte	KNW	—	Montauk S.S. Co.	—	—	—	—	—
Wyoming	NWQ	—	Navy	600	P R [73]	—	0.20	2.00
Yamacraw	NRY	150	Revenue-Cutter	300, 600	P R [73]	N	0.20	2.00
Yankton	NSK	—	Navy	300, 600	P G	—	0.20	2.00
Yantic	—	—	Naval Militia	—	—	—	—	—
Yorktown	NQX	—	Navy	300, 600	P G	—	0.20	2.00
Yosemite [76]	WQY	150	C. R. McCormick & Co.	300, 600	P G	N	0.10 [101]	1.00 [101]
							0.40 [102]	4.00 [102]

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Steamship Line.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Services Performed.	Hours of Service.	Ship Charge.	
							Per Word.	Minimum Charge.
Yucatan [76]	WMY	250	North Pacific S.S. Co.	300, **600**	P G ..	N	Francs. 0.10 [101] 0.40 [102]	Francs. 1.00 [101] 4.00 [102]
Zacapa [113]	KLE	—	Tropical Fruit Co.	300, **600**	—	—	—	—
Zapora [78]	WPQ	—	International Fisheries Co. ..	—	—	—	—	—
Zealandia KNR	KNR	—	C. L. Dimon	—	—	—	—	—
Zulia [76]	KDZ	200	Atlantic and Caribbean Steam Nav. Co.	300, **600**	P G ..	N	0.20	2.00
URUGUAY								
Baron de Rio Branco ..	CWG	55	Navy	450, **600**	O	—	—	—
18 de Julio	CWF	55	Navy	450, **600**	O	—	—	—
Ingeniero	CWH	55	Navy	600	O	—	—	—
Montevideo CWE	CWE	220	Navy	450, **600**	O	—	—	—
Oyarvide	CWI	55	Hydrographic Service	450, **600**	O	—	—	—
Uruguay CWD	CWD	220	Navy	450, **600**	O	—	—	—

NOTES

Ship Stations

1. The station is operated and controlled by the Government; it belongs to the Imperial Inspectorate of the radiotelegraph service, Trieste.

2. During the voyage between Trieste and North America, or vice versâ.

3. During the voyage between Trieste and South America, or vice versâ.

4. Yacht.

5. For pleasure courses.

6. Trieste-Alexandria Line.

7. Trieste-India, Eastern Asia Line.

8. Trieste-North and South America Line.

9. Trieste-Bombay Line.

10 Operated and controlled by the Department of Customs, Ottawa.

11. Operated and controlled by the Société Anonyme Internationale de Télégraphie sans fil, Brussels.

12. Belgian Government steamer on the service between Ostend and Dover. The station is operated and controlled by the Belgian Government.

13. Correspondence restricted to Nieuport, North Foreland, and the steamers of the same line.

14. During the crossings, which take place three times a day in each direction. Time of crossing, about three hours. Departures: from Ostend at about 10.45 a.m., 3.30 p.m., and 11 p.m.; from Dover at about 11 a.m., 4.30 p.m., and 11 p.m.

15. In the case of radiotelegrams exchanged either between the steamers and Nieuport or between two steamers, no special ship charge. The total wireless charge is fixed at fr. 1.50 per radiotelegram of ten words or less, with fr. 0.10 additional for each word over ten. For correspondence with North Foreland, the ship charge is fr. 0.10 per word, with a minimum of fr. 1.00 per radiotelegram.

16. Operated and controlled by the Ministry of Naval Service, Ottawa.

17. Operated and controlled by the Marconi Wireless Telegraph Company of Canada, Ltd., Montreal.

18. Operated and controlled by the Ministry of Marine, Ottawa.

19. Operated and controlled by the Department of Railways and Canals, Ottawa.

20. Lighthouse inspection ship. The station is operated and controlled by the Ministry of Marine.

21. Buoy inspection ship. The station is operated and controlled by the Ministry of Marine.

22. Public correspondence may be admitted, without ship charge, if there is no naval correspondence. Private radiotelegrams must be drawn up in plain language.

23. No ship charge.

24. Sailing vessel.

25. Operated and controlled by the Compagnie Française Maritime et Coloniale de Télégraphie sans Fil, Paris.

26. Ship engaged in a regular service between France on the one hand, and Corsica, Algeria, and Tunis on the other.

27. Engaged in a regular service between France and Corsica.

28. Ship engaged in a regular service between France and Algeria.

29. Ship engaged in a regular service between France, Algeria, and Tunis.

30. Ship engaged in a regular service between Calais and Dover.

31. Operated and controlled by the Deutsche Betriebsgeselischaft für drahtlose Telegraphie, Berlin.

32. In the case of radiotelegrams exchanged with British coast stations, the coast charge is fr. 0.30 per word with a minimum of fr. 1.80 per radiotelegram. In the case of radiotelegrams intended for the United Kingdom, a charge of fr. 0.35 per word, with a minimum of fr. 2.10 per radiotelegram, is made for the coast charge and the charge for transmission over the telegraph lines.

33. For radiotelegrams liable to charge.

34. Official correspondence with Sassnitz and Trälleborg, and also with the other ferry-boats of the Sassnitz-Trälleborg line, concerning the railway traffic.

35. Public correspondence with Sassnitz and Trälleborg, and also with the other ferry-boats of the Sassnitz-Trälleborg line.

36. Ferry-boat. The service of the Sassnitz-Trälleborg line being performed alternately by German and Swedish ferry-boats, it is necessary to replace the name of the ship station in the address of radiotelegrams by one of the following indications :—

Ferry-boat A for the boat leaving Sassnitz in the morning;
Ferry-boat C for the boat leaving Sassnitz in the afternoon;
Ferry-boat B for the boat leaving Trälleborg in the morning;
Ferry-boat D for the boat leaving Trälleborg in the afternoon.

37. The ship charge for radiotelegrams intended for the ferry-boats is, without regard to the nationality of the boats, fr. 0.18 per word, with a minimum of fr. 1.80, when the radiotelegrams are transmitted via Sassnitz; and fr. 0.14 per word, with a minimum of fr. 1.40, when they are transmitted via Trälleborg.

38. Special correspondence, relating to the service of the ship.

39. During the time of the voyage between New York and the West Indies.

40. Monday, 7 a.m. to 1 p.m.; Tuesday, noon to 8.30 p.m.; Wednesday, 2 p.m. to 6 p.m.; Thursday, noon to 8.30 p.m.; Friday, 7 p.m. to 10 p.m.; Saturday, noon to 8.30 p.m.; Sunday, 7 a.m. to 1 p.m., 2 p.m. to 8.30 p.m.

41. 8 a.m. to midnight, continuous service; midnight to 8 a.m., the first ten minutes of each hour and the last fifteen minutes of each hour.

42. 6 a.m. to midnight, continuous service; midnight to 6 a.m., only during the first ten minutes of each hour.

43. Operated and controlled by the owner; the accounts are settled by the Deutsche Betriebsgesellschaft für drahtlose Telegraphie, Berlin.

44. Operated and controlled by the Marconi International Marine Communication Company, London.

45. The wave-length ordinarily employed is 450 metres.

46. The wave-length ordinarily employed is 400 metres.

47. Correspondence limited to Caister-on-Sea, North Foreland, and Scheveningen Port.

48. Communicates only with Seaforth (Liverpool).

49. The ship charge is reduced to fr. 0.15 per word with a minimum of fr. 0.90 per radiotelegram when the ship is engaged on voyages between the United Kingdom and ports less than 1,000 nautical miles (1,855 km.) distant from the United Kingdom.

50. In the case of radiotelegrams exchanged with coast stations of the United Kingdom, the coast charge is fr. 0.15 per word with a minimum of fr. 1.50 per radiotelegram. In the case of radiotelegrams exchanged with French coast stations, the coast charge is fr. 0.15 per word without a minimum.

51. The period during which the station is open cannot exceed 10 hours per day.

52. Operated and controlled by the Marconi Wireless Telegraph Company of Canada, Montreal, for and on behalf of the Marconi International Marine Communication Company, Ltd., London.

53. Operated and controlled by the officers on board.

54. Operated and controlled by the Marconi Wireless Telegraph Company of America, New York, on behalf of the Marconi International Marine Communication Company, London.

55. The ship charge is reduced to fr. 0.10 per word with a minimum of fr. 1.00 when the ship travels between Victoria, Vancouver, and Seattle.

56. Steamer performing the day service between Flushing and Queenborough; from Flushing 11 a.m., from Queenborough 11.30 a.m.

57. Steamer performing the night service between Flushing and Folkestone; from Flushing midnight, from Folkestone 10.30 p.m.

58. Additional wave of 500 metres for communication with Scheveningen Port.

59. Public correspondence restricted to radiotelegrams exchanged by the steamers of the Zeeland Company, between themselves and with the Scheveningen Port and North Foreland coast stations.

60. Public correspondence restricted to radiotelegrams exchanged by this steamer either with the Scheveningen Port and North Foreland coast stations, or with the other steamers of the Batavier-Lijn. When, however, on special occasions the ship departs from the normal route the station conducts general public correspondence.

61. Public correspondence may be admitted, without ship charge, if there is no official correspondence.

62. In the case of radiotelegrams transmitted through Scheveningen Port or exchanged with the other stations of the Zeeland Company, the total radiotelegraph charge is fr. 0.20 per word with a minimum of fr. 2.00 per radiotelegram. In the case of radiotelegrams exchanged through North Foreland, the ship charge is fr. 0.20 per word with a minimum of fr. 2.00 per radiotelegram, and the coast charge is fr. 0.15 per word with a minimum of fr. 1.50 per radiotelegram. For radiotelegrams intended for the United Kingdom, however, a charge is made, in addition to the ship charge of fr. 0.20 per word with a minimum of fr. 2.00 per radiotelegram, representing the coast charge of North Foreland, and the inland wire charge.

63. In the case of radiotelegrams transmitted through North Foreland, the coast charge is fr. 0.15 per word with a minimum of fr. 1.50 per radiotelegram. For radiotelegrams intended for the United Kingdom, however, a charge is made, in addition to the ship charge, of fr. 0.20 per word with a minimum of fr. 2.00 per radiotelegram, representing the coast charge of North Foreland and the inland wire charge.

64. This call-signal is allotted to all torpedo-boats of the Royal Navy; when necessary, it is followed by the number of the torpedo-boat.

65. This call-signal is allotted to all the submarines of the Royal Navy; when necessary, it is followed by the number of the submarine.

66. Operated and controlled by Compagnia Internazionale Marconi per le Comunicazioni Marittime, Rome.

67. Public correspondence with Constantza-Tunnel only.

68. Operated by the owner (or owners) of the vessel; controlled by the Société Anonyme Internationale de Telegraphie sans fil.

69. The ship charge is reduced to fr. 0.13 per word for correspondence with Russian coast and ship stations.

70. Also, in case of urgency, at any time of the day or night.

71. The station is open during the first and last fifteen minutes of each hour from 8 a.m. to 10 p.m.

72. 3 a.m. to 4 a.m., 6 a.m. to 7 a.m., 9 a.m. to 10 a.m., 11 a.m. to noon, 6 p.m. to 7 p.m., 8 p.m. to 9 p.m., 10 p.m. to midnight.

73. Public correspondence restricted to messages of the officers and crew. Ships proceeding singly may relay urgent messages to the coast on request. In both cases the ship charge will apply.

74. In the case of radiotelegrams exchanged with coast stations of the United Kingdom, the coast charge is fr. 0.30 per word with a minimum of fr. 1.80 per radiotelegram.

75. Operated and controlled by the owner (or owners) of the vessel; the accounts are settled through Siemens Bros. and Company, Woolwich.

76. Operated and controlled by the Marconi Wireless Telegraph Company of America, New York.

77. During the months October to March.

78. During the months April to September.

79. Operated and controlled by the Marconi International Marine Communication Company, Ltd., London, for and on behalf of the Amalgamated Wireless (Australasia), Ltd., Sydney.

80. Operated and controlled by the owner (or owners) of the vessel.

81. Operated and controlled by the Amalgamated Wireless (Australasia), Ltd., Sydney.

82. During the time that the ship is in the Antarctic regions the station will also use such other wave-lengths as may be found to be necessary.

83. Operated and controlled by the Rio de Janeiro Agency of the Marconi Wireless Telegraph Company of America.

84. Operated and controlled by the Post Office Department, Ottawa.

85. Operated and controlled by the Marconi Wireless Telegraph Company of America, New York, on behalf of the Marconi Wireless Telegraph Company of Canada, Montreal.

86. Operated by the Radio Electric Company of Canada, Ltd., Montreal.

87. Operated and controlled by the Compagnie Générale de Radiotélégraphie, Paris.

88. Ship engaged in a regular service between Dieppe and Newhaven.

89. In the case of radiotelegrams exchanged with coast stations of the United Kingdom, the coast charge is fr. 0.15 per word, with a minimum of fr. 1.50 per radiotelegram.

90. Operated and controlled by Siemens Bros. and Co., Ltd., Woolwich.

91. Motor-boat.

92. Accounts are settled through Siemens Bros. and Co., Ltd., Woolwich.

93. Two motor lifeboats equipped with wireless telegraph apparatus are carried by this ship.

94. Operated and controlled by the Federal Steam Navigation Company.

95. Steam tug plying between Nieuwediep or Ijmuiden and the sea.

96. Operated and controlled by the Government.

97. Pilot-boat.

98. Operated and controlled by the Ministry of Communications.

99. Correspondence restricted to radiotelegrams exchanged with Chosen lighthouses and Japanese warships.

100. Operated and controlled by the Marconi Wireless Telegraph Company of America, for and on behalf of the Société Anonyme Internationale de Télégraphie sans Fil.

101. When the ship is trading in the North and South American service.

102. When the ship is trading in the transoceanic service.

103. For radiotelegrams exchanged with ships in North American service.

104. For radiotelegrams exchanged with ships in transoceanic service.

105. Engaged in passenger service on the Great Lakes.

106. The station is open chiefly, however, for special correspondence.

107. Navigates the Great Lakes.

108. In cases of distress.

109. Surveying ship—Coast and Geodetic Survey.

110. Navigates Long Island Sound.

111. Public correspondence limited to radiotelegrams exchanged with stations of the Pere Marquette Railroad Company.

112. Special service in connection with wrecking duties.

113. Operated and controlled by the Tropical Radio Telegraph Company.

114. Tug.

115. Tender engaged in transporting supplies for fixed lightships of the Hawaiian Islands.

116. Mine-planter.

117. Dredge (Engineer Corps).

118. The station is in the charge of a Government Radio Inspector, who will enforce the radio laws along the Atlantic coast.

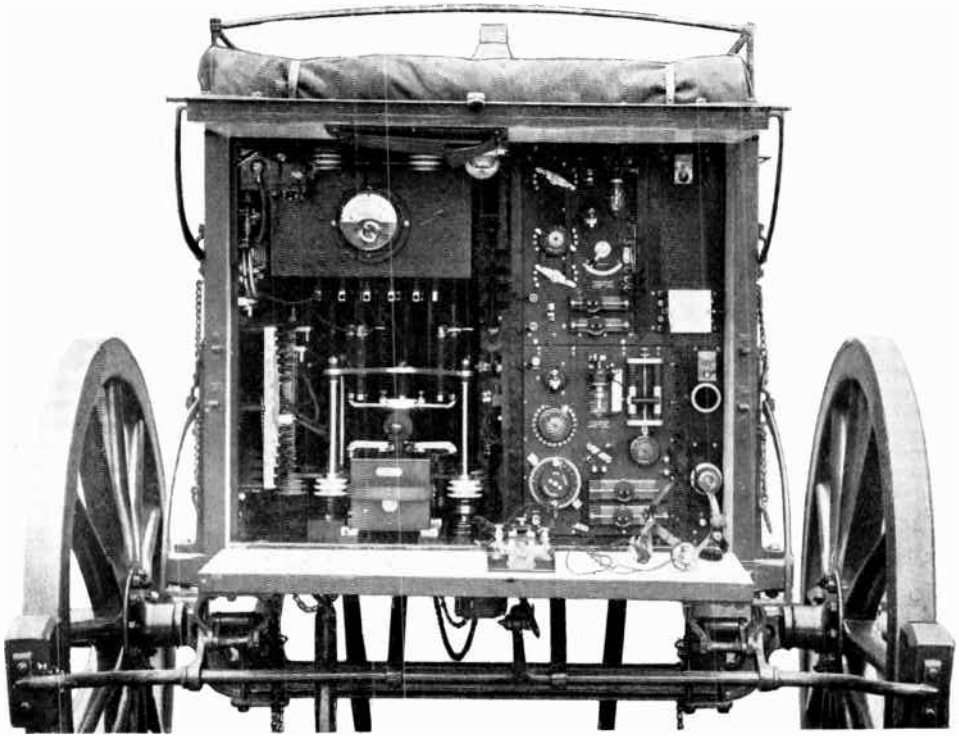
119. Lifeboat.

120. For warships, see AUSTRIA-HUNGARY.

121. For vessels other than warships, see AUSTRIA and HUNGARY respectively.

122. Cable-ship.

123. Ferry-boat.



Instrument Cart, Marconi 1½ kw. Cart-type Station.

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CALL LETTERS

THE BUREAU INTERNATIONAL DE L'UNION TELEGRAPHIQUE OF BERNE allots to the various nations who are parties to the International Radiotelegraphic Convention combinations of "call" letters which are in turn allotted to ship and land stations. Below we give a list of the letters, and combinations of letters, and the countries to which these have been assigned.

A	All to Germany and Protectorates.
B	All to Great Britain.
CAA to CEZ	Chile.
CFA to CMZ	Not yet assigned.
CNA to CNZ	Morocco.
COA to COZ	Not yet assigned.
CPA to CPZ	Bolivia.
CQA to CQZ	Monaco.
CRA to CTZ	Portugal and Colonies.
CUA to CUZ	Not yet assigned.
CVA to CVZ	Roumania.
CWA to CWZ	Uruguay.
CXA to CZZ	Not yet assigned.
D	All to Germany and Protectorates.
EAA to EGZ	Spain and Colonies.
EHA to EZZ	Not yet assigned.
F	All to France and Colonies.
G	All to Great Britain.
HAA to HFZ	Austria-Hungary and Bosnia - Herzegovina.
HGA to HHZ	Siam.
HIA to HIZ	Dominican Republic.
HJA to HKZ	Colombia (Republic).
HLA to HZZ	Not yet assigned.
I	All to Italy and Colonies.
J	All to Japan and Possessions.
KAA to KCZ	Germany and Protectorates.
KDA to KZZ	United States of America.
LAA to LHZ	Norway.
LIA to LRZ	Argentine Republic.
LSA to LWZ	Not yet assigned.
LXA to LZZ	Bulgaria.
M	All to Great Britain.
N	All to United States of America.
OAA to OFZ	Not yet assigned.
OGA to OMZ	Austria-Hungary and Bosnia - Herzegovina.
ONA to OTZ	Belgium and Colonies.
OUA to OZZ	Denmark.
PAA to PIZ	Netherlands.
PJA to PJM	Curacao (Dutch).
PJN to PJZ	Surinam (Dutch).
PKA to PMZ	Dutch East Indies.
PNA to PZZ	Brazil.
Q	Reserved for code abbreviations.
R	All to Russia.
SAA to SMZ	Sweden.
SNA to STZ	Brazil.
SUA to SUZ	Egypt.
SVA to SZZ	Greece.
TAA to TMZ	Turkey.
TNA to TZZ	Not yet assigned.
UAA to UMZ	France and Colonies.
UNA to UZZ	Austria-Hungary and Bosnia - Herzegovina.
VAA to VGZ	Canada.
VHA to VKZ	Commonwealth of Australia.
VLA to VMZ	New Zealand.
VNA to VNZ	Union of South Africa.
VOA to VOZ	Newfoundland.
VPA to VSZ	British Colonies not autonomous.
VTA to VWZ	British India.
VXA to VZZ	Great Britain.
W	All to United States of America.
XAA to XDZ	Mexico.
XEA to XZZ	Not yet assigned.
YAA to YZZ	Not yet assigned.
ZAA to ZZZ	Not yet assigned.

CALL LETTERS

(Alphabetically arranged)

ALLOTTED TO LAND AND SHIP STATIONS.

(*c.s.* = cable-ship ; *f.b.* = ferry-boat ; *g.v.* = government vessel ; *l.b.* = life-boat ; *l.s.* = land-station ; *m.b.* = motor-boat ; *s.s.* = steam-ship ; *s.t* = tug ; *s.v.* = sailing vessel ; *s.y.* = steam yacht.)

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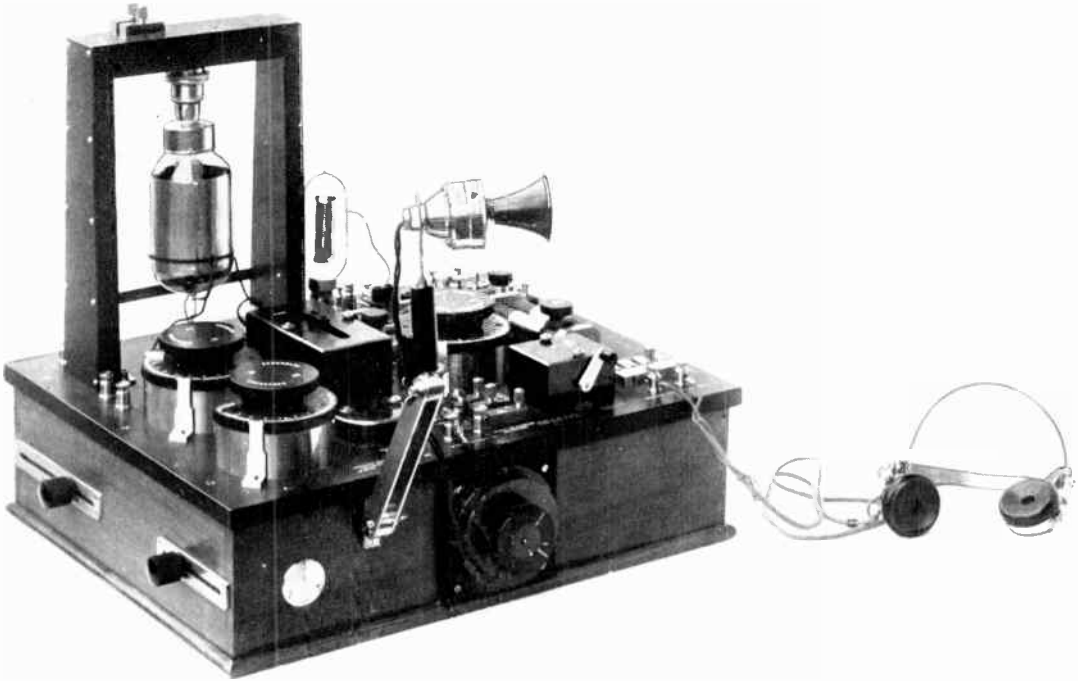

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THE FUNCTION OF THE EARTH IN RADIOTELEGRAPHY.*

By Dr. J. A. Fleming, F.R.S.

In this period of enforced inactivity for all loyal radiotelegraphists, except those actually engaged in the field of war, we can perhaps best utilise the time by turning our attention to some purely scientific questions connected with it. I desire on this occasion to invite your consideration of the question of the Function of the Earth in Radiotelegraphy.

Even if we leave out of account the two opposed opinions as regards the relative advantage of earthing the antenna or using an insulated balancing capacity there still remains the well-known fact that the nature of the surface of the earth, whether sea or soil, in between the sending and receiving stations exercises a very sensible effect. It is well known that in certain districts there is a very considerable wave attenuation due to the nature of the ground. Thus Dr. L. W. Austin has pointed out as a result of certain careful measurements that it was found that the soil to the north and north-east of Newport, Rhode Island, U.S.A. shows a very large absorption. During experiments made in 1910 between Brant Rock Station and a United States cruiser, *Birmingham,* 45 miles away, measurements were made of the received currents when waves of 1,000 metres and of 3,750 metres were sent out, the sending antenna current being in both cases about 27 ampères. The received currents were found to be 1,050 microampères for the short wave and 1,000 for the long wave. Calculating from the well-known inverse distance law, these received currents should have been 5,400 and 1,550 microampères respectively. In other words, the received current due to the 1,000 metre wave was only about 1/5th of what it should be, whilst the 3,750 metre wave had an amplitude in fact rather over the calculated value. This shows clearly that there is an absorption of 95 per cent. of the signal energy, taking the latter to be proportional to the square of the current in the receiving antenna.

* An Address delivered to the Wireless Society of London, November 13th, 1914.

In the very earliest days of radiotelegraphy it was noticed that the waves of 100 metres or 300 ft. wave-lengths gave much better effects over sea than over land, and that even the effects of rain on the ground were perceptible. It was found in the South African War, when attempts were made to employ radiotelegraphy over the veldt, that apparatus which worked well between ship and shore over 50 miles or more seemed curiously inefficient over very dry land.

The cause of this, and the theory of it, has been fairly well known for many years, but it may be of interest to some of our members to present this theory in a simple form. Let us then consider, in the first place, the propagation of a plane electromagnetic wave over a conducting surface. Let us suppose that this surface is flat and extended infinitely in all directions and made of a material of resistivity ρ or conductivity σ and magnetic permeability μ. If then an electromotive force is applied at the surface along any line it will create a current in the material and then will be electric and magnetic forces in the interior. Let C be the current density at any point and let E and H be the electric and magnetic forces. These quantities are connected by certain equations.

First let me explain two preliminary points.

If C is the current at any depth, x, then the current at any slightly greater depth $x+\delta x$ must be $C-\frac{dC}{dx}\delta x$ provided that δx is so small that the decrease in current is uniform.

In the next place let us suppose that the current is an alternating current of frequency, n, and let $2\pi n=p$. Then the usual way of representing the time variation of the current is to write $C=C_0\ Sin\ pt$ where C_0 is the maximum value during the period. It is, however, for mathematical reasons more convenient to say that C is proportional to the real or horizontal step of the vector $C_0\epsilon^{-jpt}$ where $j=\sqrt{-1}$ because this function is equal to $C_0(Cos\ pt-j\ Sin\ pt)$. The reason for this is because we have then a simple expression for dC/dt, or the time variation of C, which may be written $\dot{C}$, since it is clear that $\dot{C}=jpC$.

One other matter must be explained.

If we have any vector such as magnetic force H or current distributed in any way in a field and we draw a line in that field, we can resolve the vector along the line at every point and sum up the product $HCos\theta ds$, or take $\int HCos\theta ds$ all along the

line. This is called the line integral of the vector. Also the line integral taken round a small area and divided by the area, is called the *Curl* of the vector.

Thus if we take a small rectangle whose sides are δx, δy, and if the current along y at O is C and along y at P is $C-\frac{dC}{dx}\delta x$, then the line integral is

$$\left(C-\frac{dC}{dx}\delta x\right)\delta y - C\delta y = -\frac{dC}{dx}\delta x\delta y$$

and the area is $\delta x.\delta y$, and therefore the Curl is $-\frac{dC}{dx}$.

This Curl is a vector perpendicular to the plane of C. We can also take the *Curl* of a *Curl*, called *Curl*^{2}. Thus, if the current is in the direction of the axis y, the Curl is in the direction of the axis z, but negative. Hence the *Curl* of the *Curl* is

$$(Curl\ \ C)\ \ \delta z - \left[Curl\ C - \frac{d}{dx}(Curl\ C)\delta x\right]\delta z \div \delta x\delta z = \frac{d}{dx}(Curl\ \ C) = -\frac{d^2C}{dx^2}$$

We can now write down the equations connecting C, E and H. We have

By Ohm's law: $E=C\rho$.
By Faraday's law: $-\mu\dot{H}=\text{Curl } E$.
By Ampère's law: $4\pi C=\text{Curl } H$.

Eliminating E and H, we have

$$\frac{4\pi\mu}{\rho}\dot{C} = -\text{Curl}^2 C = \frac{d^2C}{dx^2}$$

But $\dot{C}=jpC$ where $p=2\pi n$. Hence we have

$$\left\{(2\pi)^2\left(\frac{\mu n}{\rho}\right)(j+1)^2\right\}C = \frac{d^2C}{dx^2}. \quad \text{If} \quad \frac{(2\pi)^2\mu n}{\rho} = a^2$$

we can write this

$$\frac{d^2C}{dx^2} = (a+ja)^2C.$$

The solution of this differential equation is $C=C_0\epsilon^{-ax}\epsilon^{-jax}$ where C_0 is the current density at the surface. This shows us that at a depth $x=\frac{1}{a}$ the current is $\epsilon^{-1}=0{\cdot}368$ of its value at the surface and at a depth $4/a$ it is ϵ^{-4} or about 2 per cent. of its value at the surface. Hence the current is practically confined to a skin of thickness $\frac{2}{\pi}\sqrt{\frac{1}{\mu n}} = {\cdot}636\frac{1}{\sqrt{\mu n\sigma}}$ where $\sigma=1/\rho$.

Hence the skin is thinner the greater the frequency, the conductivity and the permeability. It is therefore thinner for an iron wire than for a copper wire.

We can easily calculate by our formula the depth to which

the current penetrates. Suppose the frequency $n=10^6$, and that the material is copper, then $\rho=1600$ and $\mu=1$. Hence

$$\frac{1}{2\pi}\sqrt{\frac{\rho}{\mu n}}=\frac{1}{157}.$$

Therefore at a depth of 1/157th of a centimetre or about 1/16 of a m.m. the current has a value of 0·368 of that at the surface. Hence at four times that depth, or about $\frac{1}{4}$ m.m. it has only 2 per cent. of the value at the surface. If, however, the material is iron, then we must put

$$\rho = 10{,}000 \text{ and } \left[\mu = 900 \text{ say and } \frac{1}{2\pi}\sqrt{\frac{\rho}{\mu n}}=\frac{1}{1884} \text{ or } \frac{1}{188} \text{ m.m.}\right]$$

Hence at 1/50th of a m.m. the current would have a value of about 2 per cent. of that at the surface. In other words, the thickness of the current's skin for iron is only about 1/13th of that for copper.

We can illustrate by a simple experiment this concentration of a high-frequency current at the surface of a conductor. An oscillatory circuit is set up having a gap in it which can be bridged by various spirals of copper, brass, iron or galvanised iron of the same size. Alongside a cymometer circuit is set up. If then we tune the cymometer circuit to the oscillation circuit, the Neon tube will glow equally brightly whether we use the copper, brass or galvanised iron spiral, but it hardly glows at all if we use the iron spiral. This shows that the current is chiefly confined to the thin zinc coating of the galvanised iron.

The moral of this is that a very thin coating of zinc or copper or iron nullifies the magnetic permeability as far as H.F. currents are concerned.

Now let us apply this to electric waves travelling over the earth's surface. The materials of which the earth's crust is made are mostly very good insulators if dry. Such materials as quartz, felspar, mica, carbonate of lime, silica, and marble are extremely good insulators in themselves. The conductivity of the earth's crust materials near the surface is almost entirely due to moisture or oxide of iron. This makes the materials conductive dielectrics. In our equations we have, therefore, not only to take account of a conduction current C, but of a dielectric current which is expressed by dD/dt where D is the electric displacement, and $D=\frac{K}{4\pi}E$ by Maxwell's theory. The total current C^1 is then

$$C+\frac{dD}{dt}=C+\frac{K}{4\pi}\frac{dE}{dt}=C+k\dot{E}$$

where $k = K/4\pi$. Let s = conductivity, then $C = Es$ by Ohm's law and E varies in simple harmonic manner we have $\dot{E} = jpE$. Hence

$$C^1 = (s + jpk)E.$$

Accordingly the Maxwell equations take the form

$$-\mu \dot{H} = Curl\ E$$

and $$4\pi (s + jpk)\ E = Curl\ H$$

From what we can easily find that

$$4\pi\mu (s+jpk)\ \dot{E} = -\ Curl^2\ E = \Delta^2 E$$

or $$4\pi\mu pj\ (s + jpk)\ E = \Delta^2 E$$

or $$(2\pi)^2\ (j + 1)^2\ \mu n\ (s + jpk)\ E = \Delta^2 E$$

This is a more difficult equation to solve, because if the material is a dielectric conductor we cannot assume that there is no variation of current along the surface as we did in the case of the good-conducting metallic surface. The solution of the equation is, however, given in my book "Principles of Electric Wave Telegraphy," following the lines of a solution by Zenneck.

Hence two questions are involved—*viz.*, in what distance along the surface will the wave amplitude fall to $^1\_\epsilon$ of its value at the origin; and, secondly, in what distance measured downwards into the surface will the amplitude be diminished to $^1\_\epsilon$ of that at the surface? In other words, what is the effective skin thickness? Now clearly this will depend upon the numerical values of μ, s, and K.

We can take the permeability in the case of all soil materials to be unity, and we can take the conductivity of air to be zero and dielectric constant of air to be unity. Some years ago I published a translation and commentary on Zenneck's Paper in *Engineering*. It would occupy too much time to go through it in detail, but the results may be given briefly as follows:—

Suppose we take a short wave, say, 1,000 ft. or 300 metres in length, then we can calculate the rate at which the amplitude falls off horizontally and vertically downwards provided we ascribe various possible values to s = the conductivity and K = the dielectric coefficient. The values of s and K are only known very roughly for sea and various kinds of soil, but as a first approximation they may be taken as varying from 1 ohm per metre cube for sea water to 10,000 to 100,000 ohms per metre cube for dry soils. With regard to these figures, it is necessary to make some correction in the light of recent knowledge.

It is clear that the values we must take for s and K must be those appertaining to frequencies of the order of one million or so and not the steady or low frequency values.

About three years or so ago I communicated a Paper to the Institution of Electrical Engineers containing results of a long research by me, aided by my former assistant, Mr. Dyke, in which we described the effect of frequency on conductivity and dielectric coefficients for such ranges of frequency as is covered by telephonic work. We found that for alternating currents the conductivity increased with frequency nearly in a linear ratio. In some cases the value of the conductivity was more nearly expressed by a quadratic function of the frequency, $s = a + bn + cn^2$. Shortly after that an 1857 Exhibition Scholar, Mr. Bairsto, began to work in my laboratory and the writer suggested to him as a research to continue this work for higher frequencies, under the idea that this conductivity would prove to reach a maximum for a certain frequency. Mr. Bairsto found that for such dielectrics as slate, marble, and other materials the conductivity had a maximum for a particular frequency which is always high and near that used in radiotelegraphy. This maximum conductivity is always vastly greater than the ordinary conductivity for steady currents, or even for currents of telephonic frequency.

The soils and earth-crust materials are therefore much better conductors for H.F. currents of radiotelegraphic frequency than for ordinary low-frequency currents. This conductivity is a true conductivity and means a dissipation of energy.

To give some idea how these values compare with those at lower frequencies, I may mention that I found dry slate at a frequency of 920 to have a conductivity of 50,000 bimhos, at 3,000 133,000, and at 5,000 204,000 bimhos, whereas at 2,500,000 it has a conductivity of 2,500,000 bimhos.* It is clear, therefore, that enormous errors would be committed if we attributed to the earth's crust materials merely their steady current or low frequency conductivities.

Suppose, then, we consider a plane wave advancing normally to a horizontal surface. If the material of which the surface is made is a good conductor, the electric force in the wave plane will be normal to the surface. If, however, it is a dielectric conductor having not very great conductivity the electric force will not be normal, but will have a component along the surface. Imagine an oscillator placed on the surface of the earth and let us consider the material of which the earth is made to be first as good a conductor as copper and then gradually to change,

* One *bimho* is the conductivity of one million megohms.

diminishing in conductivity until it becomes as good an insulator as sulphur. Let us consider what would be the effect on a wave propagated over that surface.

If the "earth" were a good conductor—say, as good as copper—the wave would penetrate very little into it. It would skim over the surface and there would be no electric current or electric force at any depth greater than a fraction of a millimetre in the earth. Hence there would be no dissipation of energy, and therefore no loss of amplitude except by reason of the divergence of the wave from its centre.

If, on the other hand, the earth were a good insulator—as good, say, as sulphur—then the wave would pass right into it, but as there is no conductivity there would be no dissipation of energy and no loss of wave amplitude except that due to the divergence from a centre. It is, therefore, easy to see that for some intermediate kind of "earth" which has conductivity as well as dielectric constant there would be a maximum degree of absorption, or wave-weakening, due to dissipation of energy in the earth.

Now the mathematical theory confirms this and shows that as regards the longitudinal attenuation the wave weakening depends on s and K and p, or on the frequency, dielectric constant, and wave length. Also the vertical attenuation or penetration of the wave depends on the same quantities.

If we take sea water, for which $K = 80$ and $s = 1$ mho per metre cube, and consider waves 1,000 ft. long, the penetration into the sea is about 2 or 3 metres. Also the amplitude would not be reduced to 0·368 of that at the origin until the wave had travelled 10,000 kilometres, assuming a plane wave front and a supposed infinitely extended plane sea surface. If, however, the wave travelled over a plane dry earth the penetration might be 300 or 400 metres downwards and the longitudinal attenuation such that the amplitude would be reduced to 0·368 by travelling 10 kms. or so.

In the Paper above mentioned the writer calculated the effect produced when waves of 300 metres and 3,000 metres respectively travel over sea, ordinary damp soil, and extremely dry soil or rock respectively.

The results show that for the sea the effect of lengthening the waves is beneficial, but not markedly so, because the transmission over sea surface is already good. In the case of ordinary

damp soil the improvement obtained by lengthening the wave is very pronounced. In the case of extremely dry earth the transmission is not sensibly improved.

We see that the experiments of Dr. Austin mentioned at the beginning of this article confirm this result. He found the short wave most attenuated in passing over the land, and all experience since has confirmed the above theory generally.

It is clear, therefore, that amongst other sources of variation in signal strengths we must take into account the soil absorption in transmission overland, and wherever that is found to be pronounced over short distances a careful geological examination of the district should be made with the object of determining the ingredients in the soil or surface rock to which we can attribute this high conductivity or dielectric constant which is obviously the cause of it.

We now pass on to another point. If we consider a Hertzian oscillator in one homogeneous medium, the lines of electric force thrown off at each oscillation take the form of closed loops. If, however, we suppose the oscillator to be half-immersed in a medium of different dielectric constant, then it is clear that at the bounding surface there must be a shearing or distortion of the lines of force. When a ray of light passes from a medium of one refractive index to a medium of higher refractive index the ray is refracted towards the normal, as when it passes from air into water.

In the case of lines of electric force passing from a medium of one dielectric constant to a medium of different and higher dielectric constant there is also a refraction of the line, but in this case the line is bent away from the normal.

The condition to be complied with in the case of light is that the component of the velocity parallel to the bounding surface is unchanged on passing across the surface.

The condition in the case of the line of electric force is that the component of the electric force parallel to the surface is unchanged on passing across the surface.

In the case of light the law of refraction is $\mu_1 \, Sin \, \theta_1 = \mu_2 \, Sin \, \theta_2$. In the case of electric lines the law is $K_1 \, Cot \, \theta_1 = K_2 \, Cot \, \theta_2$. Hence we see that at the bounding surface the loop of force must be distorted. There is, therefore, a component of the force parallel to the surface at the surface.

We have seen that the differential equation which must be fulfilled by the forces is of the form

$$\Delta^2 E - k^2 E = o$$

By a full discussion of this equation for the case of an oscillator placed at the bounds of two-plane conducting dielectrics Sommerfield has shown that the surface wave amplitude diminishes inversely as the square root of the distance from the origin, whereas the space-wave amplitude varies inversely as the distance. This surface wave will travel along the surface, and not be hindered by curvature of the surface, although it may be damped out quickly by energy dissipation due to resistance.

That there is some such action I think is proved by the well-known fact that signals can be picked up from distant transmitters, without any high antenna at all, merely by connecting the receiver to a good earth and to some insulated conductor of fairly large capacity in a room.

As far back as the year 1900 the writer remembers witnessing experiments made by Commendatore Marconi in his laboratory near Poole, in which signals were received from the Isle of Wight by means of a cylinder of zinc standing on a chair placed in a room. More recently Mr. Campbell Swinton received in the same way signals from the Eiffel Tower on a bedstead, and the writer has also done the same with a zinc dustbin standing on insulators in a room. Hence it is clear that a long antenna wire is not entirely necessary for the reception of signals, and this seems to indicate that some part of the effect must be due to an impulse passing through the earth, and not to a pure space wave.

We may illustrate this action by a little experiment with three helices of wire placed on a sheet of zinc. On a sheet of metal we place an insulated helix of wire, and connect one end of an oscillation circuit to the bottom of the helix and the other end to the zinc sheet. The helix has a natural time period of its own, and the oscillation frequency is timed to this period. Stationary oscillations are therefore set up in the helix, but at the same time waves of potential are propagated along the zinc sheet.

The rapid variations of potential extend along the surface of the zinc. At the far end is placed another helix of the same size which is in good conducting connection with the zinc. At the top of this helix there is a vacuum tube. When the oscillations are started in the transmitter this tube glows. By using

two helices of different time periods we can conduct a kind of syntonic telegraphy. This action is not effected by space waves or true electric waves emitted by the radiator, but is a surface propagation of currents along the zinc sheet.

Some such action takes place in connection with all wireless work with earthed antennæ. The effect on the receiving antenna is partly due to the cutting across it of electric waves which travel above the earth, but it is partly due to the propagation along the surface of the earth of a surface wave, and it is this with which we are dealing in the case of antenna-less reception. So far we have simplified the consideration of the problem by imagining that we are dealing with an infinite flat earth and with an atmosphere above it which does not differ from free or pure. The real earth is, however, spherical and the atmosphere is complex in structure and probably highly ionised in its upper layers.

Although many mathematicians have attacked the problem of the diffraction or bending of electromagnetic waves round the earth the great difficulty is to put these results to the test of experiment.

The purely mathematical treatment ignores the atmosphere. The problem the mathematician sets himself is, given a Hertzian radiator at a certain point above the earth find the ratio of the wave amplitude at any distance, say 4,000 miles, measured along a meridian through the origin of the waves expressed as a fraction of the value it would have if the earth were removed.

In any case the result is not capable of being checked by experiment, because we now know that the diurnal and irregular variations of signal strength are so large that they point unquestionably to an influence of the atmosphere upon the total result.

The problem presents special difficulties when the radiator comes down close to the earth. Nevertheless, all investigators seem to agree that there is a certain, perhaps considerable, amount of bending of the rays into the cone of geometrical shadow and that this bending or diffraction is greater the greater the wave length.

We have not yet, however, secured from the mathematicians a full solution of the problem when the radiator is earthed. Taking, for instance, the case of transmission over 4,000 miles with an earthed antenna at both ends. The angular distance between the places is 60° and the vereine or height of the protuberance of the earth which lies between is 536 miles.

What we require to know is the ratio between the received currents for the same sending current when dealing with the two stations 4,000 miles apart, one on an ideal infinite flat earth, and the other on the real spherical earth.

The conclusions to which some investigators have been led is that the contribution which is made to the actual received current at that distance by pure diffraction round the actual earth is not a large amount, probably not 10 per cent. On the other hand, Professor A. E. H. Love, of Oxford, has recently re-discussed this problem of wave diffraction round a sphere, and come to the conclusion that diffraction alone will account for the greater part of the observed effect at great distances in the case of long distance radiotelegraphy.

The actual current in the antenna may be partly produced by surface waves which come along the surface, but most of all by space waves which reach the receiver indirectly—that is, by reflection or refraction from ionic clouds or surfaces.

In a Paper read to the Physical Society in June the writer showed that if the earth were very much larger than it is—*viz.*, about twice its present size—there would be no need to call in the hypothesis of ionic refraction. The mere gradation of atmospheric density upwards due to the weight of the air causing a decrease of refractive index, and therefore of dielectric constant, would be quite sufficient to cause an electric ray sent out horizontally at any place to follow round the earth's curvature. Alternatively, if the atmosphere have about double its present density, or if it were replaced by Krypton, the same effect would ensue.

One may speculate on what would be the mental state of beings like ourselves on such an earth. Trigonometrical measurements would show that the earth was spherical, and yet with a sufficiently powerful telescope, and given our atmosphere free from absorption, it would be possible to see a lighthouse at New Zealand. These matters of speculation do not, however, concern us much. The really interesting question is the cause and nature of long-distance transmission. As far as the function of our earth is concerned, we may say that the following facts are established :—

1. The actual earth-crust materials are far better conductors for high-frequency currents, having a frequency between 100,000

and 10^6, than they are for low-frequency currents of 1,000 to 5,000 and vastly better than for steady currents.

2. This tends to prevent the penetration of the wave into the earth and the consequent dissipation of energy.

3. Nevertheless, there is a penetration and a resulting attenuation of the wave with distance, apart from any reduction due to diffusion of the wave over wider areas.

4. This attenuation is greater from short waves than long areas and is a maximum for certain values of s, K, and n.

5. In addition to the space wave in the air over the earth there is a surface electric wave which travels along the surface, and to which is probably due the limited antenna-less reception which is possible.

6. The curvature of the earth greatly weakens the true space wave, degrading it as an exponential function of the angular distance.

7. By far the greatest portion of the received current detected at its large distances, 3,000 to 6,000 miles, is due to a space wave which reaches the receiver either by diffraction or after bending or refraction by the ionised layers in the upper air, and it is to the incessantly varying condition of this ionisation that we owe the vagaries of long-distance transmission and its secular and diurnal changes.

8. The probability is that our earth is unique in this respect, and it may perhaps be the only planet on which long-distance wireless telegraphy is possible.

Although our atmosphere is an important part of the earth, we have not attempted to deal here with the question of the relation of the atmosphere to wireless telegraphy.

The British Association Committee on Radiotelegraphy, which owes its inception to a suggestion made by me at Dundee, was engaged in organising extensive researches on this matter when the present world war put a temporary end to its work, as well as to much private investigation. Let us hope that before long this terrible devastation and shocking destruction of life will come to an end and that we shall all of us be able to return to what Milton calls the "quiet and still air of delightful studies" in connection with these outstanding problems of wireless telegraphy.

WIRELESS TELEPHONY

By H. J. Round.

DURING 1913 and 1914 Wireless Telephony for moderate distances has at last progressed to the practical stage, and several distinct methods have been developed by different workers.

Of these, the Japanese TYK system, the American Janke system, Ditcham's quenched spark system, and the reaction valve system are those most worthy of note.

TYK System.—The TYK system is one, the chief value of which is practical simplicity; but unfortunately demonstrations witnessed by the writer indicate a very poor quality of speech. Certainly in these demonstrations, which were given in England by a Japanese expert, certain parts of the apparatus, notably the microphone, were quite unsuitable for the circuits used, but this fact the demonstrator did not seem to recognise.

Briefly, the system as used consists of a 500-volt arc between points of burnt magnetite and brass shunted by a circuit with rather large capacity and small inductance.

This circuit is closely coupled to the aerial system, in which a current of about 1 ampère is induced.

A heavy current microphone placed in series with the aerial serves to impress upon the current the variations of the voice.

The inventor, Torikato, is of opinion that the result produced is a quenched spark of spark frequency beyond the limit of audibility.

A system of regulation of arc-length, and an arc striker similar in principle to most arc lamp regulators, is used. Very occasional hand regulation is required.

A "Perikon" detector is used for reception. It is claimed that the set when used by inexpert people has a five-mile minimum range, and that distances up to seventy miles have been worked by experts.

Fig. 1 (*facing page* 574) shows the complete Wireless Telephone set, except for the small 500-volt generator.

Fig. 2 (*facing page* 580) illustrates Torikato speaking on his wireless telephone.

A number of handles are provided for adjustment, none of which seem to make much difference—owing, apparently, to the high damping of all circuits; but for ordinary use this is a distinct advantage.

As mentioned before, the speech quality is very poor, certainly not so good as that given by an ordinary telephone line; but no doubt improvement could be made in this direction.

Altogether Torikato has met the important requirement of simplicity, but at the expense of the first essential in a telephone—good speech quality.

Recent reports from operators on liners sailing in the neighbourhood of Japan who have overheard the Japanese working the system indicate that improvements have taken place and that the speech quality has been bettered very considerably.

Janke System.—An American variation of the Poulsen arc is being used for telephony. The Poulsen arc has a very slow starting condition, due usually to the initial presence of air in the arc chamber.

Janke overcomes this difficulty by making his arc in liquid alcohol. An arc length regulator, similar to that of the TYK system, is used; but is not an absolute necessity.

Two to three ampères can be obtained in the aerial, and Janke has developed a special water-cooled multiple microphone for handling the current.

This arc acts very similarly to the Poulsen arc, being, if anything, more variable in frequency. Small condenser and large inductances are necessary, as with the other arc. It is not quite silent: a gentle bubbling can be heard most of the time at the receiving end. This, however, does not interfere much with the speech. The quality of the latter is good—far better than the TYK.

This arc seems to be very inefficient; since in tests witnessed by the writer 1¼ kilowatts input only gave between 2 and 3 ampères in the aerial with the microphone short-circuited.

Various quenched spark systems have also been tried, notably

that of Ditcham; but this, like the TYK, did not give good speech quality.

It is rather doubtful whether in any quenched spark system the primary circuit should be coupled direct to the aerial. It would seem to be better to couple the primary circuit to a closed circuit, and then couple this loosely to the aerial.

The reason for this is that if the microphone be inserted in series with the aerial, then, when the latter is coupled directly to the quenched primary circuit, the microphone is called upon to vary the current under two conditions—

(1) During the occurrence of the spark, when the apparent resistance of the aerial is high;

(2) During the period when the spark has stopped and the aerial is oscillating freely:

whereas if an intermediate circuit with loose coupling were used the aerial would be almost free the whole time.

High-frequency alternator systems have been used ever since the first trials of Fessenden, nearly ten years ago, but even now they are only to be considered as experiments, owing to their prohibitive cost, their low frequency, and consequently excessively long wave-length, and the difficulty of speed regulation.

Towards the end of 1913 the writer received, at Marconi House, very fair speech from Berlin, but the results were far from practical. A power of six kilowatts was used at the transmitting end, and about twenty microphones connected together. Also a very powerful man's voice was used for shouting, and at the receiving end very great magnification was required.

Better communication would have been obtained by telegraphing with a ½-kw. spark set.

In France, Colin and Jeance have done considerable work on an arc telephone, on occasions using the new Marzi microphone (which from all reports seems to show great promise).

The chief points about the arc set used by these experimenters are:

(1) That no magnetic field is used on the arc.

(2) Very small electrodes, in the form of thin discs, are used.

(3) A gaseous mixture of acetylene and hydrogen is used, which adjusts the wear of the carbon electrodes to zero.

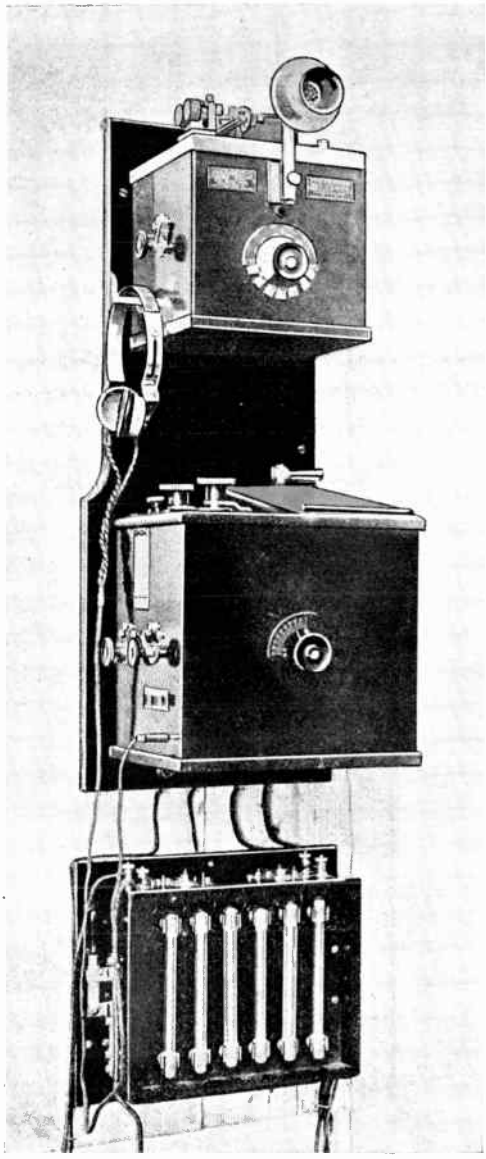

Figure 1.

Wireless Telephone Set.
T Y K System.

[*To face page* 574

These three points were embodied in apparatus constructed by Mr. Prince and the writer, seven years ago—except that in the third case a mixture of alcohol and petrol was used instead of acetylene and hydrogen.

Marzi's microphone, mentioned above, works on a rather surprising principle.

To prevent the microphone cell heating, the carbon granules are continually replaced—in fact, they move past the electrodes in a continuous stream. This microphone is said to be able to handle a current of 4 to 5 ampères, and the speech quality to be good.

This means that there has been produced a microphone capable of handling ten times the power of any single cell microphone in use at present without resort to liquid devices.

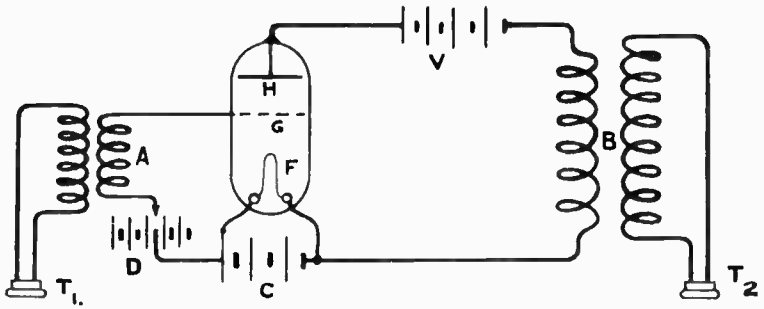

Fig. 3.

Reaction Vacuum Tube Methods.—In 1904 Fleming introduced the valve to wireless telegraphy, and in 1906 De Forest the "audion."

These instruments were constructionally identical, and were both, in their original form, rectifiers pure and simple. Any difference was possibly due to slight differences in the circuits used, perhaps to differences in vacuum, and to the now well-known fact that the valve has more than one rectifying point.

Afterwards De Forest introduced the "grid" or third electrode to the valve.

Very little seems to have been done with the "grid" tube from 1906 to 1913, when the introduction of the Lieben tube as a definite magnifier for telephone signals revived the whole question. De Forest had in the meantime dropped his English

patents, possibly on account of failure to recognise their importance.

The Lieben tube had obviously been developed quite independently of the modified audion, and had distinct properties of its own; but the underlying principle of magnification seems to be the same.

Incidentally, the writer has determined that to obtain magni-

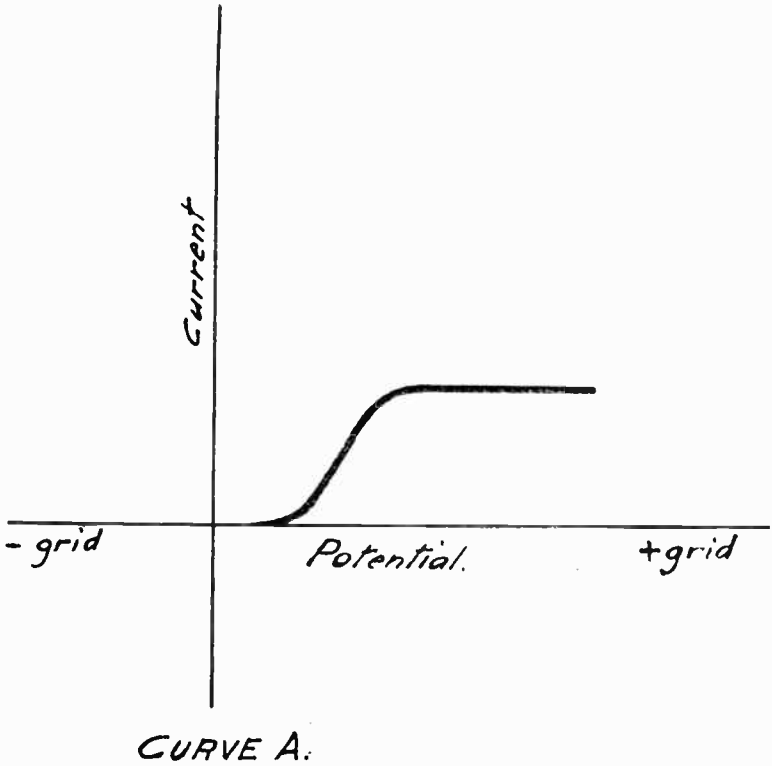

Fig. 4 (*a*).

fication it is not at all necessary to place the grid inside the tube, although for most purposes it seems to be more satisfactory thus.

The grid "audion" circuit interests us very little at present in telephony, but a short description of the action of the tubes as magnifiers will lead up to the method of producing oscillations by means of them.

The vacuum tube F.G.H. (Fig 3) has a filament F, a "grid" G, usually consisting of a plate with holes in it, and an anode H. The filament F is first rendered incandescent by a suitable battery C. To G and F are connected the terminals of a transformer A, a small potential-changing battery D being inserted to vary the potential of G.

The terminals of a transformer B are connected through a

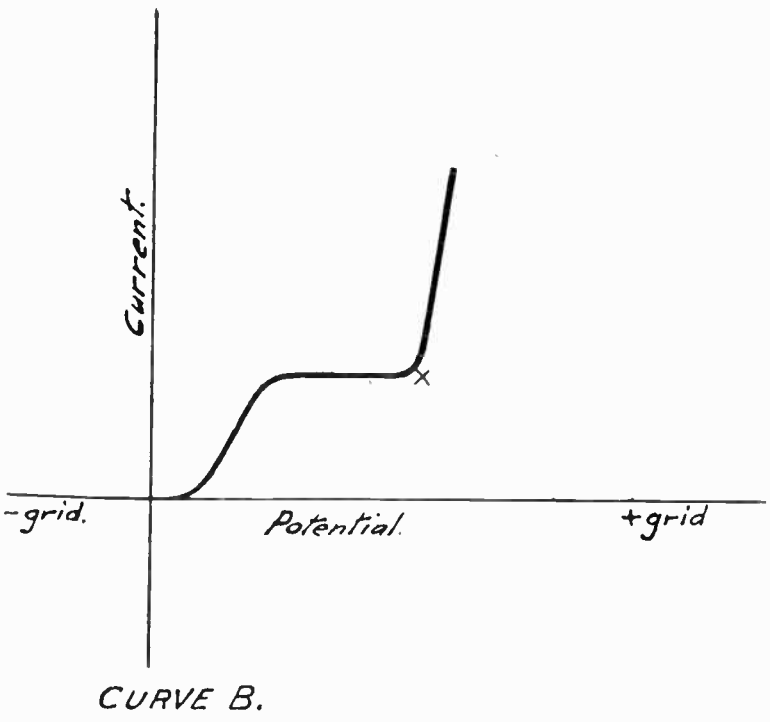

Fig. 4 (*b*).

comparatively high potential battery V to the anode H and the filament F.

If T1 and T2 represent two telephones, then any sound conveyed to T1 will be emitted by T2 considerably magnified.

The frequency which can be magnified depends merely upon the design of the transformers A and B.

A rough theory of the action is as follows.

Filament F when hot enough projects negative corpuscles or electrons from its surface.

For the present consider anode H disconnected from the high-voltage battery; then if G is made negative with respect to all parts of the filament F, all electrons which approach it are repelled, and no current can flow between F and G.

If G is gradually made positive and then more positive the current flows and increases, and finally a saturation is reached. Curve A, Fig. 4 (*a*), illustrates this.

Now if the gas in the tube has been completely removed no further action takes place; the whole question remains one of the flow of electrons—however high the voltage be made—unless one except the possible production of X-rays at high voltages. If, however, some gas is present, then curve B, Fig. 4 (*b*), is obtained– a glow appearing in the tube at the point X on the curve.

This glow, indicating ionisation, is produced by the electrons during their fall to the grid gathering velocity and breaking up the gas molecules. Each electron released from the filament thus becomes the cause of other electrons being freed from the gas molecules, and these at once begin falling through the potential gradient, gathering velocity and liberating more electrons.

If the gas is too dense this may result in an ionised gas, in which the amount of the ionisation is independent of the original number of electrons; but by a proper adjustment of the vacuum, the dimensions, and the anode voltage, a condition can be arrived at in which the amount of ionisation is a function of the original number of electrons liberated.

The point X is very possibly the point De Forest was using in the first audion; and as the valve used at this point is distinctly a lower resistance device than when used at the Fleming point, he would probably have obtained better results by the use of circuits such as those adapted to the electrolytic detector, which, however, are not at all suitable for the Fleming valve.

When the third electrode is introduced, the question becomes slightly different.

Suppose H, the anode, is connected up as in Fig. 3 and made sufficiently positive, so that the whole tube would be glowing (that is past the point X, Curve B, Fig. 4, *b*) but for the presence of the grid, G,

Now starting with G strongly negative, notwithstanding the anode H being highly positive, the electrons cannot get through the grid holes because the negative grid is nearest to them. At a very small negative value of G a few electrons can get through the holes, and will fall to H, and the number that will get through will rapidly increase until G is zero potential: the current to H then being equal to the value that it would be if G was absent. Afterwards, as G becomes positive, the current will decrease, because G will absorb some electrons.

The amount of ionisation taking place will vary with the number of electrons that can creep through G.

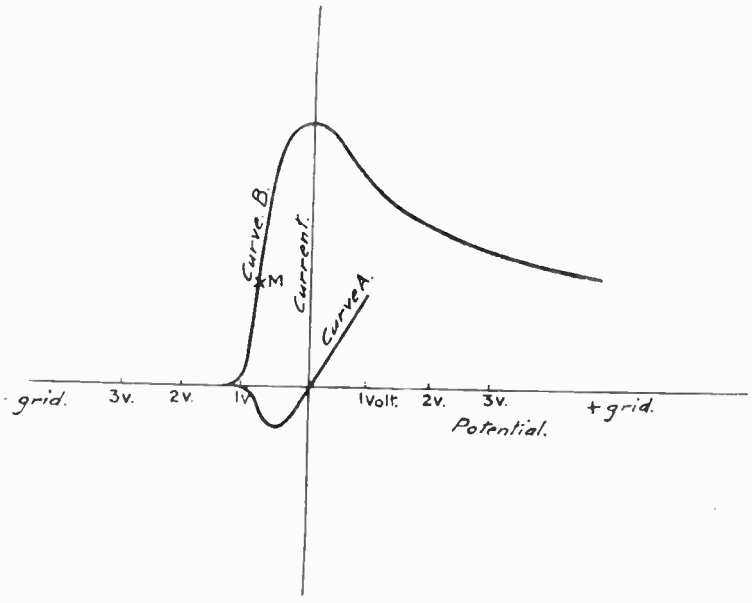

Fig. 5.

Thus a very small potential change on G will make a large current variation flowing to H, because of the consecutive ionisation started by these electrons which creep through.

The characteristic curves for a sensitive tube are given in Fig. 5. These are taken simultaneously.

Curve A represents the current to the grid.
,, B ,, ,, ,, ,, ,, anode.

The point M on Curve B and its accompanying point on Curve A is the chief magnifying point.

The maximum practical magnification is given by a tube by careful adjustment of the vacuum to the anode voltage and to the filament brilliancy.

The magnification is extremely difficult to estimate; various measurements giving anything between 5 and 25 times for tubes constructed by the writer.

The above rough theory is very imperfect and certainly does not explain away various other properties of these tubes; but, as an indication of why there is magnification at all, it is very useful.

Messner, in 1913, suggested the use of the Lieben Tube for the production of continuous oscillations, by allowing the two transformers, A and B of Fig. 3, to react upon one another, and by inserting in the circuits condensers to give them a definite natural period; and he succeeded in producing 8 watts of high frequency alternating current by this means.

The tubes apparently only lasted about 10 minutes at this power, owing to disintegration of the filament.

This reaction method has an exact analogy in the singing microphone telephone. As is well known, any telephone receiver when held opposite its own microphone (providing the line is short in length) will give a musical note, because the microphone is a magnifier. A Brown relay, if connected back on itself, will also sing violently.

The writer has so developed these two properties of the valve during the last eighteen months as to make a fairly practical telephone system.

The reaction valve is used for producing the transmitting oscillations; and, the energy employed being small, the magnifying valve is used for magnifying the received result up to a practical loudness.

It was very soon found out that the ordinary magnifying valve was, in practice, quite useless for the production of oscillations owing to the filament disintegration, and the present oscillating valve has, at the most, a magnification of 3, but it will easily give current up to one ampère in the aerial without serious filament wear.

The first distance tests were carried out in Italy by the writer between two Italian cruisers in the presence of the Duke of Abruzzi and Mr. Marconi.

Figure 2.

T Y K System.

Torikato speaking on his Wireless Telephone.

[To face page 580

It was at once found that ridiculously small aerial currents, such as ·2 ampères, were sufficient to enable speech to be transmitted 70 kilometres, this high efficiency being due to the absolutely silent and constant character of the oscillations produced and to the consequent ability to magnify at the receiving end.

The question of magnification at the receiving end is one well worth a little consideration.

The extraordinary sensitiveness for weak signals of the "heterodyne" indicated to the writer that the crystal detector is approximately obeying the law indicated by its direct current characteristic, and that, owing to the bend in the curve, rectifying efficiency falls off rapidly with reduction of applied signal voltage.

Consequently, a crystal detector is more efficient for weak signals from a spark station than equal powered signals from an arc station, because, particularly with short waves, the maximum voltage of the sparks is much higher than the maximum voltage of the continuous wave.

This at once reduces the efficiency of continuous wave telephony, as the "heterodyne" cannot possibly be used.

But by the now simple process of magnifying the received oscillations before they reach the rectifier, this lack of efficiency is partly overcome. Of course, this magnification would also further improve spark telephony, but no spark telephony yet produced is sufficiently free from horrid noises to allow of any magnification.

In addition to this a great improvement is obtained by utilising a principle due to Mr. C. S. Franklin. The circuit with the magnified energy in it is allowed to react back on the receiving aerial so that the whole system has an effective damping only slightly greater than zero. The result is an additional magnification, and the total result is that speech or spark signals, quite inaudible with a crystal-receiver, are received strongly and with great selectivity due to the extremely low effective damping of the receiving system.

A development of the sets used in Italy is shown facing page 550.

The set delivers ·6 ampères to the aerial, the microphone usually being inserted in series with this aerial. The sets are guaranteed for 50 kilometres between ships at sea. The set

can be further extended to give 1 ampère in the aerial with an estimated range at sea between moderate sized ship aerials of 100 miles.

500 volts and 15 milliampères are required to produce ·6 ampères in an average aerial.

The writer had already obtained 3 ampères in an aerial by this method—the voltage required is 2,000 and the milliampères 100, and as this voltage is rather excessive, an attempt is being made to reduce it and use more current, but heavier current tubes usually result in greater filament wear.

No microphone troubles have yet appeared, as, owing to the magnifying power of these tubes, it is not at all necessary to place the microphones in the aerial.

Incidentally, these combined transmitter and receiver sets are useful for telegraphy, as the receiver is a "self heterodyne" by slightly altering the adjustment. The telegraphic range is twice the telephone range.

A good many faults can still be found with this telephone. The tuning of both transmitter and receiver is a little too fine. Also the starting condition may be slow in cold weather. These faults will shortly be remedied.

A selective call system, due to Mr. Dobell and Commander Ryan, was being tried on these sets, but, unfortunately, the European trouble has practically stopped all possibilities of experimenting.

INTERNATIONAL WIRELESS TELEGRAPHIC RESEARCH DURING 1914

By W. Eccles, D.Sc.

THE year 1914 opened most propitiously for wireless telegraphic research. To begin with, the Radiotelegraphic Committee of the British Association had already secured the sympathy and support of various Government departments, wireless telegraph companies, and private observers—mainly, of course, in English-speaking parts of the world, but also in places on the continent of Europe—and they had already laid down a plan of campaign. The International Commission, which had just been established and financed by the public spirit of Dr. Robert Goldschmidt, of Brussels, had organised a number of Committees in various countries in Europe. These Committees, during the spring of the year, were engaged in preliminary experiments and were devising schemes of research which were to be considered at a general meeting in Brussels at the coming Easter. Besides these activities the year 1914 was marked by the announcement of the British Government's decision to establish a Telegraphic Research Laboratory resembling, though on a small scale, the Telegraphsversuchsamt of Berlin and the analogous laboratory in Washington. Moreover, the year was especially noteworthy on account of the occurrence of a solar eclipse, of which the central line lay in Europe—an opportunity which, if properly utilised, could not fail to elucidate many of the processes by which the higher atmosphere affects the transmission of wireless telegraph waves. All this was, of course, additional to what one may call the normal research work that might be expected to be accomplished in the ordinary way by individual effort, by inventors, and by the established Government laboratories in various countries.

The problems attacked by the British Association Committee and the methods they adopted were described fully in the last Year-Book. The printed forms designed for the recording of statistics were supplied to about fifty observers scattered over the British Isles and to about 100 other land stations, Governmental and private, in all English-speaking countries. Besides

this a number of ship stations, some in the British Navy, others connected with the Marconi companies of England, Canada, and the United States, took up the work; while a few European observers also received forms. The scheme got into full working order by April, and everything was arranged for the collection of statistics through one complete round of the seasons. It was hoped that from this mass of statistics a great deal of information might be obtained regarding the connections between strays, signal-strengths and weather and time of day; or, failing a harvest of definite facts, that the more important phenomena could be sorted for future study in the most fruitful ways. But the scheme had been working fully only some three months when war broke out and almost totally stopped operations. The twelve months' sequence was thus destroyed and the scientific value, even of the work that had been done, was probably greatly reduced. The utmost use will naturally be made of such information as has been collected, and the analysis is now proceeding.

Meanwhile the International Commission of Brussels, under the energetic and skilful guidance of their first President, Mr. W. Duddell, arranged and carried out the preliminary experiments mentioned above, on special signals emitted by the large station at Laeken, near Brussels. On April 6th delegates from Belgium, France, Germany, Great Britain, and Holland met at Brussels. During three days the statutes of the Commission were settled, reports of the preliminary tests were presented, methods of carrying out future work were discussed and decided, and the question of co-operation with the British Association Committee on certain researches where overlapping was possible was debated. With regard to this last matter the following resolution was drawn up and adopted:—

> "La Commission Internationale de T.S.F.S., ayant pris connaissance du but des travaux du 'Committee for Radio-telegraphic Investigations of the British Association,' estime que les travaux des deux organisations ont des objects différents.
>
> "La Commission Internationale de T.S.F.S. se propose, en effet, de faire des recherches qui portent principalement sur les mesures quantitatives se rapportant à l'emission, à la propagation et à la réception des ondes électriques.
>
> "L'Association Brittannique a décidé, de son côté, de recueiller, de classer et de commenter les résultats des obser-

vations susceptible de faire ressortir les relations entre les phénomènes géophysiques et la propagation des ondes électriques. Il entre également dans ses vues de dresser la statistique et de faire l'étude des phénomènes anormaux et des perturbations atmosphériques.

"En conséquence, si les champs d'activité des deux organisations viennent à avoir des points communs, la Commission Internationale de T.S.F.S. engage ses adhérents à prêter éventuellement le concours le plus complet à la British Association."

To this at a later date the British Association Committee responded in the following terms:—

"That the Radiotelegraphic Investigation Committee of the British Association for the Advancement of Science take cognisance of the resolution adopted by the Commission Internationale de Telegraphie sans fil Scientifique at the recent conference in Brussels, and desire to affirm that they find themselves in full accord with the definitions, as expressed in the resolution, of the differences between the aims and methods of the researches promoted by the two organisations; while in regard to those researches in which the two bodies both take an active interest, this Committee warmly welcome and value highly the offer of co-operation, and gladly undertake to give all assistance in their power."

As regards the research work to be carried on by the Commission, the *pièce de resistance* was the accurate measurement of the strength of signals propagated from Brussels to places at different distances. The measurements would be conducted under varied conditions as regards wave-length, daylight and darkness, state of atmosphere, and so forth. This demanded certain changes in the sending plant and the antenna, involved the establishment of control stations within a few kilometres of Brussels, and required the collaboration of members of the Commission, each at his own laboratory, with standard methods of measurement. A beginning was made with the work in the early summer, but before the work could be properly set going the outbreak of war put a stop to everything, and, in fact, led to the complete destruction of the Laeken station, its contents and its antenna.

During the months of May, June and July preparations were made by both the above organisations for the study of radio-

telegraphic phenomena during the total eclipse of the sun, which was due in August. A very thorough programme of observations was drawn up and a large number of observers enrolled. Forms were printed and circulated, and then the war intervened. Thus a very rare opportunity and much laborious organising work was all, or nearly all, lost. Not quite all—for a certain amount of observational work was carried out in the United States, in India, and in the British Dominions and Colonies. These observations were, however, merely of a precautionary character—they were made in order to see if anything really happens in regions removed from the region of totality, either in the way of altering the normal signal strength or in changing the number and intensity of strays. Of the whole event the only consolation is that the experience gained in arranging the work may perhaps be useful on another occasion.

The future of radiotelegraphic research on the wide lines sketched above is at present very uncertain. In Europe it is obviously contingent on the duration of the war; and, probably, in other parts of the world experimental work is in some degree hindered by the present circumstances. It seems likely that when the time comes both of the organisations whose efforts have just been sketched will endeavour to pick up the broken threads of their work and start over again just a little riper in experience.

WIRELESS AND WAR AT SEA

By Archibald Hurd.
Author of "Command of the Sea," etc., etc.

SINCE the last great naval war was waged in Europe a century ago remarkable changes have occurred in the construction of ships, in their defensive and offensive qualities, and in their auxiliary equipment. The principles of naval war are static, but their application has changed and is still changing. The object of hostilities is to defeat the enemy, and in order to effect this purpose it is desirable to know what the enemy is doing in this or that theatre and to possess means of communication which will enable superior power to be concentrated and exerted against him at the right time and in the right place. It is also essential that the power shall be of the right kind. Sometimes it may be necessary to employ battleships; on other occasions battle-cruisers—that is, ships with the speed of cruisers and the gun-power of battleships—may be more suitable, while in other circumstances it may be necessary to use scout cruisers, destroyers or submarines. The more complete and exact the information obtained as to the movements of an enemy, the better will be the arrangements for defeating him, providing the higher command is exercised with competency and sureness of purpose. It may, indeed, be said that in war almost everything depends upon rapid and accurate intelligence.

The invention of wireless telegraphy has radically altered the intelligence service of the British Fleet, as of other fleets. In former wars in which we have been engaged communication between the Admiralty and the admirals at sea and between the admirals at sea and the officers commanding individual ships was slow, uncertain, and often inefficient. The old system of intelligence may be illustrated by recalling the story of the errand of the brig *Curieux*. Nelson, acting on his unequalled intuition, had chased Villeneuve across the Atlantic, and on June 12th reached Antigua to learn that the enemy had apparently started back for Europe. The British admiral decided to send the *Curieux* to England with information of the enemy's movements and details

of what he himself intended to do. Sailing at her swiftest, she did not reach Plymouth until July 7th. Commander Bettesworth posted at once to London, only to discover that the First Lord of the Admiralty, Lord Barham, had gone to bed and that no one dared to rouse him.

> "At an early hour," Mr. Julian Corbett states in "The Year of Trafalgar," "the old man awoke and fell into a fury when he knew what had been awaiting him. For it was not only Nelson's dispatches Bettesworth had to deliver, but having taken a more northerly course than the Admiral, who was making for the Straits, he had sighted Villeneuve and determined his course. It was on June 19th as high as latitude 33° 12' and in longitude 58°—that is, some 900 miles north-north-east of Antigua—that he had seen him, and the Combined Fleet was still standing to the northward. Till there could be no doubt Bettesworth had shadowed them, and then made all sail home with his all-important news. That Villeneuve had stood so far to the northward could only mean he was making for the Bay, and not, as both Barham and Nelson expected, for the Straits. What was to be done? In half an hour Barham had decided."

In three hours the orders of the Admiralty had been drafted and the commander of the *Curieux* was thundering down the Portsmouth road to rejoin his ship, which had in the meantime moved round from Plymouth to Portsmouth. In a short time the brig again put out to sea, bearing with her dispatches to Cornwallis which had no little influence in changing the course of European history.

One can imagine how the admirals at sea and the members of the Board of Admiralty chafed under the delay which was imposed upon them owing to the slow means of communication which then existed. The *Curieux*, from the time when Nelson decided on his course of action until Plymouth was reached, was at sea twenty-four days. Then followed Captain Bettesworth's post to and from London, and further delay occurred before the vessel was able to complete the chain of intelligence by communicating with Cornwallis. In the past hundred years steam has replaced sail-power and movement by sea has thereby been rendered more rapid. On the other hand, except where cable communication exists, the Navy of to-day would still have to rely upon the same slow methods of communication as existed a

century ago were it not for the invention of wireless telegraphy. The relation between the speed of the enemy and the speed of the intelligence ship of the opposing fleet is now much what it was in Nelson's day. Under the altered conditions, however, a wireless signal "in code" can accomplish in a few seconds all that the *Curieux* was able to do in many days.

Lack of efficient intelligence was under other conditions the bane of the lives of our admirals, as their letters reveal. When Nelson was blockading Cadiz he had to maintain a chain of small vessels which stretched from the enemy's port to the main British Fleet, fifty miles away, and the news that the enemy had sailed did not reach him for two and a half hours. To-day a single scout cruiser, under steam, could cover that distance in an hour and a half, and no chain of repeating vessels would be necessary; and the enemy, instead of taking 24 hours to manœuvre out of port, could complete the operation in one or two hours. Steam in the first place rendered possible a reduction in the number of links in the chain where great distances had to be covered, but it was not until Signor Marconi invented wireless telegraphy that it became unnecessary to have any chain in any circumstances.

The marvels of yesterday are the commonplaces of to-day. We accept the triumphs of wireless telegraphy without surprise or wonderment. And yet how short is the time since this invention appeared and how surprisingly have all the early anticipations of its triumphs been more than fulfilled! In this connection it is not uninteresting to recall the leading article which appeared in the *Times*, as recently as August 17th, 1899, on the employment of Signor Marconi's system in the naval manœuvres of that summer. It was remarked that "It has been demonstrated by repeated experiments, conducted under the conditions of actual service, that signals can be transmitted, received, and interpreted from ship to ship, *up to a distance of at least thirty miles*, and that their transmission is, so far as we know at present, unaffected by any ordinary meteorological conditions. . . . Thus at a single stroke all existing methods of signalling at sea would seem to be superseded and the effective range of signalling by night or day and in all meteorological conditions is enlarged some five or six fold at least. . . . An electrical contact, alternately made and broken at prescribed intervals, in any one ship will project the required signal, by means of the familiar telegraphic alphabet of

dots and dashes, to any other ship within a circuit of thirty miles. Communication with the land can be maintained at the same distance, and the signal, being automatically recorded, will require no exceptional acuteness of vision and no trained habits of nautical observation in the operator who receives it. A button pressed in the flagship will initiate any and every tactical evolution in the fleet and ensure an almost automatic precision in the resulting movements of the ships. The flashing lantern will be superseded at night, flags and the semaphore by day, or employed for the most part only as auxiliaries for executive purposes and for the better discrimination of ships addressing and addressed. The hideous and often bewildering shrieks of the syren will no longer be heard in a fog, and the cumbrous, dilatory and very uncertain system of gun signals will become entirely a thing of the past. As the range of transmission appears to depend on certain determinate factors—such as the height to which the transmitting and receiving wires are carried and the intensity of the vibrations excited in the former—it seems not impossible that the determination of these factors may lead hereafter to an accurate and expeditious measurement of the distance between transmitter and receiver, thus superseding the sextant in ascertaining and correcting the stations of ships in a fleet."

If a means of signalling over distances of about thirty miles was welcomed by the *Times* sixteen years ago in a leader of a column and quarter in length, how great must be the indebtedness of the Navy to the new system when a squadron based on Malta can receive signals direct from the Admiralty by this new system and when the ordinary installation of a large ship of the Fleet can send messages over a distance of 2,000 miles!

When the new means of communication was in its infancy installations were made only in battleshmips and large cruisers; the system was afterwards extended to small cruisers, later on to destroyers, and finally to submarines. The German underwater craft, which have played such a dramatic *rôle* in the present war, are provided with installations which enable them to communicate three or four times as far as could a battleship in the naval manœuvres of 1899. This contrast supplies evidence of the remarkable development which has taken place in the adaptation of wireless telegraphy to the uses of the Navy in the last sixteen years. Practically every ship in the British Navy to-day can dispatch and receive wireless signals, and consequently the

intelligence work of the Navy has undergone a radical revolution. An admiral need never be out of touch with his vessels and he need practically never be out of touch with the Admiralty. The radius covered by his intelligence service is governed, not by the number of links in the chain of signal vessels, but by the character of the wireless installation. Admiral Sir John Jellicoe, in command of the Grand Fleet, can remain not only in hourly touch with the Admiralty, wherever he may be in European waters, but he can receive instant reports of any movements on the part of any section of the enemy's navy from the patrolling squadrons.

In the matter of intelligence the modern admiral is infinitely better served than was Nelson, whose continual cry was "more frigates, more frigates." In the year before Trafalgar the Navy possessed 244 frigates to 175 ships of the line, while in 1814—just over a hundred years ago—there were 317 scouting vessels and 240 heavier ships. A British admiral was never satisfied that he had with him sufficient frigates to watch the enemy's movements, convey information to him, and act as dispatch carriers. In the opening year of the present century, with the advent of steam and iron ships, conditions had undergone a change, but still the admirals demanded "more cruisers: more cruisers." In the spring of 1900—fifteen years ago—the Navy embraced 45 battleships and 126 cruisers of various types and sizes, and there were 15 large armoured or protected cruisers building. At that date the other six naval Powers had 52 cruisers in hand—France 14, Russia, Germany, and the United States 9 each, Japan 8, and Italy 3. The introduction of steam and the development of the steam engine had conferred advantages on Powers, great and small, and every country was intent on constructing cruisers. Of different types there were, built and building, 314 ships which could be used in scouting duties, though some officers held that many of the larger cruisers, carrying the 9·2 in. gun, might also be employed in the line.

Wireless telegraphy has since been developed to a state of perfection as a means of communication which fifteen years ago would have been regarded as impossible. The whole world has become a whispering gallery; yet by "tuning" and the use of codes secrecy can be maintained, so that A and B, British ships, can talk without C, a German ship, being able, except by luck in hitting on the "tune," or leakage of the code employed, knowing what is the subject matter of the conversations.

What has been the effect of wireless telegraphy on cruiser construction? How many cruisers are building? No armoured or large cruisers—what in the past would have been known as "first-class cruisers"—are under construction in any shipyard for service under any flag. The only type of vessel in hand is the small scout, except in Russia, where, for an unexplained reason, six vessels of 7,600 tons displacement are on the slips. The vessels of the scouting type which are in hand in British or other foreign yards range in displacement from 3,500 tons, in the case of Austria-Hungary, to 5,000 tons in that of Germany, the British scouts—known as light cruisers—being of 3,800 tons.

The attention which the individual Powers are devoting to cruiser construction will repay analysis. When the present hostilities opened no fewer than 17 very fast and useful craft resembling the *Arethusa*, of fame, were in course of construction for the British Navy—they were described officially as "destroyers of destroyers" rather than intelligence vessels, and as such they have been mainly employed during the war. Germany had in hand 6 small cruisers, Italy 4, Austria-Hungary 3, and France, the United States, and Japan none. The duties which it is intended that the eight large Russian ships shall perform in war cannot be guessed; these ships stand alone and apart. If we omit Great Britain and Germany, which were involved in a keen rivalry which was to find its culmination in the present war—we are confronted with the fact that the other six naval Powers had in various stages of construction only 7 cruisers.

This neglect of cruiser building coincided with the development of wireless telegraphy and the increased size of destroyers carrying wireless installations. It has been a marked feature of constructional policy for ten or more years in all countries except Great Britain and Germany. It is estimated that the effective life of a cruiser stretches over a period of fifteen years. Making allowances for the losses which the belligerent Powers have sustained during the present war,* there will next spring be about 70 effective cruisers under the British flag—a proportion of them obsolescent though not obsolete; while Germany will possess 15, the United States 21, Russia 17, Italy 11, France and Japan 9 each, and Austria-Hungary 5. The cruiser strength of the great navies of the world is steadily decreasing with every year which passes. We shall shortly be confronted with fleets with far more

*We have lost 10 cruisers, Germany 17, Austria 2, and Japan and Russia 1 each.

battleships than scouting ships, a reversal of the conditions of 100 years ago, when in the British Navy there were 317 frigates to 240 ships of the line.

In neither of the countries in which the building of cruisers has been almost, if not entirely, abandoned has any official explanation been made of the change of policy which has occurred. Even in the United States, where a very complete exposure of the springs of action of the naval authorities is made from year to year before Congressional Committees, no justification has been forthcoming of this abandonment of the cruiser. Throughout the world there is a general agreement that the day of the large and costly cruiser, with a protected deck or vertical armour, is over; there is no demand by officers in the American Navy for anything between the battleship and the seagoing destroyer, or, if there is, it has failed to find expression. In other countries naval opinion runs strongly in the same direction, except where trade routes have to be defended.

What is the explanation of this trend of policy? Wireless telegraphy does not render scouting ships unnecessary, it is true, but it has made superfluous the long chain of signal vessels. An observation vessel—small cruiser or even destroyer—can remain on her station and pour into the flagship, 50, 100, 200, or more miles away, a continual stream of intelligence as she obtains it. Wireless telegraphy has not eliminated the scouting ship and has not increased her radius of steaming, but it supplies a method of quick, rapid and certain communication. It does not serve as eyes to the battle fleet, but performs the same duties in a fleet that the mind performs in the body, conducting the sensations from any part of the human form to the mind, with the result that it is provided with material on which to act. For instance, the eye, nose or ears give warning to the mind of an imminent danger; a wise man, in the possession of his mental powers, takes suitable action to avoid it. Similarly with wireless telegraphy, the cruiser acts as the eye of the admiral and by means of its wireless installation, and without reliance on a chain of repeating vessels, communicates at once to the "brain of the fleet"—the staff in the battleship.

Reverting to the blockade of Cadiz—consider what this change means! Nelson had his line of signal vessels thrown out, linking him with his most advanced scouts. Though he was only fifty miles away, information that the enemy was putting to sea

did not reach him for 2½ hours. To-day there would be practically no interval between the observing cruiser gathering the information and that information reaching the admiral and his staff. During the Russo-Japanese war Togo could retain his main fleet, "containing" the enemy at Port Arthur, as far away as the Elliott Islands, 60 miles distant, and yet be in instant touch with the craft which were watching the movements of the Russians.

The introduction of wireless telegraphy has consequently contributed to an economy of time, which means greater strategic efficiency, and, in so far as it has been responsible for the decreased output of cruisers, to an economy of money. In some measure it has robbed the weaker naval Power of the advantage which steam conferred on him. Steam assured certainty of movement and facilitated evasion. Wireless telegraphy, in greatly assisting in scouting operations, placed in the hands of the stronger navy the ability to effect concentrations in force. One illustration of this overwhelming advantage to the supreme sea-Power—and the only one which can be mentioned, perhaps, while the war is in progress—is afforded by the destruction of the German cruiser *Emden*. After a more successful career in the destruction of commerce than even the *Alabama*, of historical fame, achieved, she put into Cocos-Keeling Island and landed a party, with the intention of isolating this small community. The wireless operator had time to send out a message for help. The signal was picked up by the senior officer in charge of the cruisers which were convoying transports from the Antipodes to Europe. The information was so full and accurate and was received so rapidly that no doubt existed either as to the identity of the enemy's ship or the possibility of catching her. The senior officer selected for the duty of destroying the *Emden* the *Sydney*, of the Royal Australian Navy, a vessel more powerfully armed and swifter than the *Emden*. Within a few moments of the signal of distress being dispatched from Cocos-Keeling Island this man-of-war, cruising many miles away, had changed her course and was bearing down upon the *Emden* for the purpose of destroying her; and destroy her she did. Wireless telegraphy was thus responsible for the complete destruction of this most famous of all commerce raiders; but for Signor Marconi's invention there is no saying when her career would have come to an end.

Wireless telegraphy has completely revolutionised the intelligence services of the Navy. An admiral need never be out of

touch with the ships under his command. Success in war depends in large measure upon unity in command, and wireless telegraphy, when it has been fully developed, will contribute powerfully to this end. The Lords of the Admiralty, seated in Whitehall, will be in a position to signal to ships of war on the outermost sea stations. This facility of communication will add incalculably to the strength of the British Fleet. It will enable concentrations of force to be made swiftly to the disadvantage of the weaker naval Power. Thus wireless telegraphy takes its place beside other scientific developments of the past few decades in assisting the supreme naval Power and conferring upon it advantages altogether out of proportion to those enjoyed by the smaller nations. But for the aid which science has rendered, the British Empire to-day would consist of a series of isolated communities, each in danger of being surprised and isolated, as they were surprised and isolated in the past. In fact, however, the King's Dominions are being day by day brought into closer relation with each other and with the Mother Country. Wireless telegraphy is destined to become the nervous system of the British peoples; a signal of danger from any isolated community will at once result in appropriate aid being dispatched. In this way wireless telegraphy will enable the British Navy to utilise to the full the advantage of speed obtained by the use of steam.

Great as are the advantages which wireless telegraphy has conferred upon the Navy, its development is not unaccompanied by some disadvantages. The distinguishing character of the Navy in the past was the initiative and resourcefulness of officers on distant stations acting on their own responsibility without reference to the Admiralty. The knowledge that, owing to the development of the new means of long-distance signalling, they possess instant means of communication with Whitehall may prove a source of weakness. Attention has already been directed to this peril both in and out of Parliament. It has been suggested that the Admiralty may be encouraged to interfere unduly with the freedom of action of officers in distant seas. On the other hand, there is a danger that officers in the outer stations, confronted with embarrassing conditions, may be tempted to evade responsibility and wait for instructions from home. Both dangers exist, but probably the latter is the greater. The Sea Lords in time of war have full reason to be conscious of the heavy responsibilities which rest upon them in the exercise of the higher command.

They are hardly likely to add to those responsibilities and arrogate to themselves the right of decision on this or that minor point of policy. But a naval officer, realising the consequences which will fall upon him if he commits an error, may well be tempted, if he be lacking in initiative and resourcefulness, to seek direction from home instead of acting according to his own judgment. In both respects time will no doubt evolve suitable measures with a view to securing to the Navy the maximum advantages of wireless telegraphy with a minimum of disadvantages. Certainly nothing which has yet occurred, so far as is known, in the course of the present war supports the belief that wireless telegraphy has proved anything but a great reinforcement of our naval power.

The Empire will not gain the full advantage of wireless telegraphy until further progress has been made in Imperial co-operation for naval defence. When the Empire obtains an Imperial Fleet, subject to the control of one authority, then the Imperial wireless service will powerfully contribute to the security of every Imperial interest, wherever it may be situated. It was suggested when wireless telegraphy was invented that it would rob the British peoples of the advantages which they had hitherto enjoyed from the possession of British owned cables. It was urged that the least wealthy naval Power would be able to take the fullest advantage of Signor Marconi's invention, and that, consequently, our sea power would be robbed to some extent of the benefits in war time which it had hitherto obtained from the control of most of the cable systems of the world. It is already apparent that this is a delusion; wireless telegraphy, owing to its length of reach and its rapidity, will reinforce our sea power, because we are and must remain the supreme nation on the oceans of the world. When, by the co-operation of the Dominions, and, possibly, of India, a great Imperial naval force has been created, wireless telegraphy will confer upon the supreme authority in control the ability, independent of the cable, to concentrate the right force at the right place and at the right moment; and in this way the world-wide needs of the British Empire will be strengthened immeasurably. The wireless system is still in comparative infancy, and we cannot doubt that in the course of the next few years it will be greatly developed, and every stage of advance will mark a further strengthening of the naval chain which binds the Empire together and secures its safety under peace and war conditions.

THE INFLUENCE OF WIRELESS TELEGRAPHY ON MODERN STRATEGY.

By Colonel F. N. Maude, C.B., late R.E.

WHILE there can be no doubt of the immense superiority of wireless communications over any of those the world already knows, or has ever known, in so far as regards the certain transmission of orders, the absence of wires or field cables liable to interruption, and so forth, it is an extraordinary thing that, as concerning the great operations of war when both armies are equally equipped, the net result is to leave strategy exactly where the marvel of wireless found it.

The statement seems so paradoxical, yet does in fact follow so logically from the several steps in the evolution of the modern strategical conception, that it will be of interest to trace out the sequence of cause and effect which has led to this singular position.

Strategy, in the modern sense in which the word is used, involves as its essential problem the timing of many columns moving on different roads to converge on a selected battlefield. Until Napoleon became Emperor of the French, in 1804, the idea did not exist, because it had never occurred to any of his predecessors to attempt the feat—at least, as part of a definite system.

Before the French Revolution roads were generally so few and far between, and the impossibility of inter-communication between separate columns proceeding towards a common objective seemed so obvious, that it was the custom to move the whole of an army by a single line or road, in such definite fighting order that it could be prepared for action practically by a single bugle call. *Efficiency,* not *numbers,* was everywhere considered the deciding element, and if a king had money to spare he found it paid him better to spend it on equipment, and especially on his commissariat, rather than on an increase in the number of mouths to be fed.

Bitter fighting experience had taught the armies of Europe that it was not expedient to attempt to subsist their men by plundering the inhabitants, since in those days they had an awkward habit of defending themselves by ambushes, by driving off their cattle, and so forth. Hence it paid better for the army not to

molest and antagonise them, but to provide its own food by purchase in open markets.

Unfortunately the French Revolution came at a period when western Europe had been spared the horrors of warfare for nearly two generations, and had forgotten the old traditions and more gentlemanly ways of their forefathers.

The early French levies (called into existence to meet the invasion of Prussians and Austrians, moving and fighting on the time-honoured lines), being entirely destitute of equipment and money, were absolutely compelled to adopt the still older system of living on the people which prevailed throughout the Thirty Years' War, and had killed themselves by the appalling excesses and wastage to which this procedure gave rise.

The Belgians proved an easy prey for the first French Armies in 1792-3; afterwards the Germans, the Italians, and the Austrians proved to be equally facile conquests (only the Spaniards and Russians, developing the spirit of self-reliance and defiance, refused to be beaten), and long before Napoleon became Emperor all countries bordering on France knew that the passage of troops through their midst meant pillage. They further discovered in a sufficiently terrible manner that resistance to such oppression meant burning villages and an indiscriminate rapine.

Brescia, near Milan, was the prototype of Louvain, and its destruction had much the same after-consequences, though they took longer to develop. When, therefore, in 1805 Napoleon found himself compelled to march against the Austrians, his troops at the moment being distributed in six Army Corps, from Boulogne, through Holland, to far-away Hanover, he knew that he could safely order each corps to march through the enemy's country feeding itself on the districts through which it passed. It was then that the idea of combining all the six columns moving on separate roads towards the battlefield of his choice first took root in his mind. The essential element, however, in his calculations was the conduct which the Austrians might choose to adopt.

Adhering to their general custom, it was practically certain that they would keep their 80,000 men together, and on learning of the approach of the converging French columns would fall on each of them in succession and beat them in detail.

To guard against this danger Napoleon covered the whole front of his army by a powerful cavalry screen, moving some two or three marches in advance of the main columns, reasoning that

when his mounted men gained touch with the enemy they would report its position and give him ample time to concentrate for an attack.

Unfortunately, Napoleon overlooked the fact that the cavalry of those days possessed no holding power at all, and though they certainly found the enemy and reported his position correctly they left him free to move in any direction he pleased. The Austrian General, Mack, at the last moment took advantage of the option thus left him and marched rapidly out through a hole in the net with which Napoleon had sought to surround him. Then followed the crisis in the Emperor's life.

By great efforts he managed to set in motion one corps out of the six under his command, and a single division of this corps alone (favoured by circumstances of which he knew nothing, and on which he could not legitimately have counted) just managed to intercept the rear guard of the Austrians and succeeded in capturing some 29,000 of them.

It does not appear that anybody except Napoleon realised the astonishing mistake thus made. By judiciously concocted bulletins he managed to conceal his failure from Europe; but that he himself was fully cognisant that to march 240,000 men half-way across Europe and only to bring 20,000 of them into action at the decisive time and place was not to his credit as a great commander of men, is sufficiently demonstrated by the fact that he never again repeated his mistake.

It was some time before he discovered and perfected a better method of procedure, but, curiously, he never succeeded in making his Marshals understand the new principles he adopted, and practically his whole system faded away with his deposition in 1815. It was not until 80 years later, and some 20 years ago, that an exceedingly able young French Staff Officer, a Captain Gilbert of the Engineers, suddenly noted the extraordinary fact that during 1807, and afterwards, the Napoleon who had so signally failed in 1805 to concentrate a superior force against his enemy at a point of his own choosing, all at once began to win battle after battle by always bringing from two to three to one men into action, even when he commanded armies numerically inferior to his opponents.

The future psychologist historian will probably find in this rediscovery the essential starting point of cause and effect which have led us up to the present *dénouement*, because, but for the

confidence which suddenly sprang into existence in the French Staff when the supreme importance of Captain Gilbert's work became manifest to them, the Government of France would never have found courage enough to accept the German challenge when it was thrown down in August of last year.

The French intellect immediately seized on the enormous advantage this secret knowledge conferred on them. They knew, as all the world knew, that the German General Staff had been most assiduous students of the Napoleonic strategy for very many years indeed, but the rediscovery of their young Engineer captain showed them that the Germans, remaining under the misapprehension of results, so carefully fostered by the Napoleonic bulletins which were issued to hide the Emperor's mistake at Ulm, had altogether missed noting the fact that the methods of the Ulm campaign *had never been repeated* by their creator. The Germans, blind to this, had gone on studying and amplifying the original model long after Napoleon himself had scrapped the disastrous methods altogether.

And this is where the question of a *reliable* wireless system of communication comes in, for the one thing against the Ulm scheme, on the very face of it, was the difficulty of maintaining rapid and trustworthy touch between the several manœuvring columns, as Von Moltke very nearly found out to his cost in 1870.

Relieved of this risk of uncertainty in transmitting information and orders, it seemed to the German, and to all the other General Staffs in Europe, that, given a numerical superiority and equal marching powers, the methods elaborated by means of Moltke's experiences and teaching after the campaigns of 1866 (Austrian) and 1870-1 (French), held the field as the ultimate expression of military knowledge and wisdom, and must always win against all comers.

The following brief summary of the events round Metz, 1870, read by the light of what the French Staff subsequently discovered, will make the sequence of cause and effect more obvious.

About the 12th August, 1870, Bazaine took over the command of the French Army of the Rhine, still 180,000 strong. They were drawn up practically as a single body some 30 miles east of Metz. The Germans (240,000) were advancing into France on many parallel roads over a front of about 150 miles

in width at the least, with the one great idea of working round the southern flank of the French, and forcing them, from their direct retreat on Paris, away northward against the Belgian frontier.

On the road to Paris lay the fortress of Metz, covering the bridges over the Moselle, and compelling the Germans to extend their southern sweep in order to avoid the guns of the place.

Bazaine, knowing nothing of any Napoleonic methods, but quite convinced, from his day to day experience, that the army entrusted to him was quite incapable of accepting battle with the superior forces of the Germans in the open field, made up his mind not to attempt to retreat beyond Metz, but to allow himself to be invested within the fortress, hoping thus to divert the energies of a considerably larger number of enemy troops than those of his own force for some months (as he actually did), thus giving the French Government time to organise the defence of Paris, to raise fresh troops, and ultimately to march to his relief, when he would play anvil to the hammer of the new armies and between them they would crush out the German invaders pretty flat.

Moltke, on his side, had no notion of what was passing in Bazaine's mind, but looking at the French position by the light of his own knowledge, and well informed by his cavalry of the day to day movements of the French troops, concluded that in Bazaine's case he would cross the Moselle in and around Metz as rapidly as possible, and then make a series of forced marches, through Verdun, to form a junction with MacMahon's new armies then assembling at Chalons.

Convinced that this was *his own* best solution of the problem, and that Bazaine would see it in the same light, he handled his cavalry, and the infantry corps behind them, *exactly* as Napoleon had handled his commands at Ulm.

The resemblance is so complete that a diagram map of the one movement serves equally well for the other. One has only to move the north point round 90 deg., write Metz for Ulm, and Moselle for Danube, to have an exact representation of the situation during the critical hours in either campaign.

But there is this difference, that whereas Mack, at the eleventh hour, marched out of the trap set for him, intending to turn and attack his enemy in the rear, Bazaine created a trap for his enemy by the simple expedient of standing still.

By the mere fact of abstaining from action he created a

numerical superiority of over three to one against the right wing of the German Army, and had he chosen to take full advantage of his opportunity he might have rolled up the whole of Moltke's right wing from right to left before the latter by forced marches could have re-established even a numerical equilibrium.

Following up the subject, it was seen that by the same abstinence from action, on each of the five days preceding the action, the same situation had reproduced itself on any day from the 11th August onwards. The German right was skirting the abyss of catastrophe.

It was when the French Staff had reached this point in carrying on the study of Captain Gilbert's discovery that the full meaning of the great Napoleonic secret dawned upon them. They saw that the weak point of the German system lay in the fact that it did not in any way dominate their adversary's will, whereas reviving Napoleon's practice at its fullest development it became clearly apparent that the Emperor *never attempted a concentration for battle until by a preliminary attack he had inhibited the enemy's will, and knew he could hold him for the time necessary to manœuvre the rest of his army against the point of his own choice, in numbers sufficient to deal the "knock-out" blow.*

Whether the enemy attacked Napoleon, or Napoleon attacked the enemy, did not matter to the Emperor in the very least. Once his troops had fixed their claws in the enemy's flesh the latter was powerless to divert the decision as willed by *the* Great War Lord.

Napoleon might elect to smash his adversary's left wing, or his right—but he could not move to parry the coming danger—and *this is the vital point.* Until the decisive movement actually began only its director's brain knew where it was about to close, and once the "swing in" became visible to the enemy distance alone made it impossible to concentrate sufficient fresh troops with which to meet it.

Neither aeroplanes nor wireless can save the enemy under these conditions. War becomes like playing chess on an open board; you can see exactly where every unit is, but, until the player's fingers actually leave the piece on its new square you cannot tell for certain exactly what move you will have to meet.

It is this stamp of uncertainty that has hung over the German leadership ever since the beginning of the war of 1914-15. Utilising the Napoleonic method to its utmost extent, the French

General Staff suddenly sprung the new Sixth Army, emerging from behind the fortifications of Paris, upon the Germans on the 6th September, 1914, and thus compelled the enemy's withdrawal to the line of the Aisne.

The Russians are using the same system with even greater success all along their own vast frontier of 1,000 miles, and no amount of prevision, or even of information, on the German side seems able to free them from the consequences of this atmosphere of uncertainty which the French method is bound to create.

For the moment the Allies in the West are only assembling troops, and waiting for the roads and country generally to dry up. But once the climatic conditions improve, whereas there is no concentration the Germans can undertake which can surprise us, the lines and combinations open to us by the Napoleonic strategy are so numerous that it is always a 24 to 1 chance against the enemy's guessing the one we shall use until it is too late to prepare to oppose its consequences. Out of this vital difficulty neither aeroplane nor wireless can extricate and deliver him.

LONG DISTANCE SERVICES

TO those of us who can realise the fact that Radiotelegraphy is yet in its infancy the present situation is full of significance. The Austro-German Allies, but for the fact that they possess certain high-power long-distance wireless stations, would be entirely cut off from the rest of the world. This means that the two central European Powers would be unable to send out orders or give or receive intelligence of any kind whatever, except through neutral countries whose cable communication is almost entirely under British control. Germany has always been conscious of her disability in this respect, and for many years past has spent her money lavishly in laying German cables—only to see them cut by the British within forty-eight hours of the declaration of war.

After the cutting of the cables the German long-distance wireless stations abroad were able to maintain a service which was found particularly useful by their rulers in the Fatherland. The next move in the British assault upon German communications consisted in the destruction, one by one, of many of their high-power wireless stations. The detrimental effect upon Germany of the British successes in this respect cannot be better demonstrated than by the following extract from an official communiqué issued at the beginning of 1915 by the German Colonial Office. It reads as follows :—

"Soon after the outbreak of war all communication with "the Colonies by sea was broken, and all German submarine "cables were cut by the British, so that even telegraphic com- "munication with the whole of our colonies was rendered im- "possible. The only remaining means of communication was "wireless telegraphy, but the first warlike measures of the British "were directed to depriving us of this means also. On August "12th fell the wireless station Yap, and soon afterwards the "station Naru (both in the Pacific Ocean). Tasigata (Samoa) "fell on August 29th, and Bitapaka, in New Pomerania, on "September 12th. During the night of August 24th the great "station at Kamina, in Togoland, had to be destroyed by us "in order to prevent its capture.

"So vanished all possibility of further direct communication "with the African protectorates, which hitherto had been able to "communicate viâ Kamina. As a matter of fact, there had been

"from the very beginning a disturbance of the system, which "prevented us from receiving any reports from the Governor of "East Africa after the outbreak of war. And so the material "which we have here collected, and which in the main reached "Berlin by circuitous routes and very late, is mostly derived from "private letters or from enemy newspapers, and must necessarily "remain fragmentary and some of it must also be regarded as "untrustworthy."

At present the high-power stations in Germany cannot be got at by the Allied forces, and these now form the sole direct link between the Austro-German authorities and the world outside their immediate neighbourhood. The successive destruction of cables and the overseas German long-distance stations has only intensified their importance.

So much for the lesson of the utility of Government wireless stations in the hour of national need as exemplified in the case of our enemy. *Fas est et ab hoste doceri;* and, indeed, this is by no means the only matter in which the Government of Great Britain has been fain to learn from her bitter foe. There are important British Colonies which under existing circumstances, in the case of certain war eventualities, would be utterly and entirely cut off from communication with the Mother-country or any outside source whatever. The existing cables would be rendered useless, and there are no long-distance wireless stations to take their place. Is it too much to hope that, now long-distance wireless is daily proving its powers in warfare, the re-establishment of peace will bring once again to the fore the final consummation of the Imperial wireless chain which was occupying so much attention before the present war started?

It is impossible under present circumstances to dwell at any length upon the subject of wireless telegraphic communication from the point of view of the State; but perhaps it may be permissible to devote a little space to a brief outline of the status of long-distance wireless from the commercial standpoint.

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Historical Resume.

In 1896 the world awoke to find that a new and hitherto undreamed-of means of communication had sprung suddenly into existence.

It was about this period that Mr. Marconi conducted his first series of demonstrations of the wonders of "telegraphy without wires" before representatives of the British Government, when he succeeded in establishing communication over a distance of four miles. Progress went on apace, and in March, 1899, the first message was sent from England to France across the Channel.

It is interesting to note that only a short while before these demonstrations were given, when Mr. Marconi first arrived in England, he stated that he considered twenty miles to be the maximum distance over which wireless signals could be transmitted and received. This statement "sorted well" with Mr. Marconi's well-known characteristic of modesty and caution; but he, of course, explained that he was speaking within practical limits and considering only apparatus of the type he was then using. It was not very long, however, before he was able to develop his system and improve upon the apparatus employed, with the result that in 1901, stations having been erected at the Lizard, in Cornwall, and Niton, in the Isle of Wight, the distance of 196 miles between these two points was successfully bridged and communication established.

The great Italian inventor went on quietly and unobtrusively improving his apparatus. With the object of demonstrating in a striking manner the results obtainable from these improvements, he selected a site in Cornwall and built the pioneer long-distance station at Poldhu, seven miles north-north-west of Lizard Point. The station finished, leaving behind him instructions that on receipt of a cable message his assistants were to start repeated transmissions of the letter "S" (represented by three dots . . . in the Morse telegrahic code), Mr. Marconi sailed for St. John's, Newfoundland.

For the purposes of experimental reception on the other side of the Atlantic he determined to content himself with a wire held aloft by a kite. All was ready; the cable was sent instructing his assistants to start transmission of signals from Poldhu, and at noon of December 12th, 1901, Mr. Marconi adjusted his instruments in a room of the old barracks on Signal Hill, and awaited the result. It was a bluff raw day, and the kite swaying high overhead gave considerable trouble. Not even a reporter was present—only Mr. Marconi and his assistants, Mr. Kemp and Mr. Paget. For nearly half an hour not a sound broke the silence of the room. Then, quite suddenly the tapper started clicking as it

struck against the coherer, and the two observers were able to verify the fact that the signals were crossing the intervening waste of waters. The practicability of trans-ocean wireless communication was thus clearly demonstrated.

A brief description of the original station at Poldhu, which played so important a part in the demonstration, may be not without interest.

The aerial wires were suspended from twenty masts, each 210 ft. high. The operating current was of energy sufficient to serve 300 incandescent lamps, and the resulting spark was of sufficient brilliance to have a blinding effect upon anyone gazing upon it with unprotected eye. The wave which was thus generated had a length of about one-fifth of a mile, while the rate of the vibration was adjusted to give 800,000 to the second. When we contrast this with the equipment of a modern trans-atlantic station, it will be seen under what disadavantages, in essentials alone, Mr. Marconi was working in these early days.

It was easily recognised that regular transmission could scarcely be hoped for with the small-powered transmitting apparatus then available. With this in view, the transmitter at Poldhu was enlarged, and in December, 1902, another attempt was made to transmit across the 1,800 miles to Nova Scotia. On this occasion more than the mere "S" signal was despatched, and complete messages were received across the Atlantic. In the meantime, a sending station was erected on the American side at Cape Breton, and in December, 1902, the two stations accomplished the exchange of messages at night under favourable conditions. This, however, did not suffice for the purposes of commercial services, because daylight transmission was still largely impracticable, and even with night transmission working could not be relied upon at times, owing to atmospheric disturbance.

Enough had been done to prove beyond all question the efficiency of Wireless Telegraphy as a means of establishing long-distance communication. The new invention had by now attracted official attention, and this fact was signalised through the means of a message transmitted by Earl Minto (at that time Governor-General of Canada) to his late Majesty King Edward VII. About the same date Mr. Marconi transmitted a wireless messages to King Humbert of Italy, and received in reply the following congratulation ;—"I have learned with great pleasure

of the results which you have obtained, which constitute a triumph for yourself, to the greater glory of Italy and of science."

The next step consisted in the erection of two further high-power stations, which were located at Glace Bay, in Canada, and Clifden, in Ireland, respectively.

The year 1904 marks an important era in the establishment of transatlantic wireless services, for in August of that year arrangements were made by the Postmaster-General of the United Kingdom whereby British post offices undertook the collection, transmission and delivery of long-distance messages on behalf of the Marconi Company. This service applies to telegrams destined for transmission viâ Poldhu to ships at sea.

Successful efforts towards the perfecting of apparatus for overcoming the most serious difficulties of atmospheric disturbances resulted (in 1907) in the establishment of a limited public service between the recently re-constructed Marconi station at Glace Bay, Nova Scotia, and the new station at Clifden, in Ireland. It was from these stations that Radiotelegraphy entered into its first direct commercial competition with the Atlantic cables. The power of these installations ensured a fair amount of reliability even in daylight, by the use of long waves and musical sparks. We may exemplify the more recent progress in the efficiency of Wireless Telegraphy for the purpose of communication over long distances by reminding our readers of the fact that, in 1910, while on board the *Principessa Mafalda*, en route for Buenos Aires, Mr. Marconi received wireless messages from Clifden at a distance of 4,000 miles by day and 6,735 miles by night.

About 1910 a number of changes were made, including the installation of horizontal "directed" antennæ at both stations. As a result of this and other modifications the speed of the service, which up to that time had been kept below 20 words a minute, on account of the necessity for repetitions, was markedly increased.

During 1914 the plants were duplexed by the erection of receiving stations to operate simultaneously in conjunction with each transmitter. By these means the capacity of the system for handling messages was doubled.

With the Duplex system in operation, messages may be transmitted by wire from New York or elsewhere to Glace Bay, whence they are repeated by wireless to the receiving station at Clifden. Clifden, on the other hand, can simultaneously collect

messages destined for North America and relay them to the receiving station near Glace Bay, whence they are re-transmitted to their destination by ordinary land lines. In each case there is a certain distance intervening between the transmitting and receiving station, and this distance is traversed by a short wire line. It will be seen, therefore, that the method of traffic-handling over these long-distance wireless connections closely resembles that followed over the indirect cables. A fresh link between the Old and New Worlds has been, more recently still, developed right up to operating point. This consists of the linked stations situated at Carnarvon, in North Wales, and Belmar, New Jersey, U.S.A. These mark yet a further step in long-distance progress. The older stations of Clifden and Glace Bay had been constructed, as it were, piecemeal; improvements being introduced in accordance with the developments resulting from experience gained. For this reason they can hardly be judged to-day as affording an example of the capabilities of up-to-date Wireless Telegraphy. The new stations start from a fresh departure point with all the teachings of experience embodied in up-to-date apparatus, constructed and adapted under circumstances best suited to it. The power of these new stations will actually be, in practice, four or five times greater than that of their elder sisters. The consequence of this may be seen in increased facilities for automatic sending and receiving, the stations being capable of working for longer hours with less liability to interruption and with a speed which is reckoned at about 100 words per minute. The outbreak of the present war has resulted in much restriction of the use of Carnarvon station for commercial purposes, and has at the same time rendered it undesirable to enter into details of working which would otherwise be available. A similar system to the one employed by the older stations has been arranged, and messages collected at New York and London are transmitted by land lines to the controlling stations at Belmar and Carnarvon respectively. Thence the long-distance stations transfer them across the Atlantic.

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The Cheapening of Rates.

We now proceed to enumerate a few of the peculiar advantages possessed by this modern method of long-distance message transmission. Perhaps the most important matter from the commercial standpoint is that of cost. It was to wireless telegraphy that the late Sir J. Henniker-Heaton looked for the realisation of his

ideal of telegraphic inter-communication between all parts of the British Empire at the rate of "one penny per word." A great deal has already been done by the Marconi Companies towards meeting the public demand for cheaper rates, and the main obstacles in the direction of the further consummation of this desirable end mainly lies at the door of the land lines with which they are obliged to work. Thus, when we come to consider the question of forwarding messages to Australia and New Zealand by wireless under the present system, we are confronted with the fact that the Pacific Cable Board leases and operates no land lines of their own between Montreal and Glace Bay, and has therefore to incur the expense of making arrangements with a concern unwilling to accord favourable rates and facilities. From Vancouver messages have to proceed viâ the Pacific Cable. The result of these arrangements is that the cheapening of rates is hampered by the absence of co-operation, and it is highly desirable, in order to cater effectively for the requirements of communication between Great Britain and Australia, to free the Pacific Board from the impost exacted by the Atlantic Cable Companies. If such arrangements could be made, the rate of 2d. per word now paid to the Atlantic Cable Companies for the transit from Montreal to the cable landings could be saved, and there would be no difficulty in arranging for a quotation of a through Atlantic wireless rate for ordinary messages, at 6d. per word. This constitutes but one example of the way in which it would be possible, by suitable and easily arranged facilities, to considerably cheapen the means of communication between the Mother Country and the Antipodean Colonies through the instrumentality of long-distance radiotelegraphy. The full rate between England and America by means of wireless works out at present at 8d. per word, as compared with 1s. which forms the charge of the Cable Companies. Over and above these normal rates, special facilities have been in operation for about a year. For instance, the "deferred rate" charge is 4d. per word, whilst "night letters" are transmitted at the rate of 2s. 6d. for thirteen words or less, and 2d. per word beyond the limit of the minimum of thirteen. "Week-end letters" cost 4s. for twenty-five words or less, with an extra rate of 2d. for each word beyond the twenty-five. These rates cover transmission from any part of the United Kingdom to New York and Montreal, and indeed Eastern Canada generally. In fact, they apply everywhere where the cable charge amounts to 1s. per

word. Any increase over these rates is merely due to the additional expense involved by utilising land lines. We may point out, moreover, that the exchange of Home and Imperial news between any place in the United Kingdom and the Dominion of Canada is already possible at the low "Press rate" of 2d. per word. This applies to Canadian destinations in Cape Breton, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, and Quebec. The service is effected without deferment, and includes "out-payments" to the land line in Canada and delivery at destination. The effect of this cheapening of commercial traffic, introduction of deferred, night and week-end messages, has been most satisfactory from every point of view. The public has expressed its appreciation of wireless facilities by a large increase in usage, with regard to all classes of traffic. There is little doubt that if commercial conditions permit of further reductions, the volume of traffic would rise more than proportionately. It is no "vain dream" to dwell upon the prospect of a time when the public will be able to communicate telegraphically with their friends and business correspondents in all parts of the world as readily and as cheaply as they now do within the limits of "our tight little island."

* * * * * *

Other Features.

The volume of traffic dealt with by cable companies depends not merely on atmospheric and other conditions, but also upon the traffic capacity of each cable. Only a certain number of words can be transmitted per minute, and it often happens that when lower rates or other reasons conduce to heavy increases in the volume of business the existing cables become "blocked" thereby. If the increased volume of business is maintained there is no other solution possible but the laying of an additional cable, a matter of great expense and delay. With wireless operation, on the other hand, improvements in apparatus and increase in power permit of dealing with increased business, over and above its existing capacity, at comparatively small increase of expense, and with far less delay in point of time. The old objection with regard to continuity of service has practically disappeared before the improvements made in recent years.

We sometimes hear of objections raised to wireless transmission on account of the fact that the messages sent can, without much difficulty, be picked up by any receiving stations

capable of being tuned for the purpose within the radius of transmission. Cable advocates point with pride to their own potentialities of secrecy. Careful analysis of the position hardly justifies this claim of superiority. It is obvious that, in by far the greater number of instances, messages picked up by persons whom they do not concern will receive little attention. Anyone who, for commercial or other reasons, is directly interested in acquiring knowledge of the messages sent would be equally likely to be able to gain such knowledge even if the messages were despatched by cable, although at perhaps a little further expenditure of trouble. But, if the motive of self-interest were at work, that extra trouble would be a matter of little moment. The cable companies have to work in connection with land lines, and these latter are almost as readily "tapped" as are wireless transmissions. The only reliable method of attaining secrecy is by the use of codes, and these may be as effectually employed in "wireless" as in "wired" transmission.

* * * * *

Imperial Considerations.

We have referred, in the first part of our paper, to the lessons taught us by the attempts, successes, and failures of our enemies. The British Government has for some years past been alive to the same possibility as the German, and several Royal Commissions have held inquiries into suitable methods of meeting Imperial requirements. In 1912 H.B.M. Government concluded a contract with Marconi's Wireless Telegraph Company for the erection of a "chain" of high-power wireless telegraph stations on the lines recommended by the Imperial Conference held in 1911. Stations under this contract are now nearing completion at Oxford, Poona (British India), and Abu Zabal (Cairo); further stations are also projected at other places. It is under present conditions undesirable to go into details with regard to this Imperial wireless chain, which, if completed under the present scheme, will girdle the world with long-distance wireless stations under the control of King George's Government. All of them will stand on British territory, and may therefore be fortified and protected to any extent which His Majesty's advisers may consider necessary. The present war, although it is responsible for calling a halt with regard to some of this work, will doubtless in the end compensate for the delay by experience which will certainly be utilised to still further

perfect this Imperial scheme. Such improvements in the project were foreshadowed by Mr. Hobhouse, the Postmaster-General, who, in replying to a recent question in the House of Commons, announced that " a considerable amount of work has been carried out in connection with the English and Egyptian stations under the Marconi contract. The question of proceeding still further with this wireless chain is, in view of the altered situation arising from the war, now under consideration." But, besides the British Government, foreign Powers are also stirring in the same direction. The American Marconi Company has established communication between San Francisco and Honolulu, and in the summer of this year communication is expected to be made between Honolulu and Japan. A station has been erected at Stavanger, in Norway, by the Norwegian Government, and France has under contemplation the erection of a wireless system between herself and her colonies for Government and commercial use.

In fact, all over the world nations are entering into a competition in establishing national wireless communications with as keen a zeal as that competition which already exists between them with regard to armaments and industrial wealth. In this, as in most other forms of international competition, Great Britain possesses peculiar advantages, and it is the hope of every patriotic Englishman that he will see, in the not distant future, his country as supreme in ruling the waves of the ether as she has so long been upon the waves of the sea.

An excellent opportunity presented itself in 1912, when the Government's scheme for the Imperial Chain of Wireless Stations was submitted to the House of Commons. It is regrettable that it was not put into immediate realisation, for the Germans promptly appreciated the great value of the idea, and without any lengthy discussion in the Reichstag or opposition by any of its members, proceeded with all despatch to erect long-distance wireless stations in their principal foreign possessions, which at the outbreak of war in August, 1914, rendered them incalculable services and proved to be of a value the extent of which is not yet appreciated or even known in this country. They were wise enough not to shrink from the great expenditure, far greater than that contemplated by this country, and although the stations were soon destroyed, they had first saved to the nation their cost a hundredfold, besides the immense assistance they rendered in other respects.

WIRELESS NEWSPAPERS AT SEA

EVERY evening a summary of the day's news is prepared at Marconi House, London. Every night this summary is radiated in all directions from the long-distance wireless station at Poldhu, standing over the little cove of Mullion, in Cornwall, seven miles N.N.W. of the Lizard Point.

Perhaps we may be voyaging in the South Atlantic, thousands of miles from our native shores. And, being interested in radio-telegraphy, let us visit *in spirit* the "Bureau of the Wireless Operator" (that stern disciplinarian, the Captain, would certainly not permit us to visit him in person), somewhere about midnight, in order to watch him at work. We find him tuning up his instruments in order to catch the bulletin. As he listens, his ear detects the call, - — - - -, which tells him that the message is about to start, and soon his pencil is flying rapidly over the paper, at the dictation of a brother telegraphist thousands of miles away.

[The reason for the operator's tuning, in the way that we have described, is that this news message travels on a longer wave than the ordinary service messages. Thus it avoids interfering with them and frees itself from interference.]

Now, still acting the part of "Peeping Tom," we watch the telegraphist finish receiving and copy out his message fairly. His next step is to despatch it to the Captain of the steamer, one of the few real "despots" left in our modern civilisation. The Captain, in his turn, hands it over to the Purser for censorship and editing; while from the Purser's office it finds its way, in due course, to the "printing shop."

Whilst we passengers are in course of enjoying our earlier meals and recreation, the officials concerned are busily occupied with getting the proofs into shape and turning out the issue. The result is that, ere the day is very old, we on board our "Ocean Home" receive a newspaper which contains practically all the *news* which would be conveyed in the great sheets of the "dailies" at home.

* * * * *

This ocean newspaper organisation started from a tiny beginning. The date of November 15th, 1899, may be regarded as its

birthday. Mr. Marconi and two of his engineers were at that time travelling on board the American liner *St. Paul*, after a successful attempt to report the "America Cup" races for the benefit of the Associated Press. They knew that they were approaching the point when they might expect to receive a "news message" from the Needles wireless station. They received the message and published the first number of an altogether new class of journal. It consisted of but a four-page newspaper, which was sold, for the benefit of the Seamen's Fund, at a dollar a copy.

In October, 1902, communication was established and *maintained throughout the voyage* between the R.M.S. *Lucania* and the Marconi stations at Poldhu, in Cornwall, and Glace Bay, in Canada. On this occasion, for the first time in history, a bulletin of news, obtained by wireless telegraphy, was published and issued daily to each passenger.

The Cunard Company started publishing their daily bulletin in a new and considerably improved form, and other companies, in their turn, took up the running. The *Atlantic Daily News* regularly takes its place on the vessels of the Holland-America Line; the French Compagnie Générale Trans-Atlantique carried their own journal; the Koninklijke Hollandsche and the aforementioned French company publish the *Diario Del Atlantico* on their South American steamers; the Scandinavian American Line, between Copenhagen and New York, publish the *Atlantic Daily News* and the *Journal De L'Atlantique*, extending its issue to the steamers of the Belgian Congo Lines. Many other shipping companies now publish a daily newspaper on their larger steamers, one of the most interesting being the *Wireless Herald*, circulating on board the Alaskan Steamship Company's steamer *North Western*.

Of course, this newspaper business, like so many others, has been adversely affected by the present war, and many of the great ocean liners which, normally, print newspapers, have been obliged to temporarily suspend their issue. Others are able to continue, and notable among these latter we may mention the R.M.S.P. and P.S.N.C. companies trading to South America, and the Union Castle Steamship Company serving South and East Africa. These three companies have uninterruptedly continued the issue of the *Wireless Mail*, whilst the White Star Line have done equally well with the *Ocean Times*. The latter well-known line started

issuing this ocean newspaper for their New York service, on the *Majestic*, June 1st, 1912, and have continued so doing *without a single break* to the present day.

The bulletins usually run between 500 and 600 words, and these messages, sent off in English, are picked up by vessels of all sorts of nationality, French, Italian, Dutch, Danish, Spanish, etc.

In normal peace times the Poldhu message contains news items culled from all parts of the world, America, North and South, Europe, the Near East, China, Japan, Australia and Africa, as well as items specially affecting the Home Country.

Politics, discoveries, finance, society, sport, all find a place within its tightly packed compass. Of course, under present conditions, the range is much more confined, seeing that war items practically monopolise the attention of the whole newspaper-reading world. But what the message loses in scope it makes up for in the thrilling intensity of its interest. It is all that the stern discipline of the Captain of an ocean liner can effect to prevent over-eager passengers from interfering with the men entrusted with the work of editing and publishing the Journal, so as to get the earliest possible information for themselves. In this connection it may be of interest to quote the extract from the lively London weekly, the *Bystander*. In a recent issue Mr. Aflalo, the well-known traveller, writes:

"There is an aspect of this skeleton news service worth noting, and I will call it, for want of a better description, independence of interpretation. We get, that is to say, only the barest summary of official news. We are immune not only from rumour, from the lying jade who has sported of late with all manner of surprises, from Cossacks to Zeppelins, but also from editorial leaders and the too ample riders added by "Our Special Correspondent at the Front." For this relief the ocean traveller should, if he knows when he is well off, give much thanks. No longer is he thrall to self-appointed interpreters of official communiqués that he himself is well qualified to understand without such extraneous aid. A long-suffering public can, after six months of such suzerainty, scarcely appreciate the blessing of emancipation, but it is almost worth making a sea voyage to win it. Marconi gives us the news and leaves us to make our own comments. The newspaper that would dare do the same would go straight to the public heart."

SOME APPLICATIONS OF RADIO-TELEGRAPHY.

By A. H. Morse, A.M.I.E.E.

"Yet all these were, when no man did them know,
Yet have from wisest ages hidden been;
And later times things more unknown shall show."

—Spenser.

OVER proximity to a picture entails a loss in due sense of proportion and perspective. This, though true with regard to art, is far from being so when applied to radio-telegraphy, a proper appreciation of which cannot be obtained except by close association with its development, the result of such association being that an ever-widening vista of possibilities opens up to the mind's eye.

The application of radio-telegraphy to navigation is now such an institution that it has become woven into the very fabric of our lives, and is much too matter-of-fact to need comment. It is, however, of some interest to remember that it is only just over seventeen years ago that it was first demonstrated by Mr. Marconi. (A station at Alum Bay in the Isle of Wight and a small steamer were used for that purpose.)

There are auxiliary "Wireless" aids to navigation which are not yet very well known, although already doing good and unique service where they have been adopted. They are the "Wireless Direction Finder" and the "Wireless Fog Signal." By means of the former, angular observations may be made of a transmitting "Wireless" station within range, just as by ordinary means they can be made of a landmark or other object within sight. Although the Direction Finder aerial is not as efficient as an ordinary receiving aerial, its range may be anything up to 250 miles, or even more in the case of a specially powerful transmitter. Obviously from such observations the same deductions may be made as to distance, position, etc., as from visual observations, in clear weather, of objects comparatively near-by. The Wireless Fog Signal is an ingenious

device, or collection of such devices, by means of which it is possible to control automatically, from a distance, fog or other signals established at danger points whereon it would be difficult or impossible to provide personal supervision. Two of such are already installed on Roseneath Patch and Fort Matilda, respectively, in the Firth of Clyde, both of which are controlled from Gourock, about a mile distant. The same principle may be employed to cause an alarm to be sounded automatically aboard ship, giving notice of proximity to a danger point, the bearing of which (subject to a suitable wave-length being used) could be detected by the "Wireless Direction Finder."

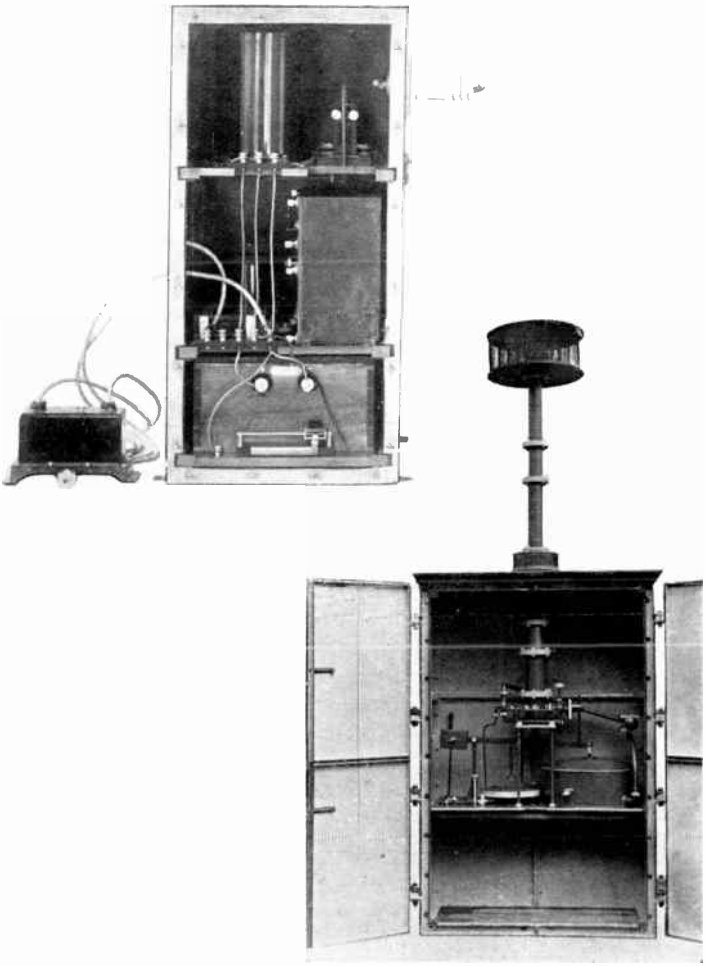
One reads much about new and wonderful systems of "Distant Control." The ambitious "'F' Rays" have come and gone, and many other systems of alleged distant control—for which almost equally astounding claims were made—seem to have died after creating an ephemeral stir in the well-intentioned lay Press. As far back as 1899 there were people who attributed to Mr. Marconi the power of blowing up torpedoes and powder magazines at will.* In this connection it is well to bear in mind that the most highly developed and dependable system of long-range distant control by "Wireless" is that used in Trans-Oceanic Radio-Telegraphy, wherein the transmitted impulses control over a distance of sometimes more than 2,000 miles a source of energy which is used to create the received signals. When one considers the extremely short duration of the "dots" in high speed transmission, and that each one is essential to the communication, it becomes evident that this is a system of distant control of no mean order, and one which, as such, may find many applications.

On the question of speed it is interesting to note that over nine years ago Thomas A. Edison said: "There is absolutely no reason why Marconi may not develop a speed of 500 words a minute in the transmission of Translantic messages; on the other hand, there are technical, scientific and mechanical obstacles which make it absolutely impossible to increase the speed of transmission of ocean cables."†

Recently, considerable attention has been given in the United States to the application of Radio-Telegraphy to railways and railway trains. In November, 1913, the Lackawanna Railroad

* See "History of Wireless Telegraphy." Fahie. Blackwood & Sons.

† See "A Story of the Telegraph." Murray. J. Lovell & Son, Ltd., Montreal.



Fog Gun and Wireless Control Apparatus.

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fitted their "Lackawanna Limited," one of their finest trains, with a radio-telegraph installation. In our "Tight Little Island" such enterprise would seem quixotic, but on the Lackawanna it was amply justified by results, and it is reasonably certain that in a few years our own trains which run for several hours without a stop will be furnished with some means of communication with fixed points. The progressive policy of the Lackawanna Railroad was further vindicated as recently as December last, when, on the 6th, 7th and 8th the wire connection between Hoboken, N.J., and Scranton, Pa., was broken down by a sleet storm. By means of their Radio Stations telegraphic communication between these two points was maintained, and what might have been a serious inconvenience was little more than an incident. The Union Pacific Railroad have carried out extensive experiments with radio-telegraphy at Omaha. They have also made some interesting tests with an induction system of wireless communication with their trains and have established radio-telegraphic stations in five or six towns on their system.

The application of radio-telegraphy to motor lifeboats, inaugurated last year, was an advance of great importance, both as a possible aid to navigation and as a factor enhancing the safety of life at sea. In dense fog or in the vicinity of ice the lifeboat may proceed ahead of its parent ship, which, guided by sight, sound, or radio-signals, may follow in safety. In the case of a person having fallen overboard, the lifeboat's course to his rescue may be directed from the ship, whereon a man in the crow's nest or on the bridge would have a much wider range of vision than those in the lifeboat. In the event of the ship's company having had to take to the boats they would, with such an installation, be no longer dependent on attracting the attention of a passing ship by such inefficient means as are generally available.

In the whaling industry it is usual for three small steamers (about the size of steam trawlers), called "Hunters," to work in conjunction with a large steamer, which is a floating factory for boiling down the blubber, etc. Many of such small fleets are now fitted with radio-telegraph apparatus, so that the units can inter-communicate and so increase their efficiency, while at the same time the "Wireless" enables them to effect considerable economies.

A steam trawler fitted with "Wireless" is now so commonplace as to excite no comment, and the sealing industry has long

since recognised and made use of the advantages of radio-telegraphy.

Now that many high-power stations regularly send out time signals, it has become a common practice for clockmakers, astronomers, Boundary Commissioners and others to equip themselves with the necessary apparatus to enable them to receive such signals with which to check their chronometers.

The foregoing instances of the applications of radio-telegraphy are representative rather than comprehensive, and do not include its applications to war, which at this time transcend all others in importance. When particulars of these are collated and published they will make very fascinating reading, as it is hoped the next issue of this Year-Book will prove.

A little consideration suggests numerous useful and novel applications of the principles already discovered and herein referred to. The Wireless Direction Finder, for instance, seems to be capable of rendering very great service to Polar exploration and to surveying on an extensive scale. It may come to be used as a means of detecting the direction from which atmospherics approach, with possibly some important effect on the development of meteorological science. Shore "Wireless" stations may also adopt it, and so be able to give an enquiring ship its compass bearing.

The principle of the Wireless Fog Signal has also great potentialities. Imagine trains on a single track being fitted with it in such a way that the brakes could be applied or steam cut off by distant control. The apparatus on trains in one direction could be adjusted to one impulse-frequency, and that on trains in the opposite direction to another, so that trains meeting would stop at a safe distance apart, while following trains, which are a smaller danger, would have no effect on each other. Or suppose every train were fitted only with such receptive apparatus and every train had a distinct and known impulse-frequency, then it would be a simple matter to equip a signal box with a transmitting apparatus which could be set to stop, in a few seconds, any particular train at the will of the signalman. One can recall several cases where, for the lack of such a device, the signalman has been left to while away in helpless anguish the brief spell between the entry of the train into danger and the sound of its disaster.

Apart from the shipping industry, commerce has held itself strangely aloof from radio-telegraphy. Countless islands in the

Southern Seas await its advent to aid the full development of their rich natural resources, and an era of unprecedented prosperity would dawn for many a remote mine, plantation, or other enterprise, could it have radio-telegraphic communication with its markets and bases of supply. The difficulties in the way are largely unreal. From the growing army of skilled operators many could be drawn who would be capable of performing other useful duties besides operating a "Wireless" station. Running expenses therefore need not be high, especially as an adequate electrical power-supply is generally available or could be installed to supply many needs in addition to furnishing the power for communication. Also, the maintenance expenses in connection with modern "Wireless" apparatus are very nearly at the vanishing point. In respect of these cases just mentioned it is safe to say that radio-telegraphy is well ahead of its applications.

Now, as to the best way of furthering the development of the life-saving and other beneficent applications of radio-telegraphy. Undoubtedly nothing could be better than that shipowners, railway managers and others should take the "Wireless" experts into their confidence, tell them their requirements, and what business could be relied upon if they were met. It is to such a keen and co-operative spirit that the world to-day owes the Wireless Fog Signal, which is only now entering on its career of usefulness.

These references to a few existing and suggested applications of the principles of radio-telegraphy are, perhaps, quite obvious, but collectively they illustrate the newly dawning fact that those principles are destined to serve us in many fields of endeavour. Thus will be enhanced an already glorious record the crowning feature of which is the endowment of vessels with such powers that, though 500 miles may part them, they are but as—

> "Ships that pass in the night, and
> speak each other in passing."

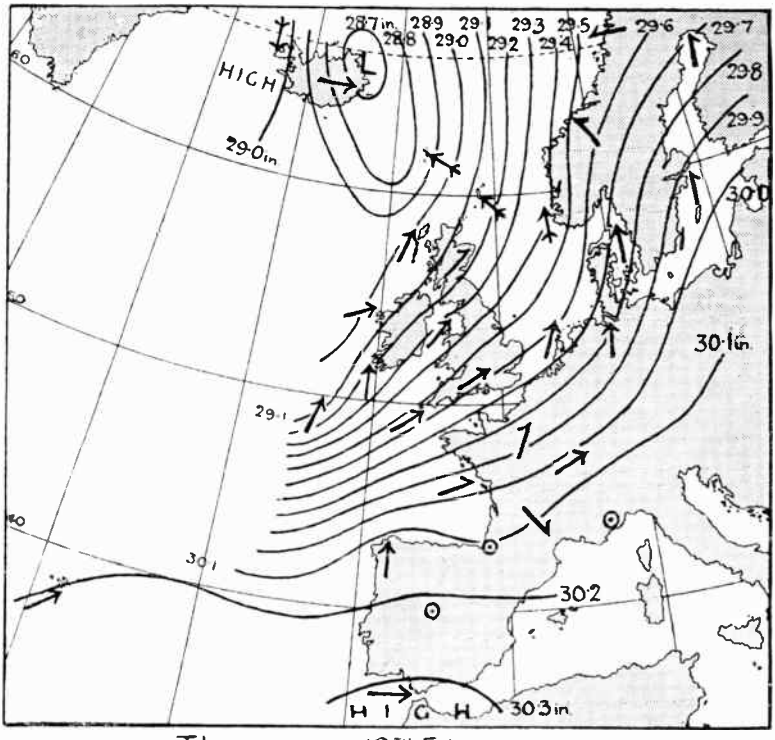
THE APPLICATION OF WIRELESS TELEGRAPHY TO METEOROLOGY

By R. G. K. LEMPFERT, M.A.

(*Superintendent of the Forecast Division of the Meteorological Office*).

THE outbreak of the war has affected wireless communication in many ways, but on the application of wireless telegraphy to the collection and distribution of weather information it has had a paralysing effect. As far as the British Weather Service is concerned the collection of reports from ships at sea has had to cease entirely, except for occasional messages from ships sailing under the American flag, and the issue of information has also been suspended. Up to the end of July the service was continued normally and on the whole with increased efficiency. The number of reports which reached the Meteorological Office sufficiently early to be of immediate application to the current forecasts steadily increased. The observations on which the forecasts are based are taken at 7 a.m. and 6 p.m. G.M.T., and the corresponding forecasts are dispatched from the Meteorological Office at about 9.30 a.m. and 7.30 p.m. respectively. The interval between the taking of the observations and the issue of the forecasts is thus short, and it requires prompt action on the part of all concerned, observing officers, wireless operators and telegraphists on land, if the maximum value is to be derived from the reports. It is therefore gratifying to find that the number of occasions on which the first indications of an approaching change in the weather conditions was effectively supplied by wireless reports from the Atlantic shows an increase for the first seven months of the year.

Figure 1 shows an interesting example of the application of wireless weather reports. I have selected the case as it illustrates how useful information about the actual state of the weather can be inferred from observations over a large area quite apart from forecasts of future developments. The map is a small-scale reproduction of the synoptic chart for 7 a.m. on February 12th, 1914. It shows a strong south-westerly wind over



Thursday, 12TH February 1914

Figure 1.

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the whole of North-Western Europe. The telegram from Corunna reported a moderate south-westerly breeze and a fairly high barometer, 30·13 inch, while out at the Azores there was also a moderate south-west wind with a barometer reading about the same value. The land observations, even if we include those from the Azores, give no information about the conditions over the Bay of Biscay and west thereof. We have, however, a wireless report from 49° North and 13° West. It also shows a moderate S.S.W. wind, and at first sight we might be inclined to infer winds of no great strength over the region between this position and Corunna, but when we take into consideration the barometer readings as well as the wind values it is at once obvious to anyone who has any familiarity with weather maps that this is not so. The wireless report gave a barometer reading as low as 29·04 inch, over an inch below the Corunna reading. The draughtsman represents this on the map by drawing no less than ten isobars between Corunna and the position 49° North, 13° West, and we know from experience that isobars crowded close together, like these are, are always associated with gales and strong winds. Observations made in the region between the two positions at 7 a.m. on February 12th, which subsequently reached the office by post, show strong south-westerly gales, but the wireless report put the office in a position to infer this in anticipation of the postal reports, and the information was incorporated in the report for the Bay of Biscay which is transmitted to Gibraltar each day from the Admiralty wireless station.

The British Meteorological Office was the first of the national weather institutes to organise the collection by wireless of information from ships at sea, but meteorological organisations in other parts of the world are now taking steps in the same direction. The administrative report of the Director-General of Observatories of the Government of India for the year 1913-14 foreshadows a scheme for collecting reports from the Indian Ocean which is expected to prove of considerable use to the service of warnings of tropical hurricanes. A code, very similar to that used by the British Office in the North Atlantic, has been prepared and printed and has already been tried experimentally. The scheme contemplates only one observation a day, at 7 a.m., but officers are requested to send reports at other hours also if they consider the weather indications as suspicious of the approach of a storm. The arrangement also enables the

forecaster at the central office to communicate with captains of ships at sea and ask them to send special reports at other hours if the conditions favour the development of storms for which warnings should be issued.

The improvement of the storm-warning service during the cyclone seasons in the Indian seas was no doubt the main object in view in organising the new wireless reports. Figure 2, which is transcribed from the Indian Daily Weather Report for May 16th, 1914, shows a typical example of a Bay of Bengal cyclone. On the morning in question the centre of the disturbance was situated over Orissa, and very disturbed weather prevailed over the surrounding region. The Daily Weather Reports for the previous and following days show that the centre of the storm travelled along the path indicated on the figure by the dotted line. The dates indicate the approximate positions of the centre on successive days. The path is a characteristic one for storms of this type, but in the absence of actual observations from the central part of the Bay of Bengal the part over the ocean must be regarded as approximate only. A few well-placed observations at sea on May 12th to 15th would have made it possible to identify successive positions of the storm centre and to estimate the intensity of the disturbance, and, had they been in the possession of the forecaster, would have enabled him to add to the definiteness of the forecasts and warnings issued to the Indian coasts and to ships at sea. Unfortunately even a system of wireless reports from liners does not meet all meteorological requirements. The tracks followed by ships do not necessarily pass through the regions from which observations are most desirable, and, again, even if they do so, the chances are rather against there being a vessel in a meteorologically important region at the precise moment when the information is required. Too much must, therefore, not be expected from wireless reports from liners, but even with their obvious limitations they are likely to prove of great value on critical occasions.

Conditions somewhat similar to those of the Indian Ocean prevail in the West Indian islands, whence tropical storms at certain times of the year sweep north-westward and often do great damage on the coast of the United States. Accordingly we find that the Weather Bureau of Washington has for some time past had an arrangement for receiving wireless reports from ships in the Gulf of Mexico, the Caribbean Sea, and the southern

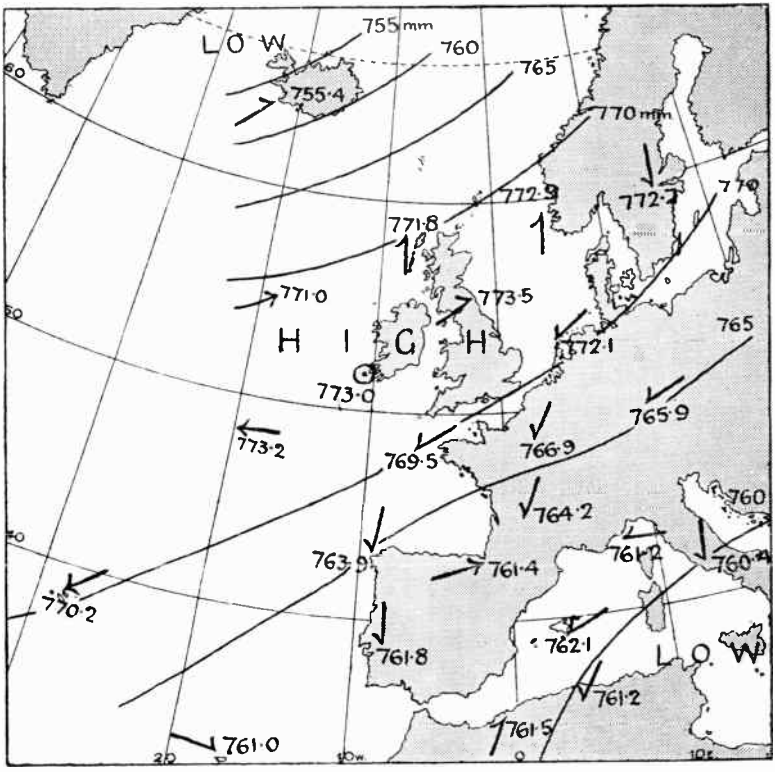

Figure 2.

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part of the North Atlantic Ocean, from which the hurricane warning service has benefited considerably.

Wireless also plays an important part in another enterprise of the Weather Bureau, to which reference was made in last year's YEAR-BOOK. Since the beginning of the year 1914 the Bureau published a daily map of the whole of the northern hemisphere. The greater part of the information required for this purpose was collected by cable, but the important reports from outlying places like Spitzbergen and the Aleutian Islands are transmitted by wireless to the respective mainlands. Schemes for collecting observations from ships at sea by wireless which would make it possible to prepare these maps in greater detail are also suggested in the reports of the Bureau. Unfortunately the publication of these maps has had to be temporarily suspended in consequence of the difficulty of obtaining reports from Europe and Siberia during the war.

The distribution of weather information by wireless must also be referred to. The most important reports circulated are those issued from the Eiffel Tower, and it may be of interest to examine one of these more closely. The morning report which is sent out at 10.49 a.m. G.M.T., immediately after the morning time signal, has the following form :—

BCM.—R 5542015, V 73000023, O 69606303, CO 63902381, HO 70204434, SP 640242, Paris 6690430, C 6420424, BI 61422413, M 62200013, N 61500013, A 61204303, SY 71816141, SH 73522281, HE 72104311, SK 72916141, ST 7273220, P 6590633, T 6170000, R 6043202.

These code figures are accompanied by brief descriptive remarks and forecasts *en clair* and a statement of the direction and velocity of the wind at the top of the Eiffel Tower for the information of aviators.

These code figures are interpreted as follows :—

	Barometer in Millimetres.	Wind Direction.	Force.	Weather.	Sea Disturbance.
Reykjavik (Iceland) ...	775·4	S.W.	Light	Rain	—
Valencia	773·0	Calm		Fair	Slight.
Ushant	769·6	E.N.E.	Gentle	Fine	Slight.
Corunna	763·9	N.N.E.	Gentle	Fog	Smooth.
Horta (Azores)	770·2	N.E.	Moderate	Cloudy	Moderate
St. Pierre (N'wf'ndland)	764·0	W.	Light	—	—
Paris	766·9	N.E.	Gentle	Fine	—
Clermont Ferrand ...	762·0	N.E.	Light	Overcast	—
Biarritz	761·4	W.S.W.	Moderate	Fine	Slight.
Marseilles	762·2	Calm		Fine	Slight.

	Barometer in Millimetres.	Wind Direction.	Force.	Weather.	Sea Disturbance.
Nice	761·5	Calm		Fine	Slight.
Algiers	761·2	N.E.	Gentle	Fine	Slight.
Stornoway	771·8	S.	Light	Overcast	Smooth.
Shields	773·5	W.S.W.	Light	Fog	Smooth.
Helder (Holland)	772·1	N.E.	Gentle	Fine	Smooth.
Skudesnaes (Norway) ...	772·9	S.	Light	Overcast	Smooth.
Stockholm	772·7	N.	Light	Fine	—
Prague	765·9	E.N.E.	Gentle	Cloudy	—
Trieste	761·7	Calm		Fine	—
Rome	760·4	N.	Light	Fair	—

Figure 3 shows the map which can be constructed from the data here given. It will be seen that they are sufficient to show the main meteorological features of the weather over Western Europe. The map has been extended over the Atlantic by incorporating a number of wireless reports from ships at sea which were in transmission to the Meteorological Office on the morning in question, and also by plotting the information contained in the Spanish message to which reference is made below.

This particular map, that for May 17th, 1914, has been selected, as it illustrates another application of wireless reports to the problems that confront a forecaster. It will be noticed that the map shows an extensive anticyclone over the British Isles and Scandinavia, and a forecaster would have little hesitation in predicting fine, dry weather for the following 24 hours. He would even recognise the conditions as "settled" and might expect similar conditions to last for some days, but in the absence of information from the Atlantic he would always have to reckon with the possibility of the existence of disturbing factors over the ocean which might spread eastward and bring less settled weather to the British Isles. In this case the wireless reports show him that anticyclonic conditions extend far out to the westward and that such disturbances as exist, are keeping well to the north, in the Iceland region. This additional knowledge would give him confidence in his forecast for several days ahead. Until recently the forecasts issued by the Meteorological Office were limited on all occasions to a period of 24 hours, but since the extension of the area from which information is available, consequent upon the coming of wireless telegraphy, the existence of conditions such as those of May 17th has been recognised by allowing the forecaster to add at discretion to the 24-hour forecast a "further outlook" extending the period covered to two or more days.

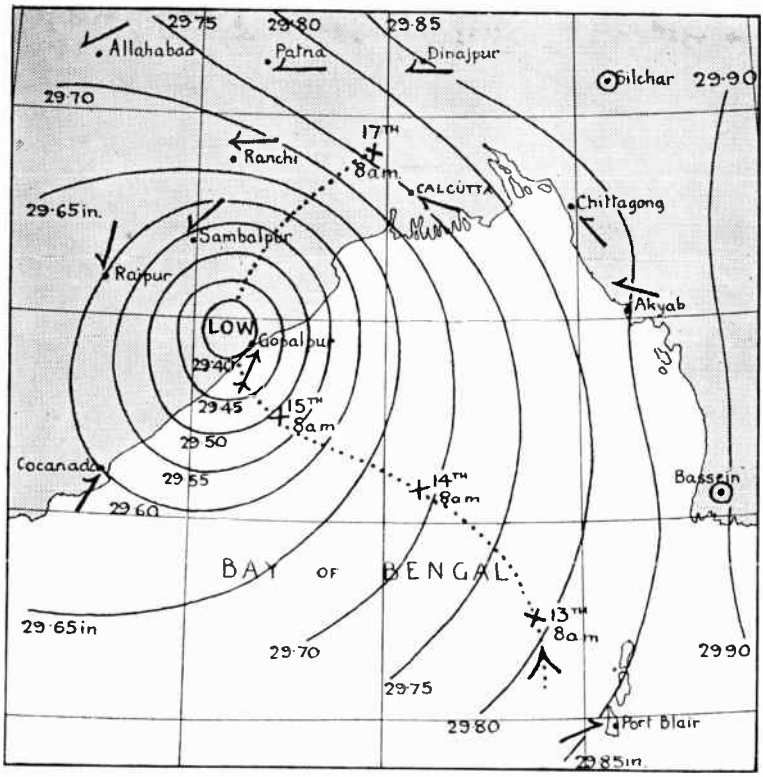

Figure 3.

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The most complete arrangements for the circulation of weather information by wireless are contemplated by the Spanish meteorological service. The Spanish organisation assumes that the receiving station will take in the Eiffel Tower messages in the first instance. This is supplemented by a report signalled from the Spanish station at Carabanchel (Madrid) at 1.30 p.m. This report is on similar lines to that from the Eiffel Tower, and gives information for twelve additional stations—viz., Funchal (Madeira), La Laguna in Tenerife, Oran in Algeria, Lisbon, Mahon in the Balearic Island, Barcelona, Alicante, Malaga, San Fernando, Huelva, Corunna, and Madrid. The code message is supplemented by notes and forecasts and particulars of storm warnings, if issued, and also by particulars of the direction and velocity of the wind at 250, 500, 1,000, and 1,500 metres above the ground in the neighbourhood of Madrid. The latter information, which is obtained by watching the rate and direction of drift of small so-called pilot balloons, is intended for the information of aviators.

Forms are supplied by the Spanish headquarters on which the recipient of the message can enter the observations in a convenient manner. The upper left-hand corner of these forms is occupied by an outline map of Western Europe showing the positions of the observing stations. It remains for the recipient to plot the observations on the chart, and with a little experience he soon gets into the way of drawing the isobars and completing his weather map. The form measures about 21 by 16 inches and is thus very suitable for public exhibition.

Last year it was pointed out that the distribution of weather information presents real difficulties. The distribution of printed or manifolded reports by post is too slow to be really effective, seeing that the forecasts as a rule cover only a period of 24 hours and a considerable part of that period must needs have lapsed before delivery can be effected even in the British Isles. In a country like Spain, where distances are greater and the average speed of trains is slower, this disadvantage must be even greater. Distribution by telegraph is expensive, as it makes demands on the time of many telegraphists. Wireless, which requires attention only from those directly concerned, has thus brought the problem of distribution nearer solution, and we may confidently look forward to the extension of the system as the years go by.

WIRELESS TELEGRAPHY IN SURVEY

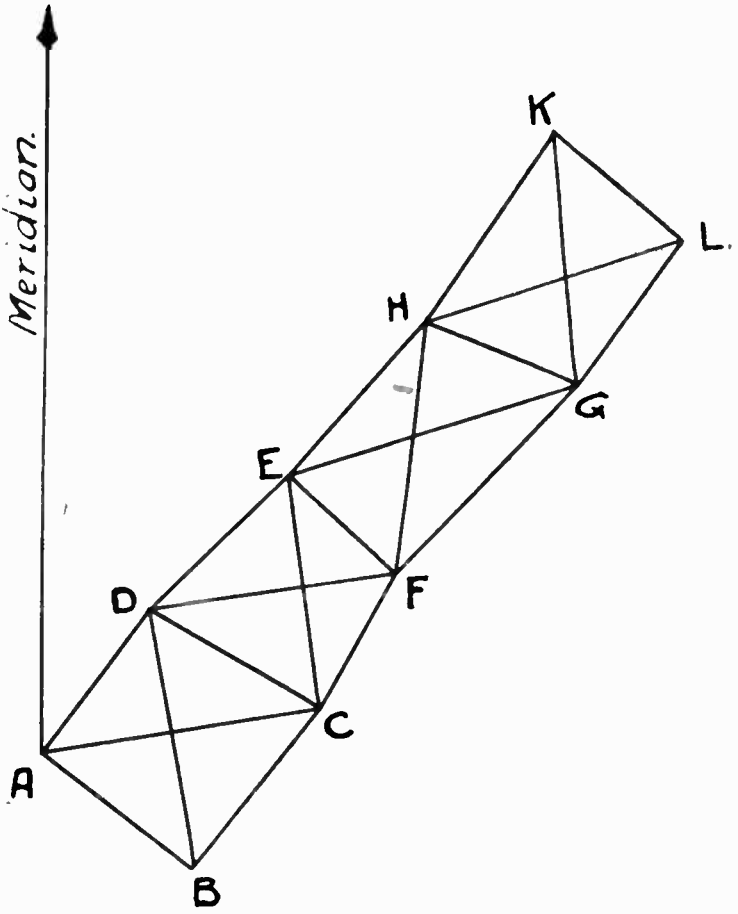
By Arthur R. Hinks, M.A., F.R.S.

THE recent return to civilisation of Dr. Filippo de Filippi provides us with the latest example of the successful application to the problems of higher surveying of the use of wireless time signals, to which we have made reference in former years. In the *Geographical Journal* for March of the current year Dr. de Filippi reports as follows:—

"Particularly interesting was the determination of the differences of longitude by means of time signals sent by wireless telegraphy from the wireless station at Lahore and received simultaneously at headquarters of the Trigonometrical Survey of India at Dehra Dun and by us at our various stations. Before and after the transmission local time was determined by star observations. Thus differences of longitude could be calculated very exactly, and so it will be possible to show—with the help of the latitudes—the deviation of the plumb-line at all our stations situated in the valley of the Indus and on the Depsang plateau. . . . The vast mountainous zone situated between Western India and Central Asia did not interfere with the transmission of signals, which were always received quite clearly even in the distant stations of Yarkand and Kashgar."

In part Dr. Filippi is merely recording success under more arduous conditions, but otherwise similar to the success already obtained by the French in the Sahara and on the Congo, and by Captain Edwards on the boundary between Brazil and Bolivia. There is, however, one point in Dr. Filippi's brief report which

deserves special attention: his statement that it will be possible to show the deviation of the plumb-line at various stations. This introduces us to a refinement which is beyond the scope of the ordinary operations of topographical surveying, and it merits



particular elucidation because it connects the employment of wireless telegraphy with the enquiry into one of the most fascinating problems presented by modern geodesy, namely, the investigation of the structure of the earth's crust as shown by the irregular distribution of mass within it.

The surveyors of India have been troubled for the last half-century with the problem of the attraction of the Himalaya Mountains on the plumb-line in India, and its consequent effect upon the determination of latitudes and longitudes, which, it will be remembered, involve essentially the position in the sky of the zenith of the place as defined by the direction of the plumb-line or by the perpendicular to the level surface of fluid. It was obvious enough that the enormous mass of the Himalayas, and of the high plateau of Tibet which lies behind them, was sufficient to exercise a sensible effect upon the direction of gravity over the whole of India. In about the year 1858 the then Surveyor-General began to be exercised by the question, whether in fact the mountains did actually produce the effect that might have been expected in disturbing the direction of gravity and the whole of the latitudes in India. In the half-century which has elapsed since that time his successors have given very much attention to this problem, which has presented a very considerable difficulty; and they were the first to show that there is some cause at work which, to a great extent, nullifies the attraction of the visible mountain masses, whereby the mountains are, in the technical language of geodesy, "compensated" by a deficiency of density below them.

The work which was begun in India has been taken up with great enthusiasm in the United States, and it is to the geodesists of that survey that we owe the term "isostasy," a word denoting a condition of equilibrium in which the mass of a mountain visible above the level of the sea is nullified so far as its action on distant objects is concerned by a corresponding deficiency of density below it. It now seems pretty well established that the principal mountain masses which have been examined are, to a considerable extent, in a condition of isostasy; but how this is brought about remains almost entirely unknown. There is, therefore, a wide field of research opened to the investigation of surveyors by this very interesting discovery, which demands, as we shall see, the provision of a very great number of points whose latitudes and longitudes are precisely determined for comparison with the positions obtained by triangulation in the ordinary way.

While latitudes have never presented any very considerable difficulty, the determination of longitude in the field has always

been much more difficult, since it demands a precise knowledge of the difference of time between two meridians—a knowledge which can be obtained in practice only by telegraphic connection between the two stations. Until wireless telegraphy became available, this restricted the operations of the surveyors to the places which were furnished with land wires or submarine cables, and automatically excluded work in the parts of the world most interesting for the investigation, such as those recently traversed by Dr. de Filippi.

It will facilitate a clear comprehension of the subject if we consider the exact geometrical significance of the survey operations in question. Let us suppose that there are ten stations—A to K, arranged as in the figure. A theodolite triangulation combined in the usual way with a measurement of one base, or, better still, of a base at each end of the quadrilateral chain, enables one to calculate the precise length of any side of the triangulation and the values of all the angles. But it tells nothing of the place of the triangulation upon the surface of the earth. Suppose now that we determine the latitude and longitude at the point A, and the true bearing of the side A B with respect to the meridian through A. If we know sufficiently well the figure of the earth—that is to say, the radii and the ellipticity of the spheroid which represents best the surveys in different parts of the world—we can proceed from our triangulation, and the initial astronomical co-ordinates of A, to calculate successively the latitudes and longitudes of all the other points B to K; and these calculated positions will be known as geodetic latitudes and longitudes, because they will not be obtained by direct astronomical observation, but through a geodetic triangulation.

Suppose, next, that when this is done we proceeded to observe these latitudes and longitudes astronomically. We should find that the results did not agree exactly with those determined by the triangulation from the initial station A, but that discordances of probably several seconds of arc were frequent. And since a second of arc in latitude is equivalent to about 100 ft., it would soon become clear that these discordances could not possibly be due to errors in the triangulation, while it would be equally easy to assure oneself that neither were they due to errors in the astronomical observations. If they gradually increased in size with distance from the initial point, it would be

reasonable to suspect that they were due to an imperfect knowledge of the figure of the earth. But this possibility is pretty well excluded nowadays; and, besides, they do not as a rule increase steadily from one end of the chain to the other, but are scattered more or less haphazard. The only conclusion is that there are local irregularities in the direction of gravity which arise from irregular distribution of density in the crust of the earth.

But it is almost always found that these irregularities are very different from those which can be produced by the visible mountain masses. In general, they are considerably smaller—in general, that is to say, the visible masses are to a considerable extent compensated; but they are not altogether compensated, and the material for further study of the problem and examination of the way in which this considerable degree of compensation is produced is obviously the residual differences. Hence it becomes a pressing need to determine as precisely as possible as many astronomical latitudes and longitudes as possible, and to obtain these residuals between the astronomical and the geodetic positions; and herein lies the opportunity of wireless telegraphy which has been seized by Dr. de Filippi. When he says that he has been able to obtain the deviation of the plumb-line at a great number of stations he must mean either that he has obtained astronomical positions at a number of stations already triangulated by the Survey of India or that he has made a triangulation himself as well as the other observations. In either case, he has been able, by the employment of the wireless time signals from Lahore, to make a very material contribution to our knowledge of the problem which was first propounded in these magnificent mountains which border India to the north.

Dr. de Filippi has only just reached home after his long expedition, and no details of his instrumental equipment or precise methods are to hand at the time of writing. But it may be interesting to go back to some of the French work a little earlier in date, and to examine their methods of instrumental equipment and the accuracy of the results which they obtained. The French and the Belgians have immense territories in Africa which are hardly accessible to the ordinary operations of survey. A large extent of the French Sahara is so nearly waterless, and has such inconspicuous relief, that the expense of carrying regular triangulation across it would be prohibitive. The forests

of the Congo are so inaccessible and so dense that triangulation in them is equally impracticable. Yet they both stand in urgent need of survey, and the only feasible plan is to determine the number of points astronomically as a foundation for the detailed survey.

An astronomical framework such as this cannot possibly compete in accuracy with theodolite triangulation, for the reason that we have just elaborated—that there are local deviations of gravity no less significant in flat countries than in mountainous; deviations which will throw a point several hundred feet out of its proper position; deviations which would be intolerable in a closely settled country, but which may be for the present tolerated with equanimity in the Sahara or the Congo. The Colonial Surveys of France and Belgium were therefore particularly interested in the application of the method of longitudes by wireless telegraphy, and in the *Comptes Rendus* of the Paris Academy for the 28th August, 1911, we have the account of an interesting trial determination of the difference of longitude between a station in the grounds of the Paris Observatory and another in the gardens of the Royal Palace at Laeken, near Brussels. The transmitting station was, of course, the military post at the Eiffel Tower; the receiving station at Laeken was an aerial, 25 metres long, carried on one of the well-known observation ladders invented by Commandant Durand, of the French Artillery, photographs of which are given, by permission of the inventor, in the writer's small book, "Maps and Survey," p. 136. Local time was determined at each station with the beautiful instrument, the *astrolabe à prisme*, for which French surveyors have a particular and, it would seem, well-deserved affection. It has the advantage of simplicity and portability, and its results are certainly unsurpassed by any practicable field instrument. Moreover, it has the advantage of giving the latitude and the local time in one series of observations, and is thus particularly adapted for geodetic observations such as those in question. With this instrument the observations of local time were made at Laeken and at Paris, and compared with the rhythmic signals from the Eiffel Tower which we described at some length last year. A couple of evenings' work gave the very satisfactory result of a difference of longitude with probable error less than one-tenth of a second of time, which was well enough to begin with,

Eighteen months later a much more refined determination was made of the difference of longitude between the Paris Observatory and the Royal Observatory of Uccle, near Brussels, in which there was a comparative test of the new method of wireless telegraphy against the older method of telegraphy over the ordinary land lines. This determination was carried out with considerable elaboration, involving the observation of the same stars at Paris and at Uccle, so that errors of star places were eliminated, and, with interchange of observers, so that errors of personal equation were also eliminated so far as is possible, though it must always remain a question whether an observer transported to a strange place of observation retains his errors of personality absolutely unchanged. The comparisons were perfectly successful in showing that the accordance of the two methods was within the limits of probable error as derived from the internal agreement of either series, and that the internal accordance of the wireless results was somewhat better than those of the ordinary telegraphic. The time of transmission of the signal over the land wires was found to be eight-thousandths of a second, while that of the wireless signals was, of course, inappreciable over this comparatively small distance.

The next step in the French programme was a re-determination of the difference of longitude between Paris and Washington, the results of which were communicated to the Paris Academy on the 21st July, 1913, by Monsieur Baillaud in his capacity as President of the Bureau des Longitudes. This determination is of especial interest, because the signals of Paris, from the Eiffel Tower, were observed at Washington, while the signals from the United States station at Arlington, near Washington, were received in Paris. It was thus possible to obtain a determination of the time of transmission of the signal between the two stations. The results were not considered definitive, because various improvements were in contemplation in the signals of both stations. But they served as an admirable reconnaissance in an operation of considerable magnitude and difficulty. The operations here described were carried out entirely by French observers, representing, separately, the Army and the Navy.

Of twelve series of trials, three were completely spoiled by interruptions of other signals. Of the nine others, five gave comparisons at one end or the other and four at both ends, but

only two series were completely satisfactory. These two gave for the time of transmission between Paris and Washington, over a distance of 6,175 kilometres, a value slightly greater than three-hundredths of a second of time. The probable error of determination of the distance of longitude is not given, owing, apparently, to the fact that some difficulty was experienced with the chronometers at Washington from their proximity to the generating station, which introduced certain irregularities into their rate—a difficulty which it will be easily possible to avoid in future work.

In our article last year we remarked that the scheme for the dissemination throughout the world of a strictly international time must involve a re-determination of the adopted longitudes of all the observatories contributing to the proposed Central Bureau at Paris, and that during the first year or two of an international co-operation such as was proposed the necessary adjustments would become conspicuous on examination of the contributions of each observatory to the common stock of time. It is characteristic of the energy which the French have put into their efforts that they have not been content to wait for this gradual remodelling of the longitudes, but have made a definite attempt to remove the more important discordances, by special investigations such as those we have briefly described for the Paris-Washington longitude, and by the new determination of the Paris-Pulkovo longitude, which was under way at the outbreak of the war.

For the time being these enterprises have necessarily come to a pause, and if in the future we are to have them restored they will be international in a sense very different from that which was contemplated when the last Congress met in Paris. It is no secret that the proceedings of that conference were by no means completely harmonious, nor that much of the difficulty was due to the disinclination of the Germans to accept the proposal that the International Bureau should be in Paris. Potsdam was the seat of the International Geodetic Association; Potsdam should be, in their opinion, the headquarters of any such enterprise. It seems probable that this particular difficulty will be solved in the general solution of all international problems now taking place. At a time when wireless is prohibited to all outside Government service, it is not even possible to say whether the time signals from the Eiffel Tower are sent in their old peaceful

regularity;* but it is certain that if they are there are very few parties of surveyors in the field to take advantage of them. The interest in wireless telegraphy has for the moment shifted to other fields. But we may look forward with confidence to the prospect that the end of the war will bring forward for solution a great number of problems in the survey of new boundaries, and that the admirable work which was done before the war in the application of wireless telegraphy to the determination of longitudes will then find its full reward.

* Since this was written the author has been informed that the time service from the Eiffel Tower, including the rhythmic signals, has been maintained throughout the war with absolute regularity.

INTERNATIONAL TIME AND WEATHER SIGNALS

IT has already been possible by means of wireless telegraphy to determine the differences of longitude between Paris and the following places :—Brest, Bizerta, Brussels, Algiers, Toulouse, and Nice. In the delimitation of the Franco-Liberian and Franco-German frontiers in the Congo, as well as of the Brazil-Bolivian boundaries, use is made of wireless telegraphy for the determination of the longitudes. Numerous points have been determined in the same manner in Morocco by the French Army Staff by using solely the scientific signals transmitted nightly from the Eiffel Tower. It is easy to foresee the important services which this method will ultimately render in the surveying of Central Africa and of similar parts of the globe which are difficult of access and where ordinary surveying methods cannot be used. The following information respecting time signalling and meteorological services carried out at various wireless stations should therefore be of practical as well as scientific interest and should also be of benefit to mariners.

Owing to the present crisis, it is not possible for us to say definitely that the services referred to in the following pages are still being maintained; for instance, we believe that shortly before the outbreak of war certain modifications were made to the time signals emitted from the Eiffel Tower, but as no official information is available it is not possible for us to publish details here. In the following pages, therefore, we give particulars of the most important services of meteorological and time signals in operation at the time of the outbreak of war.

INTERNATIONAL TIME SIGNALS.

EIFFEL TOWER (PARIS).

The following decisions were arrived at at the International Time Conference held in Paris in 1912 :—

The radiotelegraphic station of the Eiffel Tower transmits each day signals and telegrams of general interest, which are enumerated below :—

" Ordinary time signals " sent out twice per day—at 10 a.m. and at midnight.

" Scientific time signals " which precede the ordinary time signals by night.

Two "meteorological radiotelegrams of general order" transmitted each day, one immediately after the morning time signals, the other at 5 p.m.

"Measure signals" intended to permit observers to study the variations of intensity of the signals according to the time of year and the meteorological conditions, which are transmitted twice daily before the ordinary time signals.

"Urgent notices to navigators" will be sent whenever an important maritime danger is known to exist near the French coast or near the coasts of neighbouring countries.

The transmission of these signals will take place after the ordinary time signals.

All transmissions will be made with a wave-length of about 2,500 metres and using the maximum power which the station has at its disposal.

ORDINARY TIME SIGNALS.

At 9.55 a.m. three calls (— - — - —) will be given, followed by "ordinary time signals," then the signal "wait" (- — - - -).

The "ordinary time signals" commence at 9.57 a.m. and end at 10 a.m. They are transmitted automatically by means of special apparatus situated at the observatory in Paris and managed by the staff of that establishment.

The connection between this apparatus and the radio station at Eiffel Tower is established a few instants before the transmission by means of subterranean lines.

The composition of these signals is given by the illustration on p. 639.

The complete minutes 9.58, 9.59, 10.0 are therefore indicated by the end of the 3rd lines of the series of three dashes, all confusion being avoided by the fact that the signals preceding these dashes are different for each minute.

The letters X (— - - —) of the first minute constitute only advice and tuning signals.

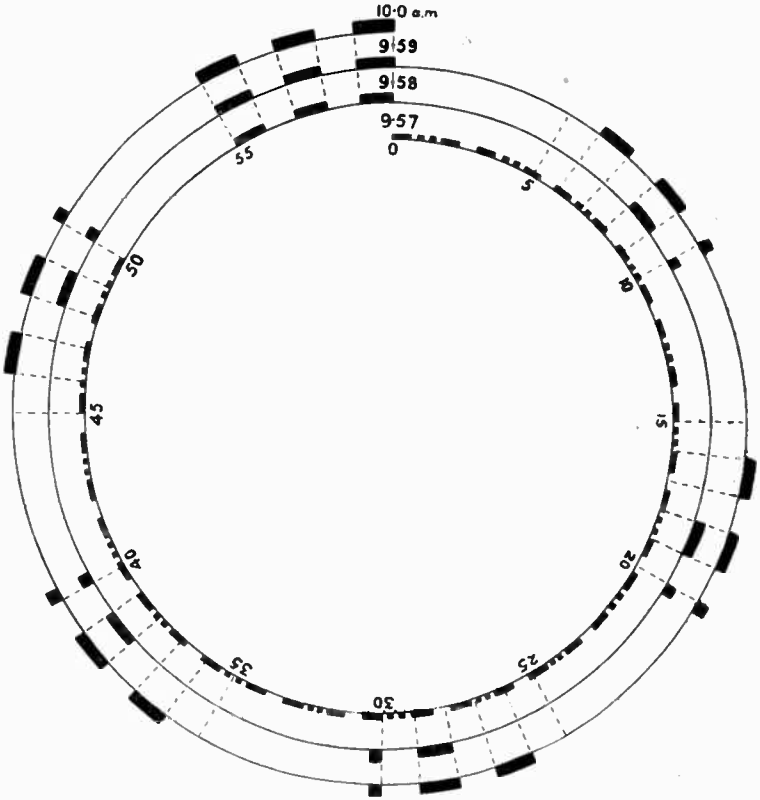
All the dashes, dots and spaces of dots or dashes of any one letter in the remainder of the signals are of equal duration, dashes = one second, dots = one-quarter of a second, intervals = 1 second.

The letters N (— -) which characterise the second minute commence numbers of 10 or more complete seconds plus eights, 8, 18, 28, 38, 48, and the beginning of the dots of these same

letters are produced exactly at the tens of seconds 10, 20, 30, 40, 50.

In the same way the letters G (— — -) characterising the third minute commence all numbers of 10 or more plus six, 6, 16, 26, 36, 46, and the beginning of the dots of these same letters are produced exactly at the tens of seconds, 10, 20, 30, 40, 50.

The "ordinary time signals" by night are transmitted in the same way.



The international service of time signals is shown in the above diagram. From the 57th minute of the hour warning signals are sent out consisting of the letter X (— · · —) repeated for fifty seconds, followed by silence for five seconds, after which the first time signal is given, consisting of three dashes each lasting for one second, separated by intervals of one second. Thus the end of the third dash coincides precisely with the end of the 58th minute. Afterwards the letter N (— ·) is sent for every ten seconds, followed by the second time signal, and finally a series of G's (— — -) followed by a third time signal, the last dash ending precisely at the hour.

The calls are made at 11.55 p.m. and the time signals are transmitted from 11.57 p.m. till midnight.

For receiving these hourly signals, termed "ordinary," it is

only necessary to have the antenna, of dimensions and height varying according to the distance from Paris, connected with a radiotelegraphic receiver, and to listen to the signals, with the clock or watch to be compared in front of the observer. It is easy for an unskilled person to estimate the difference up to half a second between the hours indicated by the clock and those which correspond with the signals that are heard in the telephones of the receiver. After some practice it is quite easy to estimate one-quarter of a second. In order to reach an accuracy of one-tenth of a second, it is generally necessary to have recourse to simultaneously recording on the same photographic strip the radiotelegraphic signals and the beats of the clock to be compared. Excellent results have in this way been obtained by various physicists and engineers. It frequently occurs, especially in winter, that the Paris observatory is not able to make astronomical observations each night. It is therefore necessary to be satisfied with the times registered by the chronometers of which the rate is known for the setting of the clock which sends the signals. These chronometers, being sufficiently numerous and accurate, cause no inconvenience so long as the cessation of astronomical observations does not exceed a few days. If, on the other hand, the period of cloudy weather continues too long, it is no longer possible to answer for the accuracy of the chronometers. Wireless telegraphy in such cases furnishes a method which allows of the co-operation of other observatories, better situated as regards climatic conditions, in the determination of the state of the master-clock at Paris, and in consequence in the accurate setting of the clock which sends the signals.

Scientific Time Signals.

Every night at 11.44 p.m. three calls (— - — - —) are made, followed by the words "scientific time signals."

Starting at 11.45 p.m. a series of 300 dots each formed of a single spark are transmitted, the 60th, 120th, 180th and 240th being suppressed in order to establish the indication for counting purposes.

This series is heard (1) at the observatory in Paris in a wireless receiver and compared with the tickings of a time-keeping clock by the coincidence method. A simple calculation permits of passing hours (noted by the clock), of the coincidences to those which are exact to 1 or 2 hundredths, of the 1st and 300th dots

of the series, which may be transformed in "legal time hours" by adding the corresponding correction of the clock.

These latter hours are transmitted by the Eiffel Tower soon after the end of the "ordinary time signals" by night, in the following manner :—

If the hours of the first and 300th beats are, for instance, 11.45 8 secs. 15 and 11.50 p.m. 1 sec. 17, the two following groups of figures three times repeated would be transmitted :— — - - - - — 450815. 500117 — - - - - — 450815. 500117 — - - - - — 450815. 500117.

In order to know approximately the correction to be made to a clock (or a chronometer) with reference to the legal international time of the observatory, it is sufficient to listen to the ticking of that instrument by means of a microphone suitably attached to a radiotelegraphic receiver at the same time as the series of 300 points are transmitted by the Eiffel Tower. It is necessary to observe and note the coincidences, and then the hours of the clock (or the chronometer) should be calculated at the moment of the 1st and 300th dots.

By subtracting these hours respectively from those sent out by the Eiffel Tower, it is possible to obtain two values of the correction of the instrument for measuring time which should be correct to about two-hundredths.

Meteorological Signals.—Apart from these time signals there are a number of signals connected with the meteorological service. These are of two kinds, the first of them affording an indication of the barometric situation of Europe as a whole, and derived from information supplied by Iceland, Ireland, France, Spain, the Azores, and America; the second of them sending out similar information regarding the state of the weather for fourteen stations in Western and Mid Europe, from Stornoway to Rome, from Prague to Biarritz and Stockholm. These telegrams are, of course, all coded, and numerals are employed to convey intelligence concerning the strength and direction of the wind, the state of the sky, and the state of the sea.

These reports are preceded by the initial letters BCM (*Bureau Central Météorologique*).

The morning report is transmitted at 10.49, immediately after the time signals commencing at 10.45 a.m. This time may be modified at a later date when the new time signals come into force.

(*a*) Six groups of 7 or 8 figures indicating the barometric pressure, the direction of the wind, state of the sky, and state of the sea. (This last figure appears in the groups containing 8 figures.) These groups are preceded by one or two initial letters indicating the name of the station referred to. R = Reykiavik (Iceland); V = Valentia (Ireland); O = Ushant (Brittany); CO = Corunna (Spain); HO = Horta (Azores); SP = Saint Pierre (America).

(*b*) Following the six groups of figures general atmospheric conditions for various parts of Europe are telegraphed in plain language (French).

(*c*) Groups of 7 or 8 figures giving the same observations for Paris: C = Clermont-Ferrand; BI = Biarritz; M = Marseilles; N = Nice; A = Algiers; SY = Stornoway; SH = Shields; HE = Helder (Holland); SK = Skudesnaes (Norway); ST = Stockholm; P = Prague; T = Trieste; R = Rome.

(*d*) General forecasts for France concerning the state of the sky and wind.

(*e*) The direction and force of the wind at the Eiffel Tower, 305 metres above ground, and probable wind for evening. This last information, for the use of aeronauts, is preceded by the initials FL; the velocity of the wind is indicated in metres per second.

A second report is sent at 5 p.m. It amplifies the morning report and takes into account variations which have been obsrved since 7 a.m., and to give a more precise forecast for the next day.

(*a*) The report consists of 8 groups of figures similar to the morning report for the following places: Paris: BR = Brest; BI = Biarritz; N = Nice; V = Valentia; SK = Skudesnaes; R = Rome; CO = Corunna.

(*b*) Forecasts of the weather.

(*c*) The direction and velocity of the wind at the Eiffel Tower at 4 p.m. and a forecast for the wind and weather for the following morning. The report is made from observations made at 2 p.m.

EXAMPLE OF MORNING WEATHER REPORT.

BCM — R5132811 — V57422445 — O64522544 — CO67530183 - - - - - Depression N.W. Europe forte pression S.W. Paris 6512031 * * * * * * Probable vent W. modéré averses Nord et Est—FL SW. 13 probable W. 10.

Example of Evening Weather Report.

BCM—Paris 6262030 — BR65224455 — BIXXXXXXXX—N62222211 — V60022425 — SK36024655 — R6142030—CXXXXXXXXX—Baisse barometrique Baltique stationnaire—Manche—Vents tournant N.W. fortes Manche Mediterranée. Averses—FL W. 10 probable W. 8.

The translation of the above is effected in the following manner: The first three figures represent the barometric pressure in millimetres and tenths of a millimetre, the figure 7 always preceding the figures telegraphed; the 4th and 5th figures indicate the direction of the wind; the 6th the force of the wind; the 7th the state of the sky; the 8th the state of the sea.

The first group in the morning report is R5132811, which is translated below.

R = Reykiavik; 513 indicates that the barometric pressure was 751·3 millimetres; 28 = direction of the wind, N.W.; 1 = force of the wind, nearly calm; 1 = sky, slightly cloudy.

The second group, V57422445.

V = Valentia; 574 = barometric pressure, 757·4 millimetres; 22 = direction of the wind, W.S.W.; 4 = force of wind, moderate; 4 = state of sky, covered; 5 = state of sea, very choppy.

When observations have not come to hand XX is sent; thus the third group of the evening report is BIXXXXXXXX, which signifies that the report from Biarritz had not arrived in time to be dispatched from FL.

Code for the Reading of Telegrams.

A group of any kind may be read as follows:—

e.g. N a a a d d f c m:

N = simple or double initial of the station.

a a a = Three figures giving the barometrical pressure to the 10th of mm. It is necessary to add 700 to arrive at the exact pressure—*e.g.* = a a a = 625 means that the pressure is 762·5.

d d = Two figures indicating the direction of the wind (see Table 1).

f = A figure giving the force of the wind (Table 2).

c = A figure giving the state of the sky (Table 3).

m = A figure giving the state of the sea (Table 4).

An observation which is not given is shown by letters x x.

TABLE 1.

4th and 5th Figures.

Direction of Wind.		Direction of Wind.		Direction of Wind.	
02	N.N.E.	14	S.S.E.	26	W.N.W.
04	N.E.	16	S.	28	N.W.
06	E.N.E.	18	S.S.W.	30	N.N.W.
08	E.	20	S.W.	32	N.
10	E.S.E.	22	W.S.W.	00	No wind (calm).
12	S.E.	24	W.		

TABLE 2.

6th Figure.

Beaufort No.	Description of wind.	Mode of estimating aboard sailing vessels.	Limits of Velocities.	
			Statute miles per hour.	Metres per second.
0	Calm	——	Less than 1	Less than 0·3
1	Light air ...	Sufficient wind for working ship.	1–3	0·3–1·5
2	Slight breeze ...	Ditto	4–7	1·6–3·3
3	Gentle breeze	Ditto	8–12	3·4–5·4
4	Moderate breeze	Forces most advantageous for sailing with leading wind and all sail drawing	13–18	5·5–8·0
5	Fresh breeze ...	Ditto	19–24	8·1–10·7
6	Strong breeze...	Reduction of sail necessary with leading wind.	25–31	10·8–13·8
7	Moderate gale (*High wind*)*	Ditto	32–38	13·9–17·1
8	Fresh gale ... (*gale*)*	Considerable reduction of sail necessary even with wind quartering.	39–46	17·2–20·7
9	Strong gale ...	Ditto	47–54	20·8–24·4
†10	Whole gale ...	Close-reefed sail running, or hove to under storm sail.	55–63	24·5–28·4
†11	Storm	Ditto	64–75	28·5–33·5
†12	Hurricane ...	No sail can stand even when running.	Above 75	33·6 or above.

* It has recently been decided that for statistical purposes winds of force less than 8 shall not be counted as gales, and to avoid the ambiguity implied by the use of the term "moderate gale" for force 7 the Beaufort description has been modified for use in connection with the daily weather service by the substitution of the descriptions in italics for forces 7 and 8.

† Only one figure is assigned in the code to wind force, and consequently forces 10, 11, 12 cannot be reported. It is usual in meteorological telegrams to send figure 9 and add the word "tempête" in cases where forces 10, 11 or 12 are observed.

TABLE 3.

State of the Sky.

7th Figure.

0 Sky quite clear)
1 ,, a quarter clouded) =b.
2 ,, a half clouded = bc
3 ,, three-quarter clouded = c.
4 ,, overcast = o.
5 Rain falling.
6 Snow.
7 Haze, light fog, or mist.
8 Fog.
9 Thunderstorm.

TABLE 4.
State of the Sea.
8th Figure.

Description.	Condition of Surface.
0 Calm	Glassy.
1 Very smooth	Slightly rippled.
2 Smooth	Rippled.
3 Slight	Rocks buoy or small boat.
4 Moderate...	Furrowed.
5 Rather rough	Much disturbed.
6 Rough	Deeply furrowed.
7 High	Rollers with steep fronts.
8 Very high	Rollers with steep fronts.
9 Phenomenal	Precipitous; towering.

SIGNALS OF MEASURE.

As the same length and strength of wave is always used in the transmission of time signals it is interesting, from the technical point of view of wireless telegraphy, for those making observations at different distances from the Eiffel Tower to compare the intensity of the reception of signals, by day and by night, at different times of the year. In order to facilitate these measures and comparisons of intensity, special signals are sent out for 1 minute at 9.52 a.m. and at 11.52 p.m. They are composed of 6 dashes, each one lasting 5 seconds and separated from each other by intervals of 5 seconds and preceded by 3 calls (— - — - —).

URGENT INFORMATION TO NAVIGATORS.

The use of the Eiffel Tower radiotelegraphic station for the sending of "urgent information to navigators" in case of grave maritime danger on the French coast, or even of neighbouring countries, is being considered.

Note.—The time at which the whole of the above regulations will come into force has not yet been decided. At the second International Time Conference, held in Paris in October, 1913, the question of definitely putting them into operation was discussed, and it was finally decided to postpone doing so.

GERMANY (NORDDEICH).

The Imperial Radiotelegraph Station, Norddeich, emits twice daily, on a wave-length of 1,650 metres, time signals indicating the Greenwich mean time at noon and at midnight—*i.e.*, according to the European mean time usual in Germany, the hours 1 p.m. and 1 a.m.

Time signals are sent out by the Norddeich Station in the following manner at 12.53 p.m. (noon) and at 12.53 a.m. (midnight), mean European time. Norddeich sends out at first, for two minutes continuously, the signal - - - — (V), so that all stations desiring to receive the time signals may tune their receiving apparatus to the wave-length of Norddeich. At 12h. 57m. 47s. the call — - — - — is transmitted, followed by the call signal of Norddeich — - — - - — - - - - (K A V), and the signals — — — — - — — - - (M. G. Z, Greenwich mean time). At 11h. 58m. 38s. the call signal — - — - — is again sent out. Another short interval denotes the close of these preliminary signals, after which the time signal proper is transmitted.

This signal consists of two groups of three, each lasting 5 seconds, and arranged so that each group ends with a full tenth-second, and the last dash of the last group indicates the time—1.0 mean European time. These signals consist of dashes lasting one second. The whole time signal therefore is sent, after the second signal of attention (— - — - —) has been given, and after the short interval has elapsed, in the following manner :—

12 h. 58m. 46s., 47s., 48s., 49s., 50s. :
One dash from second to second.
Interval of 5 seconds.
12h. 58m. 56s., 57s., 58s., 59s., 60s. :
One dash from second to second.
Interval of 5 seconds.
12h. 59m. 6s., 7s., 8s., 9s., 10s. :
One dash from second to second.
Long interval.
12h. 59m. 36s., 37s., 38s., 39s., 40s. :
One dash from second to second.
Interval of 5 seconds.
12h. 59m. 46s., 47s., 48s., 49s., 50s. :
One dash from second to second.
Interval of 5 seconds.
12h. 59m. 56s., 57s., 58s., 59s., and 1h. 0m. 0s. :
One dash from second to second.

The last dash indicates the time : it commences at 1h. 0m. 0s. mean European time, and is distinguished by the following concluding signal :— - — - — -, which is transmitted at 1h. 0m. 06s.

In order to ensure punctual transmission of the time signal, the Norddeich Station is equipped with a special astronomical precision clock which is regulated by the Imperial Chronometer

Observatory in Wilhelmshaven. This clock automatically actuates the radiotelegraph apparatus at the indicated times so that the signals are transmitted with the maximum exactness possible. In case a time signal is transmitted indistinctly or incorrectly, the attention of the receiving stations is called to this fact by transmitting immediately after the time signal the words: "Time signal void."

Meteorological telegrams are sent out daily from Norddeich at 1 p.m. (Central European time). Storm warnings are also transmitted as required and repeated three times, as soon as received. These warnings are repeated once at 1 p.m., or 11 p.m. (Central European time).

HOLLAND.

On August 1st, 1913, the Scheveningen Port coast station inaugurated a daily service of meteorological data which is transmitted to ships on request. The telegram contains the data collected from the meteorological stations: Helder, Flushing, Gris Nez, The Hague (with an indication of the state of the sea); Yarmouth, Shields, Skudesnaes, Sylt (without indication of the state of the sea).

The data given by each station consist of two groups of 5 figures made up on the basis of a table BBBWW SHTTG.

BBB gives the atmospheric pressure in millimetres and tenths of millimetres, omitting the hundreds figure of the millimetres;

WW shows the direction of the wind according to the compass-card (Table 1, p. 644);

S shows the force of the wind according to the Beaufort scale (Table 2, p. 644).

H gives the state of the sky and the weather according to the code of Table 3, p. 644;

TT gives the temperature in degrees Centigrade. Temperatures below zero are indicated by the addition of the number fifty to the number showing the degrees of frost, so that, for example, a temperature of —14 degrees is shown as 64;

G shows the state of the sea according to Table 4. When the state of the sea is not shown, the second group of the station in question contains only four figures.

Where necessary, the groups of figures are followed by an advice regarding the storm signal.

SPAIN.

The following message, intended to supplement the Eiffel Tower reports by more detailed information from Spanish stations, is signalled from the Spanish Wireless Station at Carabanchel (Madrid) :—

At 1 h. 29 min. G.M.T. for 50 seconds the letters C M A.

At 1 h. 30 min. G.M.T. the letters E O C M (Espana Observatorio Central Meteorologico); followed by :—

(1) Five groups of 8 figures, each preceded by a letter indicating the place to which the observations refer. The code, aaaddfcm, used in these groups is identical with that of the similar groups in the Eiffel Tower message (see above). The stations and hours for which information is given are :—F, Funchal 7 a.m.; L, La Laguna (Teneriffe) 8 a.m.; O, Oran (Algeria) 7 a.m.; Li, Lisbon 9 a.m.; Mh., Mahon (Balearic Islands) 8 a.m.

(2) Seven groups of 10 figures, each preceded by a letter to identify the place of observation. The groups are coded aaab′a′a′dd fc, where the letters have the same significance as in the Eiffel Tower messages, and b′a′a′ signifies the change of the barometer since 8 a.m. If the barometer has risen b′ = 0, if it has fallen b′ = 5, a′a′ gives the amount of the change in millimetres and tenths, thus 522 indicates a fall of 2·2 millimetres. The observations are taken at noon. The reporting stations are : B, Barcelona; A, Alicante; Ml, Malaga; Sf, San Fernando; H, Huelva; C, Corunna; Md, Madrid.

(3) A group of 12 figures, ddfddfddfddf, giving the direction (dd) and force (f) of the wind at 250, 500, 1,000 and 1,500 metres above the ground at Madrid.

(4) A group of 9 figures giving the sea disturbance on the following sections of the coast :—(1) San Sebastian to Santander, (2) Santander and Cape Ortegal, (3) Cape Ortegal to the Portuguese frontier, (4) Huelva to Gibraltar, (5) Gibraltar to Almeria, (6) Almeria and Valencia, (7) Valencia and the French frontier, (8) the Balearic Islands, (9) Algerian coast.

(5) A group of 11 figures, giving weather forecasts.

(6) A group or groups giving the position of the centres of atmospheric disturbances.

UNITED STATES.

The United States Agricultural and Navy Departments are now sending wireless storm warnings and general weather forecasts to ships at sea. Bulletins are sent out from the navy wireless

stations at Radio, Va., and Key West, Flo., a few minutes after 10 o'clock every night. These bulletins consist of two parts. The first gives, in code letters and figures, the actual weather conditions, at 8 p.m. (75th meridian time), at Sydney, Nova Scotia, Nantucket, Atlantic City, Hatteras, Charleston, Key West, Pensacola, and Bermuda, followed by a special forecast of the probable winds to be experienced one hundred miles off shore. The second part gives the storm warnings covering a period of forty-eight hours from the time of issue, and at the end of the forecast is given a statement of the location and movement of any barometric depressions that may be likely to affect the winds over the ocean. The distribution of wireless weather bulletins by the stations at Arlington and Key West is a part of the purpose for which these stations were originally designed. The following stations in the United States send out bulletins :—

Station.	Time of Transmission.	Wave-Length.
Arlington, Va.	Mid-day and 10 p.m. by time 75° West of Greenwich	2,500
Boston, NAD Charleston, S. Carolina Key West, Flo. New Orleans Newport, Rhode Island New York, NAH Norfolk, Va.	Mid-day by time 75° West of Greenwich	1,000
Eureka, Cal. Mare Island North Head San Diego, Cal. Tatoosh	Mid-day by time 120° West of Greenwich	1,000

Each naval coast station situated within the continental limits of the United States of America and of Alaska, as soon as it is advised of any danger to navigation (the presence of derelicts, displacement of lightships, etc.), immediately transmits the information on wave-lengths of 600 and 1,000 metres. Such information is repeated at 8 a.m., noon, 4 p.m., and 8 p.m. (local time). Naval coast stations of the Atlantic receiving information of this kind forward it by radio-telegraphy to Arlington Radio, and it is re-transmitted by that station daily at 10 p.m. on the wave-length of 2,500 metres. These messages are sent broadcast by all radio-telegraph stations in their turn on wave-lengths of 600 and 1,000 metres at 8 a.m., noon, 4 p.m., and

8 p.m. The foregoing procedure also takes place on the Pacific Coast, with the difference that the reports of coast stations are transmitted to Mare Island, to be re-transmitted by that station (for the present) to all other coast stations of the Pacific.

Arlington Radio station sends time-signals for five minutes on wave-lengths of 2,500 metres, commencing at 11.55 a.m. and 9.55 p.m., every day, Sundays and holidays included. Final signals at noon and 10 p.m. (time of the meridian 75° west of Greenwich). Every tick of the standard clock of the Naval Observatory, Washington, is transmitted as a dot, omitting the 29th second of each minute, the last five seconds of each of the first four minutes, and finally the last ten seconds of the last minute. The noon and 10 p.m. signal is a dash. Immediately after transmitting these signals at 10 p.m., the station transmits on the same wave-length information received from the Hydrographic Office during the preceding 24 hours relating to matters of navigation.

JAPAN.

The Japanese coast station of Choshi transmits on the wave-length of 600 metres each night, except Sunday, the mean time of Central Japan (time of the meridian 135° E), as follows :—

From	8.59′ 00″	to	8.59′ 55″	— — — — — — — — — —, etc.
,,	9.00′ 00″	,,	9.00′ 01″	—
,,	9.00′ 30″	,,	9.00′ 55″	—.—.—.—.—.—.—, etc.
,,	9.01′ 00″	,,	9.01′ 01″	—
,,	9.01′ 30″	,,	9.01′ 55″	—..—..—..—..—.. , etc.
,,	9.02′ 00″	,,	9.02′ 01″	—
,,	9.02′ 30″	,,	9.02′ 55″	—...—...— ...—... , etc.
,,	9.03′ 00″	,,	9.03′ 01″	—
,,	9.03′ 30″	,,	9.03′ 55″	—....—....—....—, etc.
,,	9.04′ 00″	,,	9.04′ 01″	—

AUSTRALASIA.

The Dominion Meteorological Bureau of Wellington and the shipping companies have arrived at an agreement with the Commonwealth Meteorological Office at Melbourne for the exchange of news and meteorological information.

Ships will give information concerning the state of the weather when they are 300 or more miles from the coasts of Australia or New Zealand, or whenever the captain may consider

that the atmospheric conditions offer special interest. As concerns Australia all ships which approach or leave Cape Leeuwin will report concerning the atmospheric conditions which prevail.

Until further orders such messages delivered on board will be sent without previous payment, provided they conform to the following conditions :—

1. That they are written in the special code of the Meteorological Offices and a copy of them shall be supplied to the said offices.

2. That the messages shall be drawn up by the responsible officer (" observer "), and not by the operator.

3. That for their delivery they shall be addressed with the indication " Melbourne time " or " Wellington time."

4. They shall not deal with other than the following points :—

a. Position of the ship.

b. The barometric reading.

c. The direction and velocity of the wind.

d. The state of the weather.

e. The condition of the sea.

and they shall be written in the prescribed form.

All telegrams as a rule shall be immediately forwarded by the quickest route and shall have priority as a Government message. For these the Marconi tax will not be collected.

Time signals are transmitted by the Melbourne Radio station at noon and midnight (Sundays excepted) Victorian standard time (10 hours ahead of Greenwich), international time signals being used.

Ocean forecasts are transmitted by the following stations at the hours specified (Victorian standard time) :—

Adelaide, 6.30 p.m. and 8 p.m.
Brisbane, 10.30 p.m. and 11 p.m.
Hobart, 10 p.m. and 11.30 p.m.
Melbourne, 7.30 p.m. and 9 p.m.
Sydney, 8 p.m. and 9.30 p.m.

Other stations may repeat as requested or as necessary.

SOUTH AFRICA.

The radiotelegraphic stations at Capetown (Slangkop) and Durban signal at 1 o'clock in the afternoon of each day weather reports containing information relative to the meteorological conditions affecting the coastal belt of the South African Union.

The arrangements made in the Union of South Africa for the transmission of radio time signals for the use of shipping in South African waters is as follows :—

A special clock at the Royal Observatory, Capetown, is adapted to give automatically a series of signals of a distinctive character extending over an interval of half a minute. The clock is brought into conformity daily with the Observatory standards shortly before the hour selected for transmitting the signals. The hour chosen is 11 p.m., Union standard time (9 p.m. Greenwich mean time).

The time signal is preceded by the usual warning signal from the radio coast station. The time signal proper consists of twelve dashes, each of about $\frac{3}{4}$ of a second in duration, in five groups, commencing at the following Greenwich mean times :—

Group I.			*Group II.*			*Group III.*			*Group IV.*			*Group V.*		
h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	59	30	8	59	38	8	59	44	8	59	48	8	59	54
—	—	32	—	—	40	—	—	—	—	—	50	—	—	56
—	—	34												58
												9	0	0

The beginning of the last dash corresponding exactly with 9 p.m. Greenwich or 11 p.m. South African standard time.

By means of a special relay, the time signal is simultaneously transmitted to Slangkop (Capetown) and Durban radio stations, the signal to the latter station passing over the land telegraph wire connecting Capetown and Durban, a distance of about 1,100 miles.

MEXICO.

The coast station of Campeche transmits the time of the meridian of Tacubaya daily at noon in the following manner :—

From 11.55 a.m. to noon : repeated transmission of the inquiry signal "CQ"; then repeated transmission of the signal "XH" (time of Tacubaya);

At noon: transmission of the word "noon," always followed by a free announcement of the state of the weather.

GREAT BRITAIN.

At 9.30 a.m. the Admiralty station at Whitehall, in London, sends out a meteorological bulletin. At 10 o'clock the Cleethorpes weather report and forecast is sent out, this lasting about 20 minutes. Whitehall sends out an additional bulletin at 8.30 p.m., Cleethorpes at 10 p.m. The following is a specimen of the Cleethorpes weather report, which is preceded by the call signal CQ. CQ. CQ.

A deep depression, 28·6, is still centred off the south-west of Iceland and pressure remains high over the Alps (Munich 30·5). A fresh secondary has appeared overnight off the west of Ireland, and the barometer is now falling at all western stations.

Forecast.—Strong winds reaching gale force at times from direction between south and south-west probable off all British coasts; sea rough and weather unsettled, squally and showery.

USEFUL FORMULAE AND EQUATIONS

We present here for the convenience of our readers a number of formulae and equations useful in radiotelegraphy, collected from various sources. Those marked with an asterisk (*) have been taken by special permission of the Author and Publisher from Dr. J. A. Fleming's well-known treatise on "The Principles of Electric Wave Telegraphy and Telephony," published by Longmans, Green & Co., of 39 Paternoster Row, London, E.C.

HEADING	FORMULA	REMARKS
1. Sine Curve	$y = R \sin \alpha$	R is the *amplitude* of the curve and y varies between the limits of $\pm R$.
Harmonic motion of a point.	$y = R \sin 2\pi n.t$	The curve is repeated n times per second, t is the elapsed time in seconds from the commencement of motion.
Current from alternator or undamped oscillation.	$i = I \sin 2\pi n.t$	i is the value of the current at the instant of time represented by t seconds, or the *instantaneous* value of the current in terms of the maximum current I, and the frequency n (number of complete cycles per second or periodicity).
Alternator Frequency.	$n = \frac{\text{Revs. per min.} \times \text{number of poles}}{120}$	
2. Impedance	$\text{Impedance} = \frac{\text{Volts}}{\text{Amperes}}$	The extended term applied to circuits having characteristics additional to ohmic resistance.
Circuit having Inductance and Resistance only.	$\text{Impedance} = \sqrt{4\pi^2 n^2 L^2 + R^2}$ $= \sqrt{L^2 p^2 + R^2}$ $= \sqrt{\text{Reactance}^2 + \text{Resistance}^2}$ $= Lp$	L is the Inductance in Henrys, R Resistance in ohms, $p = 2\pi n$. Reduces to reactance if pL is

Capacity only.	$\text{Impedance} = \frac{1}{Cp}$	farads.
Impedance in circuit having Capacity and Resistance only.	$\text{Impedance} = \sqrt{R^2 + \left(\frac{1}{Cp}\right)^2}$	If Cp is very small $\left(\frac{1}{Cp}\right)^2$ is large and the expression reduces to that previously given.
Impedance in circuit having Resistance, Capacity, and Inductance.	$\text{Impedance} = \sqrt{\left(Lp - \frac{1}{Cp}\right)^2 + R^2}$ $= \sqrt{(\text{Reactance} - \text{Captance})^2 + \text{Resistance}^2}$	
3. Resonance	Impedance = Resistance only From $Lp = 1/Cp$ we get $n = 1/2\pi\sqrt{CL}$ and T, the time of one oscillation. $= \frac{1}{n} = 2\pi\sqrt{CL}$	When $Lp = 1/Cp$. This is the condition of resonance.
	Resonance Voltage $Ec = \frac{Lp}{R} Ea$	Ec = Condenser Voltage. Ea = Alternator Voltage.
4. Heating value of Alternating Current.	Calling I and A the maximum values of a continuous and an alternating current then, for equal heating effects $I^2 = \text{mean } A^2$ and $I = \sqrt{\text{mean } A^2}$	The expression on the right hand is called the Root mean square value (written R.M.S.).
5. R.M.S. value of a Sine function.	$\text{Sin}^2\theta + \text{Cos}^2 = 1$ $\therefore$ mean value of $\text{Sin}^2\theta + \text{Cos}^2\theta = 1$ and mean value $\text{Sin}^2\theta$ = mean value $\text{Cos}^2\theta = \frac{1}{2}$ $\therefore$ R.M.S. value of the sine or cosine is $1/\sqrt{2}$ or 0·707 of its max. value	This holds for all values of θ.

HEADING	FORMULA	REMARKS
6. Angle of Lag and Power Factor.	$\text{Tan}\theta = \frac{\text{Reactance}}{\text{Resistance}}$ $\text{Cos}\theta = \frac{\text{Resistance}}{\text{Impedance}}$ $= \text{Power Factor}$	θ is the angle of lag between the current and the applied P.D.
7. Inductances in parallel with no mutual Inductance between them.	$L_{s0} = \text{effective inductance} = \frac{LL_1}{L+L_1}$	Holds only if $L/R = L_1/R_1$ or if R and R_1 small compared with Lp and L_1p.
8. Exponential function.	$y = \epsilon^{-ax}$	Represents law of loss of charge in a condenser leaking through a resistance. ϵ is the base of Napierian logs. $\epsilon = 2{\cdot}71828$, Log ϵ to base 10 ($\text{Log}_{10}\epsilon$) = 0·4343 Log 10 to base ϵ ($\text{Log}_\epsilon 10$) = 2·303.
	$y = \epsilon^{-ax} \cdot \sin . bx$	Decrescent curve of sines or damped wave train.
9. Oscillatory discharge.	In a circuit having Capacity, Inductance and Resistance, R must not be greater than $\sqrt{4L/C}$. The time T of a complete oscillation is given by :— $2\pi \frac{2LC}{\sqrt{4LC - R^2C^2}}$	Generally R^2C^2 can be neglected in comparison with $4LC$ and the expression then reduces to $T = 2\pi\sqrt{LC}$ (see 3). From an inspection of the exact expression of T it is seen that as R increases towards $\sqrt{4L/C}$, T slowly increases at first, but as R gets nearer the critical value. the increase in T is correspondingly more rapid, T finally becoming infinite when

10. Velocity of Propagation and Wave Length.

Velocity of electro-magnetic waves

$V = 186{,}000$ miles per sec., approximately
$= 300{,}000{,}000$ metres per sec. ,,
$= 3 \times 10^{10}$ cms. per sec. ,,

$V = n\lambda$

$$n = 1/2\ \sqrt{CL}$$

$$\therefore\ \lambda = \text{Vel. Light}\ /n$$
$$= 3 \times 10^{10} \times 2\pi\sqrt{CL}\ \text{metres}$$

General formula connecting frequency n, wave length λ, and velocity of propagation V.

C and L are in absolute units. But the absolute electro-magnetic unit of capacity $= 10^{9}$ farads. $= 10^{15}$ mfds. and the absolute unit of Inductance $= 10^{-9}$ henrys, or 10^{-3} millihenrys.

Therefore

$$\lambda = 3 \times 10^{10} \times 2\pi\sqrt{CL}/10^{12}$$
$$= 1885\sqrt{CL}\ \text{metres approx.}$$
$$= 6182\sqrt{CL}\ \text{feet.}$$

C and L are mfds. and mhys. respectively.

11. Frequency . . . .

Using same units as above

$$n = 160{,}000/\sqrt{CL}\ \text{approx.}$$

Complete oscillations per second.

12. Electrostatic and Electromagnetic Units . .

Ratio of $\frac{\text{electromagnetic unit}}{\text{electrostatic unit}}$		
of Quantity is equal to	v	
of Current ,, ,,	v	
of Resistance ,, ,,	$1/v^2$	
of Potential ,, ,,	$1/v$	
of Capacity ,, ,,	v^2	
of Inductance ,, ,,	$1/v^2$	

v is the velocity of light and equals 3×10^{10} cms. per sec.

HEADING	FORMULA	REMARKS.
13. Practical Units . .		
Capitals for steady values, small letters for instantaneous values. I, i; E, V; L; C; R, r; P; W, J; Q		

	Practical Unit.	Equivalent in absolute electro-magnetic units.
Current	... Ampère ...	10^{-1}
Electromotive Force	... Volt ...	10^{8}
Inductance	... Henry ...	10^{9}
Capacity	... Farad ...	10^{-9}
Resistance	... Ohm ...	10^{9}
Power	... Watt ...	10^{7}
Work or Energy	... Joule ...	10^{7}
Quantity	... Coulomb...	10^{-1}

14. Damped Oscillations.

* $i = I\epsilon^{-\alpha t} \operatorname{Sin} 2\pi nt$

Compare with (1) and (8) α is a constant and is called the "damping factor" (in Telephony the "attenuation constant").

15. Damping of non-radiative free or non-coupled circuit.

* $I_1/I_2 = I_2/I_3 = \ldots = \epsilon^{\frac{\alpha T}{2}}$

* and $\alpha T\ 2 = \alpha/2n = R'/4nL$

Where R' is the high-frequency resistance.

$= \delta$

The logarithmic decrement per half-period. R' in ohms, L in henrys, or both absolute.

* $\therefore \epsilon^{\delta} = I_1/I_2 = I_2/I_3 \ldots .$

* and $\delta = \log_{\epsilon} I_1/I_2 = \log_{\epsilon} I_2/I_3 \ldots .$

* $I_1/I_m = \epsilon^{(m-1)\delta}$

I_1 is the first, I_m the m^{th} current maxima.

Number of Oscillations in a damped wave train.	If the oscillations are extinguished when $I_1/I_m=$ i.e., when the last is only 1% of the first,	The number of half oscillations before amplitude reduced to 1% of the initial value. The number of complete oscillations in the train $=m/2$ for practical purposes
	* $m=\dfrac{4{\cdot}605+\delta}{\delta}$	
Two coupled circuits, each with damping.	* $\delta_1+\delta_2=\pi\left(1-\dfrac{n_2}{n_1}\right)\dfrac{J}{\sqrt{J_r^2-J^2}}$	Where the frequencies of the two circuits are n_1 and n_2 close together and, finally, $n_1=n_2$ giving resonance; and J is the R.M.S. value of the secondary current, increasing to J_r on attainment of resonance.
Determination of decrement.	* If a resonance curve be plotted, with a hot-wire ammeter in the secondary circuit, in which the ordinates represent the values of J^2/J_r^2 and the abscissae the fraction n_2/n_1 this gives us a curve with max. ordinate equal to unity and a corresponding abscissa also equal to unity. If y is an ordinate very near to the maximum, and if $x=1-n_2/n_1$	
	* $\delta_1+\delta_2=\pi x\sqrt{\dfrac{y}{1-y}}$	
16. High frequency Resistance	* $\dfrac{R^1}{R}=1+\dfrac{\kappa^2}{48}-\dfrac{\kappa^4}{2880}+\ \ldots$ (*Lord Rayleigh*)	R is the steady current resistance and R^1 the h.f. resistance for cylindrical straight conductors $\kappa=\pi^2d^2n\mu/\rho$, where d is the diameter of the wire in cms. n = number of oscillations per second. ρ = the specific resistance of the material forming the wire in terms of absolute c.g.s. units.

HEADING	FORMULA	REMARKS
High frequency Resistance—*cont.*		μ = magnetic permeability of material and is unity for non-magnetic wires.
	For copper wire at ordinary temperatures, $\rho = 1640$	The previous formula may be used when κ is less than 1.
	* $\frac{R^1}{R} = \frac{1}{2}\sqrt{\kappa}$	When κ is greater than 5 then use the formula opposite.
17. Mean Square Value .	Mean square value (integral value) of oscillations of N trains or groups per second	
	* $J^2 = \frac{NI^2\epsilon\delta}{8n}$	Provided δ (the decrement) is not greater than say $\pi/10$.
18. Coupling	* $k^2 = M^2/L_1L_2$	Where k is the coefficient of coupling, M is the mutual inductance, L_1 and L_2 the self-inductances of primary and secondary. The percentage error of this form is approximately $\frac{1}{8}k^2$; for $k = 20\%$ error is $\frac{1}{2}\%$ of k.
	$k = \frac{\lambda_1 - \lambda^2}{\lambda_0}$ approx.	
	* $T_1 = T\sqrt{1+k}$	
	* $T_2 = T\sqrt{1-k}$	
	* $n_1 = \frac{n}{\sqrt{1+k}}$	Where T, n, λ are the time-period, frequency and wave-length of each circuit when separate, and T_1, T_2, n_1, n_2, and λ_1, λ_2 the corresponding values when the circuits are coupled.
	* $n_2 = \frac{n}{\sqrt{1-k}}$	
	* $\lambda_1 = \lambda\sqrt{1+k}$	
	* $\lambda_2 = \lambda\sqrt{1-k}$	
	* $k = \frac{\lambda^2 - \lambda^2}{\lambda^2 + \lambda^2}$	

19. Capacity	$C = r$ cms.	Electrostatic units.
Sphere in space having radius of r cms.	$\frac{r}{9\times10^5}$ (12) and (13)	Microfarads.
Cylindrical condenser. (air dielectric)	C per unit length $= \frac{1}{2 \log b\ a}$	b and a are outer and inner radii. This formula applies approximately to jars.
Parallel plates. (air dielectric)	$C = \frac{A}{4\pi d}$	d=distance apart of plates in cms., small compared to edge lengths. A=surface in sq. cms.
	Parallel plate air condenser. 1 cm. between plates. C per sq. metre about ·00088 mfd.	
Long Wire.	* $C = \frac{l}{2 \log_e 2l\ d}$	l=length in cms. d=diam. in cms. Add about 10% for effect of earth. This expression works out at something between 1·6 and 2·0 micromicrofarads (mmfs.) per foot length, for most cases of a single aerial wire.
20. Energy in Condensers	$J = \frac{1}{2} QV$ But $Q = CV$ $\therefore J = \frac{1}{2} CV^2$	Q is the quantity in coulombs. C is the capacity in farads. V is the voltage applied. J is the number of Joules stored.
21. Inductance . . . . Cylindrical-sectioned wire. one turn, in form of square.	* $L = 2l\ (2{\cdot}303 \log_{10} 4l/d - 2{\cdot}853)$ Absolute units.	l=length in cms.. d=diam. cms.
In form of circle.	* $L = 2l\ (2{\cdot}303 \log_{10} 4l/d - 2{\cdot}45)$	This is sufficiently accurate for wireless frequencies, but is obtained for an infinite frequency.

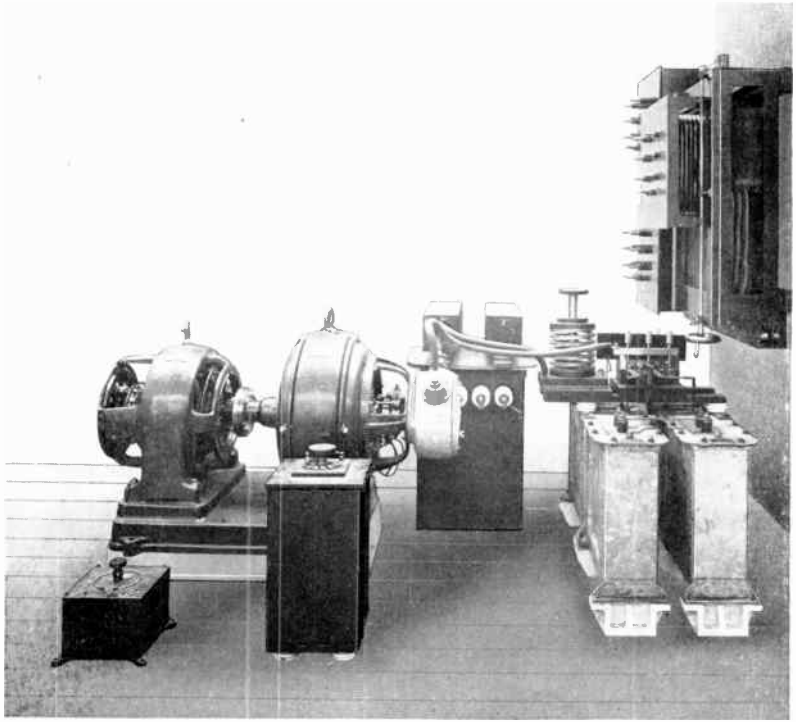
HEADING	FORMULA	REMARKS
Solenoid, single layer.	$L = 4\pi^2 n^2 \left(\frac{2a^4 + a^2 l^2}{\sqrt{4a^2 + l^2}} - \frac{8a^3}{3\pi} \right)$ Abs. units. (*Cohen*)	a = mean radius. n = number of turns per cm. length. l = length in cms.
Solenoid.	$(\pi DN)^2 l \left\{ 1 - \frac{4}{3\pi}\frac{D}{l} + \frac{1}{8}\left(\frac{D}{l}\right) - \frac{1}{64}\left(\frac{D}{l}\right)^4 \right\}$ cms. (*Russell*)	D = Diameter of coil in cms. N = Nr. of turns per unit length. l = Axial length of coil. Note.—The first two terms in the bracket will be sufficient if D/l is not greater than $\frac{1}{2}$.
Single straight wire.	$L = 2l\left(2{\cdot}303 \log_{10} \frac{4l}{d} - 1\right)$ Abs. units.	l = length in cms. d = diam. in cms.
22. Energy stored in Inductance	$J = \frac{1}{2} L I^2$	L = Inductance in henrys. I = current in ampères. J = energy stored in Joules.
23. Horse-Power . . .	1 H.P. = 33.000 ft. lbs. per min. Indicated Horse-power = $\frac{plan}{33.000}$	p = mean effective pressure per sq. inch on piston. a = area of piston sq. ins. l = length of piston stroke ft. n = number of working strokes. For double-acting engine take double the number of revs. for the working strokes.
	Brake Horse-Power	The work available at the engine shaft.
	B.H.-P./I.H.P.	The efficiency of the engine.
	1 Kilowatt = 1000 Watts = 10^{10} ergs per sec. = 737·3 ft. lbs. per sec. = 1·32 H.P. 1 H.P. = 746 watts	

Safe H.P. for Shafting.	Diam. of Shaft $= 3{\cdot}69\sqrt[3]{\frac{\text{H.P. transmitted}}{\text{Revs. per min.}}}$ Inches.	
24. Magnets	Magneto-motive force (M.M.F.) $= 4\pi nC$ $= 4\pi nC/10$ $= 1{\cdot}26$ ampère turns.	in C.G.S. units, C being current. n = nr. of turns. If current is in amps. Ampère turns = the product of the number of turns and the ampères flowing in the coil.
	$\frac{\text{M.M.F.}}{\text{flux produced}} = \text{Reluctance}$ $= \frac{\text{Length of magnetic circuit}}{\text{Area of cross section} \times \text{permeability}}$	
Tractive force of magnet.	$p = a\sqrt[3]{w}$ Kgms.	w = wt. of magnet kgms. a = constant for steel varying from 18 to 23.
Length of Wire on Bobbin.	$l = \frac{l(D-d)}{2\delta^2} \times \frac{\pi(D+d)}{2}$ in.	D = external diameter of winding space in. d = internal diameter of winding space in. l = length between bobbin cheeks in. δ = diam. of wire in mils. (1 mil. = $\frac{1}{1000}$ inch).
	If d = diam. of wire of a magnet whose resistance is r ohms, to fill the bobbin so as to give a resistance r^1 ohms, a wire of diameter d^1 must be used such that $d^1 = d\sqrt[4]{r/r^1}$	If d^1 is less than d, the actual gauge used should be rather smaller than that given by the formula. and *vice-versâ*.
25. Rope, Strength of—	Rough rule for all Cordage except Coir :— Safe Working Load $= c^2$ cwts. where c = circumference in inches.	This may be increased, for good cordage, up to a maximum of $2c^2$ cwts.
	For wire ropes (hemp core). Working load $= 9c^2$ cwts.	
	For best quality steel rope with wire core this may be increased considerably. One authority gives for such ropes: Working load $= 16c^2$ cwts.	

HEADING	FORMULA	REMARKS
Elongation of Stays.		
All-wire rope	Elongation $0{\cdot}25 \times S/c^2$ %	S = load in tons.
Wire rope with one main hemp core.	,, $0{\cdot}3 \times S/c^2$ %	c = circumference in inches.
Wire rope with main hemp core, and hemp core in each strand.	,, $0{\cdot}5 \times S/c^2$ %	
Weight of Wire Rope.	Weight in lbs. per fathom = square of circumference in inches.	
Miscellaneous	1 Atmosphere = 14·7 lbs. per sq. inch. = 1 Kilogram per sq. cm. 1 Radian = 57·29° ϵ = (base of Napierian Logs.) = 2·7183. Common Log. × 2·3026 = Napierian Log.	

Strength of Materials.

	WORKING STRESS.			
	In Tension.	Compression.	Shear.	
Mild or Structural Steel.	6	6	3·7	Tons per sq. in.
Oregon Fir	1,200	1,200 with grain 300 across grain		Lbs. per sq. in. ,, ,,
Red Pine	900	800 with grain 200 across grain		,, ,, ,, ,,



Standard 5 kw. Transmitting Set.

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GLOSSARY OF TERMS

B.E.C.=Definition approved by the British Electrotechnical Committee Revised Report, 1914.

I.E.C.=Definition provisionally approved by the Sub-Committee on Nomenclature, British Committee International Electrotechnical Commission, 1908.

AERIAL.—The system of conductors designed to radiate, or absorb electromagnetic waves.

AERIAL CIRCUIT.—The circuit comprising the aerial conductors, the earth conductors, and all inductances and condensers connected between them.

AERIAL RESISTANCE.—The resistance which, multiplied by the square of the R.M.S. current in the aerial, equals the total energy dissipated by the aerial. It is the sum of the ohmic resistance of the aerial and its radiation resistance.

ÆTHER.—The medium assumed by electromagnetic theory in order to explain the translation of energy at finite speed by electromagnetic waves.

ALTERNATING CURRENT.—One which reverses its direction periodically with time.

ALTERNATOR.—A rotating machine which transforms mechanical energy into electrical energy, producing at its terminals one or more alternating E.M.F.'s (single phase or polyphase).

AMPLITUDE.—The maximum value of current or voltage attained during any half period of an alternating current or voltage is called the amplitude during that half period.

AMPLIFICATION (Magnification).—The ratio of the useful effect obtained by the employment of the amplifier to the useful effect obtained without that instrument.

AMPLIFIER OR MAGNIFYING RELAY.—One which modifies the effect of a local source of energy in accordance with the variations of received signals, and in general produces a larger indication than could be had from the incoming energy alone.

ANGULAR VELOCITY.—Of a periodic alternating current in radians per second equals 2π times the frequency in cycles per second.

ANODE.—(*a*) In an electrolytic cell. The conductor through the surface of which the current enters the liquid.

(*b*) In a primary cell. The metal (usually zinc) through which the current enters the electrolyte.

(*c*) The terminal by which the current enters a cell or other apparatus, such as a vacuum tube, etc. (B.E.C.)

ANTENNA.—See Aerial.

APERIODIC CIRCUIT.—A circuit whose resistance is large enough to prevent natural oscillations occurring, and which therefore has no definite time period.

ARC.—"A luminous discharge of electricity through a gas in which the material of one or both the electrodes is volatilised and takes part in the conduction of the current, whether continuous or alternating" (B.E.C.).

ARRESTER, EARTH.—A spark gap with a small gap and large sparking surfaces; used to protect receiving apparatus from powerful discharges.

ASYNCHRONOUS.—"A term applied to an A.C. generator or motor, the speed of which has no fixed relation to the frequency of the current" (I.E.C.).

ATMOSPHERIC ABSORPTION.—That portion of the total loss of radiated energy due to atmospheric conductivity, reflection, and refraction.

ATMOSPHERICS.—Disturbances produced in the receiving circuits, caused by electrical action in the atmosphere or in the earth's surface. They are also known as "X's," "Strays," and in the U.S.A. as "Static."

ATTENUATION.—The progressive diminution of intensity as a disturbance advances through a medium.

AUDIBILITY (MINIMUM).—The condition in which there is present in the antenna the least power required for an audible indication in the receiving telephones, with the particular apparatus employed.

AUDIBILITY FACTOR.—The ratio of the telephone current producing the receiving signals to that producing the least audible signal at the given audio frequency.

AUTO-JIGGER.—See Jigger.

AUTOMATIC RECEIVER.—A receiver which records signals so they can be translated at any convenient time after reception.

AUTOMATIC TRANSMITTER.—A transmitter which has the usual operating key replaced by any mechanical telegraph sender, such as a Wheatstone transmitter.

BALANCING AERIAL.—An aerial used in duplex wireless telegraphy. It fills a purpose similar to that of the artificial line in duplex wire telegraphy.

BATTERY.—A primary or secondary cell for producing electric current or a collection of such units.

BEAT.—When two oscillations of slightly different frequencies are impressed on an electrical circuit they periodically help and oppose each other. The result is an oscillation whose successive half periods gradually increase and decrease in amplitude with a frequency equal to the difference between the two impressed frequencies.

BRUSH DISCHARGE.—"A discharge having a feathery form, and consisting of an intermittent partial discharge which takes place from a conductor when the potential difference exceeds a certain limit, but is not high enough to cause the formation of a true spark or arc. It is always accompanied by a hissing or crackling sound" (I.E.C.). When such a discharge is being given off by a conductor the latter is said to be "Brushing."

BUZZER.—A small mechanism (usually electromagnetic) used for rapidly making and breaking an electric circuit. When connected in series with part of an oscillation electric it continually impulses the circuit, thereby producing oscillations which are convenient for testing purposes.

CAPACITY.—That property of a material system by virtue of which it is capable of storing energy electrostatically.

The capacity of a system is dependent on its geometrical dimensions, its position relative to other conductors, and the dielectric constants of the surrounding media.

Capacity is measured by the ratio of the quantity of electricity stored to the potential difference at which it is stored.

A distinctive property of a capacity is that it permits the passage of electrical energy through it only in the form of displacement currents.

CATHODE.—See Kathode.

CHARACTERISTIC CURVE.—A curve showing the variation of a property of a material or a piece of apparatus when submitted to a changing influence which produces that variation.

The characteristic curve of an arc or crystal shows the relation between the current produced and potential required to produce the current.

CHOKING COIL.—" A coil with so great a self-induction that its impedance depends chiefly on the self-induction rather than upon the resistance " (I.E.C.). Generally called a Reactance Coil in U.S.A.

CIRCUIT, CLOSED OSCILLATING.—A circuit in which the capacity and inductance are localised substantially in different places, and which has very small power of radiating electromagnetic waves.

COHERER.—A kind of detector (q.v.). An imperfect contact or collection of such contacts so arranged that when under the influence of an alternating potential it coheres and allows current from a local battery to pass and make some kind of signal.

CODE.—A system of conventional characters designed to represent letters by dots and dashes. The International Morse Code is official.

COMPASS, WIRELESS.—See Direction Finder, Wireless.

CONDENSER.—A material system possessing electrostatic capacity. Two conducting surfaces separated by a dielectric.

CONTINUOUS CURRENT.—A term recommended by the I.E.C. to supersede " direct current " as a description of " an electric current in one direction and sensibly steady or free from pulsation. Abbreviated CC."

CONDUCTION CURRENT.—A transfer of electrical energy guided by a conducting medium.

CONVECTION CURRENT.—A transfer of electrical energy by separate charged particles, unguided by any material medium.

CONTINUOUS WAVES.—The term applied to waves radiated from an aerial in which oscillations are maintained. Continuous waves may have successive half periods of equal amplitude, or the amplitude may vary within small limits without detriment to their use for wireless telegraphy.

CONVERTER, ROTARY.—A machine for converting electrical energy of one form of current to electrical energy of another form. Such as from alternating current to continuous or *vice versa*.

COUPLING.—The connection between two circuits enabling energy to be transferred from one to the other. The connection may be by

magnetic linkage, electrostatic linkage, direct connection, or any combination of these.

COUPLING, COEFFICIENT OF, in inductively coupled systems is the ratio of the mutual inductance of the two circuits to the square root of the product of the self-inductance of the circuits. The coefficient of coupling (κ) between two circuits tuned to the same frequency and then coupled, is also given by the formula :—

$$\kappa = \frac{\lambda_1^2 - \lambda_2^2}{\lambda_2^2 + \lambda_2^2}$$

where λ_1 λ_2 are the longer and shorter resulting natural wave-lengths of the coupled system.

CRITICAL RESISTANCE.—That resistance which is just sufficient to prevent free oscillation in an electrical circuit. If L inductance, C Capacity, then Critical Resistance $= \sqrt{\frac{4L}{C}}$

CRYSTAL DETECTOR.—A detector which uses the rectifying properties of the contact between a crystal and a metal surface or between two crystals.

CYMOMETER.—A " wave-measurer." See Wave-meter.

CURRENT.—The time rate of transfer of electrical quantity.

DAMPING.—The diminution of energy in an electrical circuit resulting from loss of energy.

DAMPING FACTOR (of a simple circuit).—The ratio of the effective resistance of that circuit to twice the effective inductance (the reciprocal of a time). This term applies only to circuits capable of carrying free alternating currents.

DECREMENT, LOGARITHMIC, is equal to the natural logarithm of the ratio of the amplitude of two successive half-periods.

Note.—Some investigators take the ratio of amplitude of successive half periods in the same direction.

DECREMETER.—An instrument for measuring the logarithmic decrement

DETECTOR.—That portion of the receiving apparatus which serves to transform the energy of the high frequency oscillation into a form suitable for actuating an indicator.

DIELECTRIC.—Any medium which will only allow of electric conduction to a small or negligible extent.

DIELECTRIC CONSTANT (or Specific Inductive Capacity) of a medium. The ratio of the capacity of a condenser having that medium as a dielectric to the capacity of a condenser having a vacuum dielectric, but otherwise identical. (The dielectric constant of air is substantially unity, and therefore for all practical purposes air may be used in place of the vacuum in the comparison condenser.)

DIELECTRIC HYSTERESIS.—That lagging property of a dielectric which is measured by the energy lost when the rising and falling (displacement current)—(Voltage) characteristics (dynamic) are not identical.

DIELECTRIC HYSTERETIC CONSTANT of a given dielectric. The value of the dielectric hysteresis per cycle per unit of potential gradient applied to the dielectric.

DIFFRACTION is the deviation of the direction of propagation of a wave from the normal to the wave front at the point where the waves pass the edge of an obstruction. The amount of diffraction depends on the wave-length and increases with increase of wave-length.

DIPLEX TELEGRAPHY is the simultaneous transmission or the simultaneous reception of two messages at the same station.

DIRECT COUPLING.—When one circuit is linked to another in such a way that a portion of the one forms part of the other they are said to be direct-coupled. An example is provided in the auto-jigger (*vide* Jigger), in which a portion of the inductance is common to two circuits.

DIRECTION FINDER, WIRELESS.—A receiving instrument which, in combination with a special aerial system, enables the direction of the transmitting station to be determined.

DISC DISCHARGER, ASYNCHRONOUS.—A disc discharger the speed of which has no fixed relation to the frequency of the current charging the condenser which it discharges.

DISC DISCHARGER, SYNCHRONOUS.—A disc discharger usually directly coupled to the alternator supplying power to the condenser. It may discharge the condenser, one, two, three, or more times during a half-period ; or every one, two, or more half-periods. The usual practice is to discharge once every half-period, at the moment when the condenser potential is a maximum, and the alternator current zero.

DISCHARGER.—That piece of apparatus in the primary oscillating circuit at which the spark takes place.

DUPLEX TELEGRAPHY.—Is the transmission of a message an the reception of a message simultaneously at the same station.

DISPLACEMENT CURRENT.—The electrical condition within a dielectric region of varying electric stress. It produces the same external electric and magnetic effects as the equivalent conduction current.

EARTH CONNECTION, OR "EARTH."—The connection to the earth which in most systems forms the lower extremity of the Aerial System (q.v.). It usually takes the form of a system of metal plates or wires, or a combination of both, more or less deeply buried in the ground. (U.S. equivalent, Ground.)

EDDY CURRENTS.—Those induced in conducting masses by external varying magnetic fields, the location of these currents being primarily determined by the position of the fields and not by the configuration of the conducting mass. (That is, the conducting mass is not specially arranged to provide perfectly well-defined circuits.) Such parasitic currents are also called Foucault currents.

ELECTRIC POTENTIAL is defined as the work done in carrying a unit charge of electricity from infinity to the point considered. (See Electromotive Force.)

ELECTRIC STRESS.—The cause of the electrically strained condition in the medium between two regions which are at different potentials.

ELECTROMAGNETIC WAVE.—A progressive disturbance characterised by the existence on the wave front of electric and magnetic forces acting in directions which are perpendicular to each other and to the direction of propagation of the wave.

ELECTROMOTIVE FORCE.—The force which tends to displace electricity, and is equal to the difference of potential between the points considered.

FORCED ALTERNATING CURRENT.—One produced in any circuit by the application of an alternating electromotive force.

FREE ALTERNATING CURRENT.—That produced by an isolated electrical displacement in a circuit having capacity, inductance, and less than the critical resistance.

FREQUENCY.—A term used in connection with any form of rhythmical motion or rhythmical change, denoting the number of complete movements or changes in a given time—usually a second.

FREQUENCY METER.—An instrument which indicates frequency.

FUNDAMENTAL FREQUENCY.—The lowest frequency to which an electrical circuit will resonate.

GROUP FREQUENCY.—The number of distinguishable alternating current groups occurring per second in an electrical circuit.

Note 1.—The group referred to above is, in general, mainly a free alternating current which is substantially damped to extinction before the beginning of the following group or train.

Note 2.—The pitch of the note in the receiving station is, in general, determined by the group frequency at the transmitting station.

Note 3.—The term "Group Frequency" replaces the term "Spark Frequency."

HARMONIC FREQUENCY.—The harmonics of any particular frequency are generally understood to be all higher frequencies which are odd or even multiples of the said frequency. An electrical oscillator which has uniformly distributed inductance and capacity (a straight wire nearly fulfils these conditions) will resonate to any odd or even multiple of its fundamental frequency according to whether one end is earthed or not. If the inductance and capacity are not uniformly distributed the circuit may resonate to a number of frequencies higher than its fundamental, but these higher frequencies will not necessarily bear any whole multiple relation to the fundamental frequency.

HYSTERESIS.—See Dielectric Hysteresis and Magnetic Hysteresis.

HETERODYNE.—A receiver for continuous waves using the principle of reaction between locally generated oscillations and the received oscillations in order to produce beats.

HIGH FREQUENCY RESISTANCE.—The resistance offered by a conductor to the passage of high-frequency currents.

It is always greater than the resistance for direct current because of the unequal current distribution over a section of the conductor when carrying high-frequency currents.

IMPEDANCE.—Total opposition to current flow in a circuit in which the current is varying, and is numerically equal to the square

root of the sum of the squares of the ohmic resistance and the total reactance of the circuit.

INDUCTANCE.—That property of a material system by virtue of which it is capable of storing energy electromagnetically.

The inductance of a system is dependent upon its geometrical dimensions and the permeability of the surrounding media. In hysteresis-free circuits inductance is measured by the ratio of the energy stored in the magnetic field surrounding a current-carrying conductor to the square of the current in that conductor, for stationary conditions. In any circuit, it may be measured by the interlinkage with the system itself of magnetic lines of force due to unit current passing through the system. An alternative method involves the measurement of the counter-electromotive force at the terminals of the given conductor when the current through the conductor changes at the rate of one unit of current per second. In hysteresis-free circuits these three methods of measurement yield identical results.

INDUCTION COIL.—A piece of apparatus which makes use of the phenomena of induction to transform an intermittent current of comparatively low voltage to an intermittent current of high voltage.

INDUCTIVE COUPLING.—Two circuits so arranged that some of the lines of force from one pass through the other circuit are inductively coupled.

INTERFERENCE.—The interaction of two alternating currents or of electromagnetic waves under conditions such that they oppose each other.

INTERFERENCE (IN RECEPTION).—The introduction of undesired signals, either from other stations or from Atmospherics (q.v.), into a receiver which is engaged in the reception of a message ; often referred to as " jamming."

IONISATION OF A GAS.—The breaking away from the molecules of the ions contained in them, thus rendering the gas conductive.

JAMMING.—See Interference (in Reception).

JIGGER.—The transformer used in coupled circuits. The primary and secondary form part of the primary and secondary circuits respectively. If the transformer has part of the winding common to both primary and secondary, it is called an Auto-Jigger.

KATHODE.—" (*a*) In an electrolytic cell. The conductor through the surface of which the current leaves the electrolyte.

" (*b*) In a primary cell. The conductor (generally carbon) through which the current leaves the electrolyte.

" (*c*) The electrode by which the current leaves a cell or other apparatus, such as a vacuum tube " (B.E.C.).

KEY (MANIPULATING) (OPERATING).—A switch arranged for easy manual operation.

LINE OF FORCE.—A curve described in an electric or magnetic field such that the direction of the electric or magnetic force at any point of that curve is a tangent to the curve.

MAGNETIC FIELD INTENSITY.—The number of lines of force per unit area.

MAGNETIC FORCE.—At a point. The force acting on a unit magnetic pole placed at that point. It is numerically equal to the field intensity in a medium of unit permeability.

MAGNETIC HYSTERESIS.—That property of a magnetic medium which is measured by the energy losses when the rising and falling (magnetomotive force—induction), *i.e.* (H—B), dynamic characteristics are not identical.

MAGNETOMOTIVE FORCE.—A force tending to produce a magnetic flux.

MAGNETIC DETECTOR (MARCONI'S).—A detector of oscillations depending on the effect of these on the hysteresis of iron.

MICROPHONE.—A variable resistance, usually in the form of an electrical contact, whose resistance is varied with and in a proportional manner to the movement or pressure of one part. Thus if the movement or pressure is produced by sound waves acting on a diaphram which is connected to the moving member of the microphone, an electrical current will be produced in the circuit containing the microphone and a battery, whose amplitude varies in a similar manner to the movement of the diaphram.

MUTUAL INDUCTANCE of two circuits, each on the other, is that portion of the inductance of one due to the magnetic field common to both.

NATURAL FREQUENCY.—Is the frequency with which a circuit will oscillate when supplied with energy and then left to itself. If

R = resistance
L = inductance
C = capacity
N = frequency per second

$$\text{then } N = \frac{1}{2\pi}\sqrt{\frac{1}{LC} - \frac{R^2}{4L^2}}$$

NOTE OR TONE TUNING.—A receiver is tuned to the note of the transmitter when a circuit or part of the indicator is designed to resonate to the spark frequency.

OSCILLATIONS.—See Alternating Currents, Free and Forced.

OSCILLOGRAPH.—" An apparatus for observing or recording quickly varying currents or potential differences " (B.E.C.).

PERIOD, PERIODIC TIME.—" Any varying quantity which repeats its values regularly at equal time-intervals is said to be periodic, and the time-interval of one repetition is called the periodic time or period " (B.E.C.).

PERMEABILITY of a medium.—The ratio of the magnetic flux density produced in that medium by a given magnetomotive force to the magnetic flux density produced by the same magnetomotive force in vacuum (or, for practical purposes, in air).

PHASE.—" (*a*) In an operation which recurs harmonically the stage or state to which the operation has proceeded.

" (*b*) In an operation which recurs harmonically the fraction of the whole period which has elapsed, measured from some fixed origin " (B.E.C.).

PHASE DIFFERENCE.—" The difference of phase (usually reckoned in time or in angle) between two periodic quantities which vary harmonically. Each of the circuits of a polyphase apparatus is sometimes called a phase " (B.E.C.).

PLAIN AERIAL.—An early form of transmitter in which the spark gap was placed directly in series with aerial and earth, so that the only condenser in which the energy of the transmitter could be stored was the capacity of the aerial to earth.

The term is also applied to the receiving circuit when the detector is placed directly in series with the receiving aerial and earth.

POLARISATION of a wave.—A wave is said to be plane polarised when its electric and magnetic displacements are propagated in the same plane.

When the plane of the electric and magnetic displacement rotates uniformly with time, the waves are said to be circularly or elliptically polarised.

Such waves result from the compounding of two plane polarised waves having the same frequency and line of propagation but different relative phases and polarised in different planes.

POTENTIOMETER.—An instrument for adjusting at will the potential between any two parts of a circuit.

An instrument for measuring potential difference.

POTENTIAL.—See Electrical Potential.

POWER.—The amount of work done in unit time.

POWER APPARENT.—In an alternating electric circuit this is the product volts × ampères.

POWER FACTOR.—" The ratio of the watts to the volt-ampères. In the case of voltage and current of sine form the power factor is $\cos \phi$ " (B.E.C.).

QUENCHED SPARK.—A spark whose duration is shortened by conditions at the discharger designed to rapidly increase the resistance at the spark gap is said to be " quenched."

RADIATION RESISTANCE.—The resistance which multiplied by the square of the R.M.S. current in the aerial equals the energy lost by the aerial in radiation.

REACTANCE of a circuit is a function of the inductance, capacity, and the impressed frequency.

An inductance has reactance $2\pi \times \text{frequency} \times \text{inductance}$.

A capacity has reactance

$$\frac{1}{2\pi \times \text{frequency} \times \text{capacity}}$$

An inductance in series with a capacity has reactance equal to the sum of the reactance of the inductance and the reactance of the condenser.

Under conditions of resonance in a circuit the reactance of the capacity neutralises the reactance of the inductance and the resulting reactance is zero.

RECTIFIER.—An apparatus for converting alternating or oscillating currents into continuous current, or into pulses of unidirectional current.

REFLECTION OF ELECTROMAGNETIC WAVES.—(1) When a wave impinges on a conductor its electric and magnetic energy is expended in the production of electrical oscillations therein. The oscillations expend their energy in radiating waves and in heating the conductor.

Part of the energy of the original wave, therefore, appears in the form of a wave of the same wave length radiated from the conductor, and this wave is called a reflected wave. When the dimensions of the conducting surface are large compared with the wave length the laws of reflection of electromagnetic waves are in general the same as for light.

2. When waves are being guided by a conductor, such as a wire which has a certain inductance and capacity per unit length, any abrupt change in the value of these constants (such as are produced by inserting an inductance coil, or occur at the end of the wire) causes the production of alternating potentials which result in a wave which travels along the wire in the opposite direction. This second wave is also called a reflected wave.

REFRACTION.—The change in the direction of a wave propagation when passing from one medium to another.

RELAY.—An apparatus by means of which a current, too small to perform a required work, is made to control a larger and adequate current.

RESISTANCE.—The measure of that property of a conductor by the action of which electrical energy is transformed into heat in that conductor. It is numerically equal to the ratio of the heat energy liberated per second, measured in watts, to the square of the current in the circuit, for stationary conditions; it is also equal to the ratio of the applied electromotive force to the resulting current, both being constant.

RESONANCE.—A circuit will resonate to an impressed frequency when the reciprocal of 2π times the square root of the product of inductance and capacity is equal to the impressed frequency and provided that its resistance is less than the critical resistance. Under conditions of resonance the amplitudes of successive half-periods of the resultant current gradually increase to a maximum which is dependent only on the impressed electromotive force and the resistance of the circuit.

RESONANCE CURVE.—A curve showing the relation between the current induced in an oscillatory circuit and the inducing frequency.

ROOT-MEAN-SQUARE VALUE.—R.M.S. value of an alternating or oscillating current or voltage is the value given by the square root of the mean of the squares of the successive values throughout the half-period.

In a current or voltage of strict sine-wave form (sinusoidal) the R.M.S. value is equal to the maximum multiplied by .707—*i.e.*, $(1/\sqrt{2})$. The R.M.S. value is also called the effective or virtual value.

SELECTIVITY.—The power of a receiving system to discriminate between a number of simultaneous signals.

SELF-INDUCTANCE of a circuit.—That portion of the inductance which is due to the magnetic field produced by the current in that circuit. See also Inductance.

SHOCK EXCITATION.—A name given to the method of exciting oscillations in the aerial circuit by a sudden and very short transference of energy from another circuit.

SKIN EFFECT OF VARYING CURRENTS.—The non-uniform current density through the cross-section of the conductor. It is greatest at the surface and least at the centre.

SPARK.—An electrical discharge across a gap. It may consist of one discharge in either direction, but generally consists of a number of rapid oscillatory discharges.

SPECIFIC INDUCTIVE CAPACITY.—The S.I.C. of a medium is the ratio of the capacity of a condenser, having the medium as a dielectric, to its capacity with air as the dielectric.

SYNTONY AND SYNTONISATION.—The adjustment of one circuit to another, or of one transmitter taken as a whole to one receiver taken as a whole, in such a way that their time-periods are the same and waves of a different time-period produce little or no effect on the system.

TICKER, TIKKER.—A rapid make-and-break device used in conjunction with a resonant circuit and a pair of telephones as a receiver for continuous waves. It discharges the condenser of the resonant circuit at every make. The speed of the make-and-break device has no relation to the wave frequency.

TONE WHEEL.—A high-speed commutator used as a receiver for continuous waves. It is run at a speed slightly different from the synchronous speed for the wave frequency and in effect converts the high-frequency current into a current of audible frequency.

TRAIN OF WAVES.—The waves produced by one discharge of the primary condenser.

TRANSFORMER.—A stationary induction apparatus for transferring energy from one circuit to another by the medium of magnetic energy. It may or may not transform the current into another current at different potential.

TUNER.—An apparatus made in a convenient form, which in conjunction with a detector provides all necessary circuits and adjustments for selective tuning.

TUNING—See Syntony.

UNDAMPED WAVES.—See Continuous Waves.

VALVE, FLEMING.—A detector for oscillations. It depends on the rectifying properties of the ionised space between a hot filament and a cold electrode in an exhausted vessel.

WAVE.—See Electromagnetic Wave.

WAVE LENGTH.—Twice the distance (taken in the line of propagation of the wave) between two successive points of zero disturbance. The wave length is numerically equal to the velocity of the waves (3×10^{10} cms. per sec.) divided by the frequency.

WAVE METER.—A frequency meter calibrated to read wave lengths.

DICTIONARY OF TECHNICAL TERMS

ENGLISH.	FRENCH.	ITALIAN.	SPANISH.	GERMAN.
Accumulator batteries .	Batterie d'accumulateurs	Batterie di accumulatori.	Acumuladores, Baterias de	Accumulatoren Batterie
Aerial, balancing . .	Antenne de compensation	Antenna di compensazione	Antena compensadora .	Wage Antenne
Aerial, directional . .	Antenne dirigée . .	Antenna dirigibile . .	Antena dirigida . .	Gerichtete Antenne
Aerial, direction-finder .	Antenne réception dirigée	Antenna, rivelatrice della direzione	Antena para busca de direcciones	Antenne, zur Entdeckung der Richtung
Aerial, horizontal . .	Antenne horizontale .	Antenna orizzontale .	Antena horizontal . .	Horizontaler Luftleiter
Aerial, receiving . .	Antenne de réception .	Antenna di ricezione .	Antena de recepcion .	Empfangsdraht
Aerial, transmitting . .	Antenne d'émission .	Antenna di trasmissione.	Antena de transmission .	Geberdraht (Sendeluftleiter)
Aerial, umbrella . .	Antenne en parapluie .	Antenna a forma di ombrella	Antena de paragua en forma	Schirmnetz
Ammeter, a.c. . .	Ampèremètre pour courant atternatif	Amperometro per corrente alternata	Amperimetro, c.a. . .	Wechselstromamperemeter
Ammeter, d.c. . .	Ampèremètre pour courant continu	Amperometro per corrente continua	Amperímetro, c.c. . .	Gleichstromamperemeter
Ammeter, hotwire . .	Ampèremètre à fil chaud.	Amperometro a filo caldo	Amperímetro térmico .	Hitzdrahtamperemeter
Ammeter, moving coil .	Ampèremètre d'Arsonval	Amperometro a bobina mobile	Amperímetro de bobina movil	D'Arsonvalscher Amperemeter
Angle divider . . .	Diviseur d'angle . .	Divisore di angoli . .	Divisor de Angulo . .	WinkelTrennungs-Apparat
Antenna. . . .	Antenne . . .	Antenna . . .	Antena. . . .	Luftleiter (Antenne)
Antenna, horizontal extension of	Branche horizontale de l'antenne	Fili orizzontali dell' antenna	Antena, Prolongación horizontal de la	Horizontale Verlangerungsdrahte des Luftleiters
Antenna, T-shaped . .	Antenne en T. . .	Antenna a forma di T. .	Antena en forma de T. .	T. formige Antenne
Antenna, extended T-shaped	Antenne en T. à branches horizontales prolongées	Antenna a forma di T. allungata	Antena en forma de T. prolongada	Verlängerte T. Luftleiter
Apparatus, receiving .	Appareils de réception .	Apparecchi di ricezione .	Aparatos receptores .	Empfanger
Apparatus, transmitting .	Appareils de transmission	Apparecchi di trasmissione	Aparatos transmisores .	Sender
Arrester, earth terminal .	Eclateur de mise à terre .	Morsetto par presa di terra	Estallador de toma de tierra	Unterbrochener Erdanschlusz
Arrester, lightning . .	Parafoudre . . .	Dispositivo scaricafulmine	Pararrayos . . .	Blitzschutz
Atmospherics . . .	Perturbations atmosphériques	Perturbazioni atmosferiche	Perturbaciones Atmosféricas	Luftstoerungen
Battery of Leyden jars .	Batterie de bouteilles de Leyde	Batteria di bottiglie di Leida	Bateria de Botellas de Leyden	Batterie Leydener Flaschen

	trique	mento elettrico	lador eléctrico	Antrieb
Busbars, main- . .	Barres omnibus principales	Barre collettrici principali	Barras colectoras principales	Haupt Sammelschienen
Building, station- . .	Bâtiment du poste radiotélégraphique	Fabbricato della stazione	Edificio de la estación .	Stationhaus
Buzzer	Vibrateur . . .	Vibratore . . .	Zumbador . . .	Summer
Buzzer, practice . .	Vibrateur d'apprentissage	Cicala per la pratica della ricezione a udito	Zumbador para prácti .	Ubungssummer
Capacity . . .	Capacité . . .	Capacità . . .	Capacidad . . .	Aufnahmefähigkeit
Cart, radiotelegraph .	Voiture radiotélégraphique	Carro radiotelegrafico .	Carro de radiotelegrafía .	Funkenkarren
Change of connections for receiving	Commutation pour la réception	Commutazione per ricezione	Cambio de conexiones para la recepción	Umschaltung auf Empfangen
Change of connections for transmitting	Commutation pour la transmission	Commutazione per trasmissione	Cambio de conexiones para la transmisión	Umschaltung auf Senden
Chokes, air core protecting	Bobine de réactance sans noyau de fer	Bobine di protezione a nucleo d'aria	Bobinas de reactancia, protectoras, de núcleo de aire	Impedanzspulen fur hohe Frequenz mit Luftkern
Choking coil . . .	Bobine d'impédance .	Rocchetto d'autoinduzione	Bobina de reactancia .	Drosselspule
Circuit breaker and closer.	Disjoncteur et conjoncteur automatique . .	Interruttore . . .	Interruptor con apertura y cierre automáticos	Strom - unterbrecher und Strom-schliesser
Circuit, closed oscillating .	Circuit oscillant fermé .	Circuito oscillante chiuso.	Circuito oscilante cerrado	Geschlossener Erregerkreis
Circuit, intermediate .	Circuit intermédiaire .	Circuito intermedio .	Circuito intermedio .	Zwischenkreis
Circuit, open radiating .	Circuit radiant ouvert .	Circuito radiante aperto .	Circuito radiador abierto	Offener Strahlungskreis
Circuit, oscillatory . .	Circuit oscillatoire . .	Circuito oscillante . .	Circuito oscilante .	Schwingungskreis
Coherer	Cohereur . . .	Ricevitore a coherer .	Cohesor . . .	Fritterempfänger
Coil, syntonising . .	Inductance de syntonisation	Rocchetto di sintonizzazione	Bobina de sintonización .	Abstimmspule
Commutator . . .	Commutateur . .	Commutatore . .	Conmutador . . .	Stromwender
Commutator (of Dynamo)	Collecteur . . .	Collettore . . .	Colector . . .	Stromwender
Condensers . . .	Condensateurs . .	Condensatori. . .	Condensadores . .	Kondensatoren
Condenser, adjustable .	Condensateur règlable .	Condensatore regolabile .	Condensador variable .	Variabler Kondensator
Condenser, adjustable disc	Condensateur à disque .	Condensatore a disco regolabile	Condensador de disco, variable	Drehkondensator
Condenser, aerial tuning .	Condensateur de syntonisation d'antenne	Condensatore per la sintonizzazione dell' antenna	Condensador de sintonización de la antena	Kondensator zur Luftleiterabstimmung
Condenser, air . .	Condensateur à air .	Condensatore ad aria .	Condensador de dialéctrico de aire	Luftkondensator
Condenser, calibration .	Condensateur étalon .	Condensatore per tarature	Condensador para calibración	Eichungskondensator
Condenser, circuit . .	Circuit du condensateur.	Circuito del condensatore	Condensador, Circuito de	Kondensatorkreis
Condenser, intermediate circuit	Condensateur du circuit intermédiaire	Condensatore per il circuito intermedio	Condensador del circuito intermedio	Kondensator im Zwischenkreis

Dictionary of Technical Terms—*Continued*

English.	French.	Italian.	Spanish.	German.
Condenser, secondary circuit	Condensateur du circuit secondaire	Condensatore per il circuito secondario	Condensador del circuito secundario	Kondensator im Secundärkreis
Condenser, short wave	Condensateur de raccourcissement	Condensatore per onda corta	Condensador de onda corta	Verkürzungskondensator
Condenser-system	Système de condensateur	Sistema di condensatori	Sistema de Condensadores	Kondensatorsystem
Condensers, test-tube	Condensateurs à tube	Condensatori tubolari	Tubo para erisayo de condensadores	Kondensator Prüfröhre
Condenser, twin-coupled	Condensateur jumelé	Condensatore a doppio accoppiamento	Condensador de doble acoplamiento	Kondensator, doppelt geschaltete
Condensers, variable	Condensateurs réglables	Condensatori variabili	Condensadores variables	Variablerkondensatoren
Converter	Commutatrice	Convertitore	Convertidor	Drehumformer
Continuous wave	Onde non-amortie	Onda continua	Onda continua	Kontinuierlische Welle
Continuous wave receiver	Recepteur pur ondes non-amorties	Ricevitore d' onde non smorzate	Receptor para onda continua	Empfanger fuer kontinuierlische Welle
Coupling	Couplage	Accoppiamento	Acoplamiento	Kopplung
Couplings, flexible and insulating	Manchons d'accouplement souples et isolants	Accopiamenti elastici ed isolanti	Acoplamientos flexibles y aisladores	Biegsame und isolierende Verbindungen
Current, alternating	Courant alternatif	Corrente alternata	Corriente alterna	Wechselstrom
Current, direct	Courant continu	Corrente continua	Corriente continua	Gleichstrom
Current, primary alternating	Courant alternatif primaire	Corrente alternata del circuito primario	Corriente alterna primaria	Primär Wechselstrom
Cut-out, automatic	Interrupteur automatique	Interruttore automatico	Interruptor automático	Selbstunterbrecher
Cymometers	Cymomètres	Cimometri	Cimómetro	Wellenmesser
Damper	Sourdine	Sordina	Amortiguador	Dämpfer
Damping, high	Amortissement élevé	Forte smorzamento	Amortiguamiento, Gran	Grosse Dämpfung
Decremeter	Décrémètre	Decrimetro	Decrémetro	Dekremeter (Dämpfungsmesser)
Detector, crystal	Détecteur à cristal	Rivelatore di onde a cristallo	Detector de cristal	Krystalldetektor
Detector, balanced crystal	Détecteur à cristal équilibré	Rivelatore a cristalli compensati	Detector de cristal compensador	Wellenanzeiger, bilanzierten Kristall
Detector, Fleming valve	Récepteur à valve d'oscillation " Fleming "	Rivelatore di onde con valvola di Fleming	Detector de Válvula, Fleming	Prof. Fleming's Valve-Empfänger
Detector, magnetic	Détecteur magnétique	Rivelatore di onde magnetico	Detector magnético	Marconi-Magnetdetektor
Detector, thermo-electric	Détecteur thermo-élec-	Rivelatore di onde termo-	Detector termoeléctrico	Thermo-elektrischer-

Discharger, asynchronous	Eléateur asynchrone	Scaricatore asincrono	Descargador asincrono	Scheibenfunkenstrecke, asynchron
Discharger, disc, high-speed	Eclateur à disque à grande-vitesse	Scaricatore a disco ad alta velocitá	Descargador de disco de gran velocidad	Schnell rotierende Scheibenfunkenstrecke
Discharger, disc, smooth	Eclateur à disque uni	Scaricatore a disco a contorni lisci	Estallador de disco liso	Rotierende Scheibenfunkenstrecke-glatt
Discharger, disc, studded	Eclateur à disque—muni de prisonniers lateraux	Scaricatore a disco con punte	Estallador de disco dentado	Rotierende Scheibenfunkenstrecke mit Zähne
Discharger, fixed	Eclateur fixe	Scaricatore fisso	Descargador fijo	Scheibenfunkenstrecke, fixierter
Discharger, micrometric spark	Eclateur à étincelle micrométrique	Scaricatore per la produzione di scintilla micrometrica	Estallador de chispa micrométrica	Mikrometerfunkenstrecke
Discharger, side electrodes	Eclateur à électrodes laterales	Scaricatore con elettrodi laterali	Descargador, electrodos laterales del	Scheibenfunkenstrecke, Seiten electroden
Discharger, synchronous	Eclateur synchrone	Scaricatore sincrono	Descargador sincrono	Scheibenfunkenstrecke, synchron
Duplex telegraphy	Télégraphe duplex	Telegrafia duplex	Telegrafia duplex	Duplex Telegraphie
Earth connection	Connexion de terre	Messa a terra	Conexión de tierra	Erd Verbindung
Efficiency	Rendement	Rendimento	Rendimiento	Wirkungsgrad
Frequency, high	Haute fréquence	Alta frequenza	Frecuencia, alta	Hochfrequenz
Frequency, low	Basse fréquence	Bassa frequenza	Frecuencia, baja	Niedfrequenz
Frequency meter	Fréquencemètre	Frequenziometro	Frecuencímetro	Frequenzmesser
Generating plant	Générateur	Impianto generatore	Instalación generadora	Stromanlage
Generator, c.c.	Dynamo	Generatore di corrente continua	Generador de corriente contínua	Dynamo (Gleichstrom)
Hammer-break, magnetic	Interrupteur à marteau	Interruttore magnetico a martello	Interruptor magnético de martillo	Magnetischer Hammerunterbrecher
Inductance, aerial	Inductance d'antenne	Induttanza dell' antenna	Inductancia de antena	Antenneninduktanz
Inductance, aerial tuning	Inductance à syntoniser le circuit de l'antenne	Induttanza per la sintonizzazione dell' antenna	Inductancia de sintonización de la antena	Induktanz zum Syntonisieren der Antenne
Inductance, low frequency	Bobine d'inductance du circuit à basse fréquence	Induttanza per il circuito a bassa frequenza	Inductancia del circuito de baja frecuencia	Induktanzspule niedriger Frequenz
Inductance, primary	Inductance primaire	Induttanza per circuito primario	Inductancia primaria	Primärinduktanz

Dictionary of Technical Terms—*Continued*

English.	French.	Italian.	Spanish.	German.
Inductance, primary syntonising	Inductance primaire de syntonisation	Induttanza sintonizzatrice del circuito primario	Inductancia primaria de sintonización	Primärinduktanz zum Abstimmen
Inductance, variable primary syntonising	Inductance primaire variable de syntonisation	Induttanza, sintonizzatrice del circuito primario, regolabile	Inductancia variable de sintonización del primario	Veränderliche Primärinduktance zum Abstimmen
Induction coil. . .	Bobine d'Induction .	Rocchetto d'induzione .	Bobina de inducción .	Rhumkorffscher Funkeninduktor
Inkwriter, Morse . .	Appareil Morse enregistreur	Ricevitore scrivente Morse	Aparto Morse registrador	Schreibempfänger
Insulation . . .	Isolation . . .	Isolamento . . .	Aislamiento . . .	Isolierung
Insulator, leading-in .	Isolateur d'entrée . .	Isolatore d'entrata. .	Aislador de entrada .	Isolator, Einfuehrungs
Insulator, flexible . .	Isolateur souple . .	Isolatore, elastico . .	Aislador flexible . .	Flexibler Isolator
Insulator, receiving . .	Isolateur de réception .	Isolatore dell' antenna di recezione	Aislador para circuito receptor	Isolator fur den Empfangsdraht
Insulator, transmitting .	Isolateur de transmission	Isolatore dell' antenna di transmissione	Aislador para circuito transmisor	Isolator fur die Senderantenne
Interrupter . . .	Rupteur . . .	Interruttore . . .	Interruptor . . .	Unterbrecher
Interrupter, current- .	Rupteur de courant .	Interruttore di corrente .	Interruptor de corriente .	Stromunterbrecher
Interrupter, electrolytic .	Rupteur électrolytique .	Interruttore elettrolitico.	Interruptor electrolítico .	Wehnelt Unterbrecher
Interrupter, turbine .	Turbo-rupteur à mercure	Interruttore a turbina .	Interruptor de turbina .	Quecksilberturbinenunterbrecher
Jigger	Transformateur d'oscillations	Transformatore delle correnti oscillatorie	"Jigger" . . .	Jigger, Selbst-induktion des Erregerkreises
Jigger, balanced . .	Jigger compensé . .	Transformatore ad alta frequenza compensato	Jigger compensador .	Jigger, bilanzierter
Jigger, primary . .	Primaire de transformateur d'oscillation	Circuito primario del transformatore delle correnti oscillatorie	"Jigger," primario del .	Primär-Jigger
Jigger, secondary . .	Secondaire de transformateur d'oscillation	Circuito secondario del transformatore delle correnti oscillatore	"Jigger," secundario del	Sekundär-Jigger
Key-sending . . .	Manipulateur . .	Tasto manipolatore di trasmissione	Manipulador . .	Taste
Leyden jar	Bouteille de Leyde	Bottiglia di Leida . .	Botella de Leyden .	Leydener Flasche

Leyden jar, battery of	Batterie de bouteilles de Leyde	Batteria di bottiglie di Leida	Botellas de Leyden, Bateria de	Batterie Leydener Flaschen
Lamp, tuning—and choke	Lampe de sintonisation avec bobine de réactance	Lampada di sintonizzazione con bobina	Lámpara de sintonización y de reactancia	Syntonisierlampe mit Impedanz
Lightning arrester. (*See* Arrester, lightning)				
Mast, portable	Mât, portatif	Albero, portatile	Mástil, portátil	Tragbarer Mast
Masts, steel sectional	Mâts d'acier à sections	Albero di acciaio diviso in sezioni	Mástil de secciones de acero	Stahlmasten in Teilen
Mast, telescopic	Mât, télescopique	Albero telescopico	Mástil telescópico	Teleskopmast
Microphone apparatus	Appareil microphone	Apparecchio microfonico	Aparato microfónico	Microphon-Apparat
Micrometer, spark	Micromètre à étincelle	Micrometro per Scintilla	Micrometro de chispa	Funkenmikrometer
Motor alternator disc set	Groupe moteur alternateur avec éclateur à disque	Gruppo convertitore con scaricatore a disco	Grupo de motor, alternador con estallador de disco	Wechselstromgenerator kombiniert mit Rotierende Funkenstrecke
Multiple transmission and reception	Transmission et réception multiples	Transmission e Ricezione multipla	Transmisión y recepción múltiple	Vielfach Übermittlung und Empfang
Oscillations, electric	Oscillations électriques	Oscillazioni elettriche	Oscilaciones eléctricas	Elektrische-Schwingungen
Overload	Surcharge	Sovraccarica	Sobrecarga	Überlast
Plant, radiotelegraphic	Installation radiotélégraphique	Impianto radiotelegrafico	Instalación radiotelegráfica	Radiotelegraphische Anlage
Potentiometer	Potentiomètre	Potenziometro	Potenciómetro	Potentiometer
Radiogoniometer	Radiogoniomètre	Radiogoniometro	Radiogonometro	Radiogoinometer
Range	Portée	Portata	Alcance	Reichweite
Receiver	Appareil récepteur	Apparecchio ricevitore	Receptor	Empfänger
Receiver arrangement	Dispositif de réception	Dispositivo di ricezione	Dispositivo de recepcion	Empfangsvorrichtung
Receiver, balanced	Récepteur compensé	Rivelatore compensato	Receptor compensador	Empfanger, bilanzierter
Receiver, flexible	Récepteur souple	Ricevitore flessibile	Receptor flexible	Empfänger
Receiver, vacuum valve	Récepteur à valve d'oscillation	Ricevitore con valvola a vuoto	Receptor de válvula de vacio	Vakuum ventil Empfänger
Rectifiers	Rectificateurs	Raddrizzatori di corrente	Rectificador	Ausgleicher
Relay	Relais	Soccorritore	Relevador	Relais
Relay H.T.	Relais pour haute tension	Soccorritore ad alta tensione	Relevador A.T.	Hochspannungrelais
Relay magnets	Aimants du relais	Magneti di soccorritore	Imanes del relevador	Relais-magnete
Resistance, high	Haute résistance	Alta resistenza	Resistencia, alta	Hoher Widerstand
Resistance, low	Basse résistance	Bassa resistenza	Resistencia, baja	Niedriger Widerstand
Resistance, starting	Rhéostat de démarrage	Reostato di avviamento	Reostato de arranque	Anlasser
Resistance regulating	Rhéostat de champ	—	Resistencia de regulación	Regulierwiderstand

Dictionary of Technical Terms—*Continued*

English.	French.	Italian.	Spanish.	German.
Room, accumulator (battery)	Salle des accumulateurs	Stanza per la batteria di accumulatori	Sala de acumuladores (Batería)	Akkumulatorenraum
Room, operating	Salle de manipulation et réception	Ufficio radiotelegrafico	Sala telegráfica	Bedienungszimmer fur die Drahtloseinstallation
Room, transmitting	Chambre des appareils de transmission	Locale di trasmissione	Sala de manipulacion	Senderraum
Saddles, pack	Selles de paquetage	Basti	Bastes	Packsattel
Screening box	Boîte de garde	Cassetta di protezione	Caja de resguardo	Schutzkasten
Series rheostat	Rhéostat en serie	Reostato in serie	Reostato en serie	Serien Widerstand
Ship station	Station de bord	Stazione navale	Estación de á bordo	Schiffstation
Short circuiting device	Dispositif de mise en court circuit	Dispositivo di messa in corto circuito	Dispositivo de corto circuito	Kurzschliesser
Shunt, highly inductive	Shunt à pouvoir inductif élevé	Shunt ad alta induzione	Shunt altamente inductivo	Shunt mit hohe Selbstinduktion
Shunt, non-inductive	Shunt, non-inductif	Circuito in derivazione non-induttivo	Shunt, no inductivo	Nebenschlusz nduktionsfreier
Signals, balancing	—	Segnali equilibrati	Señales compensadores	Balanciersignale
Signals, telephone	Signaux téléphoniques	Segnali del telefono	Señales telefónicas	Telephonsignale
Span	Haubanage	Campata	Tirante	Abspannung
Spark	Etincelle	Scintilla	Chispa	Funke
Spark coil, with hammer-break	Bobine d'induction à interrupteur à marteau	Rochetto d'induzione a martello	Bobina de chispa con interruptor de martillo	Funkeninduktor mit Hammerunterbrecher
Spark gap	Eclateur à étincelle	Oscillatore	Estallador de chispa	Funkenstrecke
Spark gap, micrometric	Eclateur à intervalle micrométique	Oscillatore micrometrico	Estallador micrometrico	Micrometer Funkenstrecke
Spark micrometer	Micromètre à étincelles	Micrometro di scintilla	Micrómetro de chispa	Funkenmikrometer
Spark gap, multiple	Eclateur en série	Oscillatore multiplo	Estallador de chispa múltiple	Unterteilte Funkenstrecke
Spark gap, quenched	Eclateur pour étincelle étouffée	Spinterometro per oscillazioni smorzate	Descargador de chispa extinguida	Gedaempfte Funkenstrecke
Spark quenched	Etincelle étouffée	Scinti a smorzata	Chispa extinguida	Löschfunke
Sparking distance	Distance explosive	Distanza esplosiva	Distancia explosiva	Funkenstrecke
Starter, automatic	Démarreur, automatique	Avviatore automatico	Reostato de arranque, automático	Selbstanlasser
Starter, combined with shunt regulator	Rhéostat de démarrage avec rhéostat de champ	Reostato di avviamento combinato con regolatore in derivazione	Reostato de arranque y regulador de campo combinados	Anlasswiderstand mit Nebenschlussregler

Starter, single-phase	Démarreur monophasé	Avviatore per corrente monofase	Reostato de arranque monofásico	Einphasenanlasser
Starter, three-phase	Démarreur tri-phasé	Acciatore per corrente trifase	Reostato de arranque trifásico	Dreiphasenanlasser
Station, aeroplane	Aéroplane (poste d')	Stazione per aeroplano	Estación para aeroplano	Flug-zeug Station
Station, airship	Station de ballon dirigeable	Stazione per aeronave	Estación para globos dirigibles	Luftschiffstation
Station, cart type	Station du type sur voiture	Stazione del tipo su carri	Estación tipo de carros	[station Karren station. Fahrbar-
Station, cavalry	Poste de cavalerie	Stazione per cavalleria	Estación de cavalería	Kavalleriestation
Station, high-power	Station à grande puissance	Stazione di grande potenza	Estación de gran potencia	Kraftstation
Station, knapsack	Poste d'havresac	Stazione da zaino	Estación de mochilas	Tornisterstation
Station, landing	Poste de débarquement	Stazione da sbarco	Estación de desembarco	Landungsstation
Station, long-distance	Poste de grandes distances	Stazione ultrapotente	Estación de gran alcance	Radiotelegraphische Grossstation
Station, portable	Station portative	Stazione portatile	Estación portátil	Tragbarestation
Station, portable military	Poste militaire transportable	Stazione militaire mobile	Estación militar portátil	Tragbare Militärstation
Station, radiotelegraph	Poste radiotélégraphique	Stazione radiotelegrafica	Estación radiotelegráfica	Funkenamt
Station, small-power	Station à faible puissance	Stazione di piccola potenza	Estación de pequeña potencia	Kleinstation
Swiss commutator	Commutateur suisse	Commutatore tipo svizzero	Conmutador suizo	Schweizerische Kommutator
Switch, aerial change-over	Commutateur d'antenne	Commutatore dell'antenna	Conmutador para cambio de hilos de antena	Luftdrahtumschalter
Switch, aerial heating	Commutateur, échauffement d'antenne	Interruttore per riscaldamento dell'antenna	Conmutador de seguridad contra calentamiento de la antena	Umschalter zum heizen der Antenne
Switch, automatic	Interrupteur automatique	Interruttore automatico	Interruptor automático	Selbsttaetiger Schalter
Switch, automatic field break	Interrupteur automatique d'excitation	Interruttore automatico ad eccitazione	Interruptor automático del campo	Selbsttaetiger Magnet-ausschalter
Switch, carbon break	Interrupteur à contacts de charbon	Interruttore a carbone	Interruptor con contactos de carbón	Kohlenschalter
Switch, change-over	Commutateur	Commutatore	Conmutador	Umschalter
Switch, change-tune	Commutateur de longeurs d'ondes	Commutatore di sintonizzazione	Conmutador de sintoinzacion	Wellenumschalter
Switch, charging	Interrupteur de charge	Interruttore di carica	Conmutador de carga	Ladeschalter
Switch, combined fuse and	Interrupteur avec coupe circuit	Fusibile ed interruttore combinati	Interruptor con fusible	Schalter und Sicherung-kombiniert
Switch, double-bladed knife	Interrupteur bipolaire à lames	Interrutore doppio a coltello	Interruptor de cuchillo, bipolares	Doppelmesserschalter
Switch, double-pole	Interrupteur bipolaire	Interrutore bipolare	Interruptor bipolar	Zweipoliger Schalter
Switch, double pole, double throw	Commutateur bipolaire à deux directions	Interruttore bipolare a doppio effetto	Conmutador bipolar de dos posiciones	Zweipoliger Umschalter
Switchboard, d.c. and a.c.	Tableau de distribution pour courant continu et alternatif	Quadro di distribuzione per corrente continua ed alternata	Cuadro de distribución de c.a. y c.c.	Schalttafel fuer Gleich und Wechselstrom

Dictionary of Technical Terms—*Continued*

English.	French.	Italian.	Spanish.	German.
Switch, field-break	Interrupteur de l'excitation	Interruttore ad eccitazione	Interruptor del campo	Magnetausschalter
Switch, high-tension	Interrupteur pour haute tension	Interruttore per alta tensione	Interruptor de alta tensión	Hochspannungschalter
Switch, high-tension remote control	Tèlèinterrupteur pour haute tension	Interruttore ad alta tensione comandato a distanza	Teleinterruptor de alta tensión	Hochspannungsfernschalter
Switch, knife	Interrupteur unipolaire a lames	Interruttore a coltello	Interruptor de cuchillo	Messerschalter
Switch, main	Interrupteur principal	Interruttore principale	Interruptor principal	Hauptschalter
Switch, oil-break	Interrupteur à bain d'huile	Interruttore ad olio	Interruptor con baño de aceite	Oelschalter
Switch, press (toggle)	Interrupteur à pression	Interruttore a pressione	Interruptor de tornillo	Druckschalter
Switch, quick-break	Interrupteur à rupture brusque	Interruttore a scatto rapide	Interruptor de rotura brusca	Momentschalter
Switch, single-pole	Interrupteur unipolaire	Interruttore unipolare	Interruptor monopolar	Einpoligerschalter
Switch, three-phase	Interrupteur pour courant tri-phasé	Interruttore tripolare	Interruptor trifásico	Drehstromschalter
Switch, three-way	Commutateur à trois directions	Commuttatore a tre vie	Conmutador de tres pasos	3 Wege Umschalter
Switch, voltmeter	Interrupteur du voltamètre	Interruttore per voltometro	Interruptor para voltimetro	Voltmeterumschalter
Switch, wave-changing	Commutateur pour changement de longeur d'onde	Commutatore d'onda	Conmutador de cambio de onda	Wellen Umschalter
Syntonisation	Syntonisation	Sintonizzazione	Sintonización	Abstimmung.
Syntonised wireless telegraphy	Télégraphie sans fil syntonisée	Radiotelegrafia sintonica.	Telegrafia sin hilos sintonizada	Abstimmbare Drahtlose-telegraphie
Table, operating	Table de manipulation	Tavola per il servizio radio-telegrafico	Mesa de aparatos	Radiotelegrafischer Bedienungstisch (Apparattisch)
Tapper	Frappeur	Decoherer	Decohesor de martillo	Klopfer
Telegraphy, directional wireless	Radiotélégraphie dirigée.	Radiotelegrafia a sistema dirigibile	Telegrafia sin hilos dirigida	Gerichtete Drahtlose Telegraphie
Transformer	Transformateur	Transformatore	Transformador	Transformator
Transformer, high-frequency oscillation	Transformateur d'oscillation à haute fréquence	Transformatore delle correnti oscillatorie ad alta frequenza	Transformador de oscilaciones de alta frecuencia	Umformer fuer Hochfrequenzschwingungen
Transformer, oscillatory	Transformateur d'oscillation	Transformatore delle correnti oscillatorie	Transformador oscilatorio	Oscillationsumformer

Transmitting arrangement	Dispositif d'emission	Dispositivo di transmissione	Dispositivo de transmision	Senderanordnung
Transmitter cavalry	Transmetteur pour cavalerie	Transmettitore di stazione per cavalleria	Transmisor para estación de cavaleria	Kavalleriesendeapparat
Transmitter, inductive	Transmetteur à couplage inductif	Transmettitore ad accopiamento induttivo	Transmisor de acoplamiento de induccion	Gekoppelte Sender
Transmitter, sharply-tuned	Transmetteur à syntonisation aiguë	Transmettitore acutamente sintonizzato	Transmisor de sintonización aguda	Scharf abgestimmte Sender
Transmitter, simple (P.A.)	Dispositif d'emission directe	Transmettitore semplice	Transmisor sencillo	Einfacher Sender
Tremblers	Trembleurs	Interruttore a martello	Tembladores	—
Trembler, cantilever	—	—	Temblador de canecillo	
Trench, covered in for wiring	Canalisation souterraine	Fossa coperta per cavi elettrici	Zanja cubierta para cables	Abgedeckter Kabelgraben
Tube, ebonite	Tube en ébonite	Tubo di ebanite	Tubo de ebonita	Ebonitroehre
Tuning	Syntonisation	Sintonizzazione	Sintonización	Abstimmen
Tuning, flat	Syntonisation non aiguë	Sintonizzazione piana	Sintonización aplastada	Unscharfes Abstimmen
Tuner, multiple	Syntonisateur multiple	Sintonizzatore multiplo	Sintonizador múltiple	Vielfach Abstimmapparat
Tuning, note	Hauteur de la note	Sintonizzazione della nota	Sintonización de la nota	Tonhöhe der Abstimmung
Tuning, note and wave	Note et onde de syntonisation	Sintonizzazione della nota e dell' onda	Sintonización de la nota y de la onda	Abstimmen von Tonhöhe und Welle
Tuning wave	Onde de syntonisation	Sintonizzazione della onda	Sintonización de la onda	Welle der Abstimmung
Undamped wave. (*See* Continuous wave)				
Valve	Valve	Valvola	Válvula	Ventil
Valve, vacuum	Valve à vide	Valvola a vuoto	Válvula de vacio	Vakuumventil
Voltage	Voltage	Potenziale	Voltaje	Spannung
Voltmeter, a.c.	Voltmètre pour courant alternatif	Voltometro per corrente alternata	Voltímetro c.a.	Voltmeter fur Wechselstrom
Voltmeter, aperiodic	Voltmètre apériodique	Voltometro aperiodico	Voltímetro aperiodico	Aperiodisches Voltmeter
Voltmeter, d.c.	Voltmètre pour courant continu	Voltometro per corrente continua	Voltímetro c.c.	Voltmeter fuer Gleichstrom
Voltmeter, hotwire	Voltmètre à fil chaud	Voltometro a filo caldo	Voltímetro térmico	Hitzdrahtvoltmeter
Voltmeter, switch	Interrupteur de voltmètre	Interruttore per voltometro	Voltímetro, interruptor para	Voltmeterumschalter
Wagon apparatus	Voiture portant les appareils	Carro per gli apparecchi	Aparatos sobre carros	Apparatekarren
Wagon, dynamo	Voiture portant le générateur	Carro per il generatore	Dinamo sobre carros	Kraftkarren-Kraftwagen
Wavelength	Longueur d'onde	Lunghezza d'onda	Longitud de onda	Wellenlaenge
Wavemeter	Ondemètre	Ondametro	Ondámetro	Wellenmesser
Waves, radiation of	Radiation des ondes	Irradiamento di onde	Radiación de las ondas	Ausstrahlung der Wellen

USEFUL DATA

WEIGHTS AND MEASURES

AVOIRDUPOIS WEIGHT.

drachms.	oz.	lbs.	qrs.	cwts.	ton.	French grammes.
1 =	·0625 =	·0039 =	·000139 =	·000035 =	·00000174 =	1·771846
16 = 1		= ·0625 =	·00223 =	·000558 =	·000028 =	28·34954
256 = 16	= 1		= ·0357 =	·00893 =	·000447 =	453·59
7168 = 448	= 28	= 1		= ·25 =	·0125 =	12,700
28672 = 1792	= 112	= 4		= 1 =	·05 =	50,802
573440 = 35840	= 2240	= 80		= 20 =	1 =	1,016,048

TROY WEIGHT.

grains.	dwts.	oz.	lb.	French grammes.
1 =	·04167 =	00208 =	·0001736 =	·0648
24 = 1	=	·05 =	·004167 =	1·555
480 = 20	= 1		= ·0833 =	31·1035
5760 = 240	= 12		= 1 =	373·242

7000 grains troy = 1 lb. avoirdupois.
175 lbs. troy = 144 lbs. avoirdupois.
lbs. avoirdupois × 1·2153 = lbs. troy.
lbs. troy × ·82286 = lbs. avoirdupois.

LONG MEASURE.

ins.	feet.	yards.	fath.	poles.	furl.	mile.	French metres.
1 = ·083	= ·02778 =	·0139 =	·005 =	·000126 =	·0000158 =		·0254
12 = 1	= ·333	= ·1667 =	·0606 =	·00151 =	·0001894 =		·3048
36 = 3	= 1	= ·5 =	·182 =	·00454 =	·000568 =		·9144
72 = 6	= 2	= 1 =	·364 =	·0091 =	·001136 =		1·8287
198 = 16½	= 5½	= 2¾ =	1 =	·025 =	·003125 =		5·0291
7920 = 660	= 220	= 110 =	40 =	1 =	·125 =		201·16
63360 = 5280	= 1760	= 880 =	320 =	8 =	1 =		1609·315

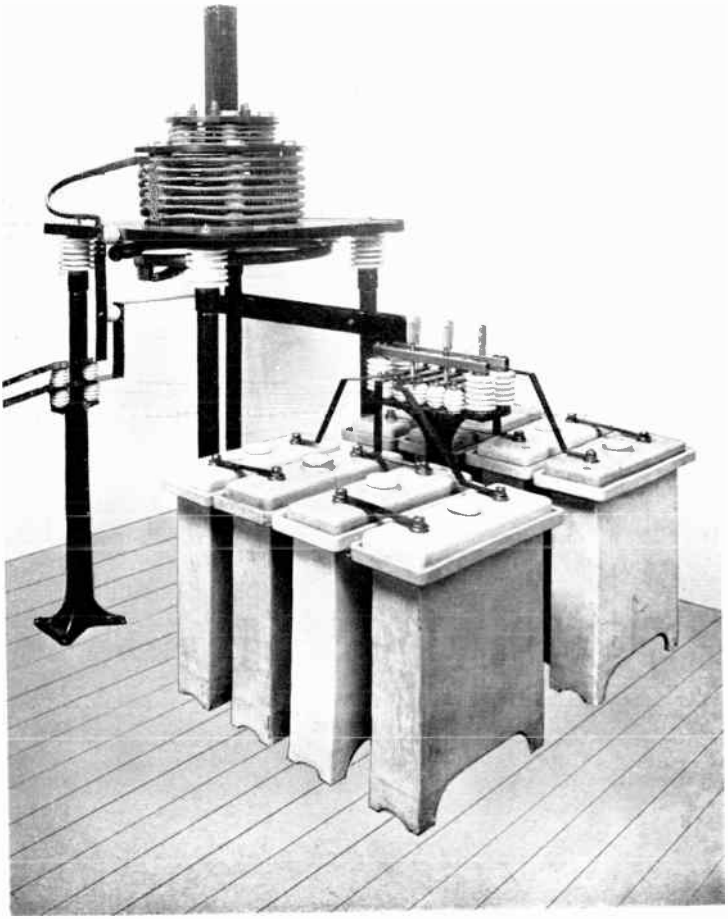
MEASURE OF CAPACITY.

pints	gall.	peck.	bushel.	quarter.	wey.	last.	cub. ft.	litres.
1 = ·125 =	·0625 =	·01562 =	·00195 =	·00039 =	·000195 =		·02 =	·5676
8 = 1	= ·5	= ·125 =	·0156 =	·00312 =	·00156 =		·1604 =	4·543
16 = 2	= 1	= ·25 =	·03125 =	·00625 =	·00312 =		·3208 =	9·082
64 = 8	= 4	= 1 =	·125 =	·025 =	·0125 =		1·283 =	36·32816
512 = 64	= 32	= 8	= 1 =	·2 =	·1 =		10·264 =	290·625
2560 = 320	= 160	= 40	= 5 =	1 =	·5 =		51·319 =	1453·126
5120 = 640	= 320	= 80	= 10 =	2 =	1 =		102·64 =	2906·25

1 gallon in wine, ale, or dry measure
= 277¼ cubic inches = ·16 cubic foot
= 10 lbs. of distilled water =
Cube feet × 6·2355 = gallons.
Cube ins. × ·003607 = gallons.
1 bushel = 2218·19 cube inches = 1·28 cube foot.
Cube feet = ·78 = bushels.
Cube ins. × ·00045 = bushels.

SQUARE OR SURFACE MEASURE.

144 square inches = 1 square foot.
9 square feet = 1 square yard.
30¼ square yards = 1 square rod or perch.
40 square rods = 1 rood.
4 roods = 1 acre (4,840 square yards).
640 acres = 1 square mile (3,097,600 square yards).



Condensers and Jigger of 5 kw. Land Station

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METRIC SYSTEM OF WEIGHTS AND MEASURES.

The Metric System is based upon the estimated length of the fourth part of a terrestrial meridian. The ten-millioneth part of this arc is called a *Metre*, and is the unit of length. The cube of the tenth part of the metre was adopted as the unit of capacity, and denominated a *Litre*. The weight of a litre of distilled water at its greatest density was called a *Kilogramme*, of which the thousandth part, or *Gramme*, was adopted as the unit of weight. The multiples of these, proceeding in decimal progression, are distinguished by the employment of the prefixes *deca*, *hecto*, *kilo*, and *myria*, and the subdivisions by *deci*, *centi*, and *milli*.

MEASURES OF LENGTH (UNIT METRE).

Equal to	Inches.	Feet.	Yards.	Miles
Millimetre	0·039 ...	0·003 ...	0·001 ...	0·000
Centimetre	0·393 ...	0·032 ...	0·010 ...	0·000
Decimetre	3·937 ...	0·328 ...	0·109 ...	0·000
Metre	39·370 ...	3·280 ...	1·093 ...	0·000
Decametre	393·707 ...	32·808 ...	10·936 ...	0·006
Hectometre	3937·079 ...	328·089 ...	109·363 ...	0·062
Kilometre	39370·790 ...	3280·899 ...	1093·633 ...	0·621

CUBIC, OR MEASURES OF CAPACITY (UNIT LITRE).

Equal to	Cubic inches.	Cubic feet.	Pints.	Gallons.
Millilitre, or cubic centimetre	0·061	0·000 ...	0·001 ...	0·000
Centilitre, 10 cubic centimetres	0·610 ...	0·000 ...	0·017 ...	0·002
Decilitre, 100 cubic centimetres	6·102 ...	0·003 ...	0·176 ...	0·022
Litre, or cubic decimetre ...	61·027 ...	0·035 ...	1·760 ...	0·220
Decalitre, or centistere ...	610·270 ...	3·353 ...	17·607 ...	2·200
Hectolitre, or decistere ...	6102·705 ...	3·531 ...	176·077 ...	22·009
Kilolitre, or stere, or cub. met.	61027·051 ...	35·316 ...	1760·773 ...	220·096

MEASURES OF WEIGHT (UNIT GRAMME).

Equal to	Grains.	Avoirdupois lb.	Cwt. = 112 lb.	Tons = 20 cwt
Milligramme ...	0·015 ...	0·000 ...	0·000 ...	0·0000
Centigramme ...	0·154 ...	0·000 ...	0·000 ...	0·0000
Decigramme ...	1·543 ...	0·000 ...	0·000 ...	0·0000
Gramme ...	15·432 ...	0·002 ...	0·000 ...	0·0000
Decagramme ...	154·323 ...	0·022 ...	0·000 ...	0·0000
Hectogramme ...	1543·234 ...	0·220 ...	0·001 ...	0·0000
Kilogramme ...	15432·348 ...	2·204 ...	0·019 ...	0·0009

SQUARE, OR SURFACE MEASURE.

Equal to	Square feet.	Square yards.
Square Metre	10·7643	1·196

The Metric System of Weights and Measures, which, as plainly demonstrated in the preceding pages, is logically symmetrical, now forms the usual standard in the following countries :—

*Argentine Republic.	Egypt.	*Peru.
Austro-Hungary.	France.	Portugal.
Belgium.	German Empire.	†Roumania.
*Bolivia.	†Greece.	Servia.
*Brazil.	Holland.	*Spain.
*Chile.	Italy.	Sweden.
*Colombia.	*Mexico.	
Denmark.	Norway.	

The following countries have not adopted the Metric System :—

CANADA.—The legal Weights and Measures are the Imperial yard, Imperial pound avoirdupois, Imperial gallon, and the Imperial bushel. By Act 42 Vict., cap. 16, the British hundredweight of 112 pounds and the ton of 2,240 pounds were abolished, and the hundredweight was declared to be 100 pounds, and the ton 2,000 pounds avoirdupois as in United States, but sometimes contracts stipulate for the British weights.

CHINA.

Weights—10 Ch'ien ... = 1 Liang (Tael) = 1·333 oz. avoirdupois or 37·78 grammes

16 Liang ... = 1 Kin (Catty) = 1·333 lbs. avoirdupois or 604·53 grammes.

100 Chin ... = 1 Tan (Picul) = 133·333 lbs. avoirdupois or 60·453 kilogrammes.

4 ozs. = 3 taels; 1 lb. = $\frac{3}{4}$ catty or 12 taels; 1 cwt. = 84 catties; 1 ton = 16 piculs 80 catties.

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* Old Spanish measures also occasionally used are :—

Onza	= 1·014 ounce avoirdupois.
Libra	= 1·014 lb. avoirdupois.
Quintal	= 101·44 lb. avoirdupois.
Arroba (of 25 libras)	= 25·36 lb. avoirdupois.
Arroba of Wine	= 6·70 Imperial gallons.
Gallon	= 0·74 Imperial gallon.
Vara	= 0·927 yard.
Square Vara	= 0·859 square yard.

† Turkish measures are also in use :—

Oke of 400 drams	= 2·8283 lbs. avoirdupois.
Almud	= 1·151 Imperial gallons.
Kileh	= 0·9120 Imperial gallon.
44 okes = 1 Cantar	= 124·3616 lbs. avoirdupois.
39·6263 okes	= 1 cwt.
180 okes = 1 Tcheke	= 509·094 pounds.
1 kileh = 20 okes	= 0·36 Imperial quarter.
816 kilehs	= 100 Imperial quarters.

CHINA—*continued.*

Capacity—10 Ko ... ... = 1 Sheng (pint) = 1·031 litre
10 Sheng... ... = 1 Tou (peck) = 10·31 litre (holding from 6½ to 10 Kin of rice and measuring from 1·13 to 1·63 gallon)

Commodities, even liquids, such as oil, spirits, etc., are commonly bought and sold by weight.

Length—10 Fen ... ... = 1 Ts'un (inch)
10 Ts'un ... ... = 1 Chi'h (foot) = 14·1 English inches by treaty
10 Chi'h ... ... = 1 Chang = 11 ft. 9 in. (141 in. by treaty)
1 Li ... ... = ⅓ English mile (about)

The mow, the unit of measurement, is almost exactly one-sixth of an acre.

In the tariff settled by treaty between Great Britain and China, the Chi'h of 14 1/10 English inches has been adopted as the legal standard. The standards of weight and length vary all over the Empire, the Chi'h ranging from 9 to 16 English inches, and the Chang (=10 Chi'h) in proportion; at the treaty ports, the use of foreign treaty standard of Chi'h and Chang is common.

In October, 1907, a decree for uniform weights and measures was issued, making the K'up'ing or Treasury Scale the standard weight. The K'up'ing tael or ounce weighs 575·64 grains. The Haikwan tael weighs 581·47 grains.

INDIA.—The Maund of Bengal,
40 Seers ... ... = 82 2/7 lbs. avoirdupois
The Maund of Madras ... = 25 ,, ,, (nearly)
,, Tola ... ... = 180 grains troy
,, Guz of Bengal ... ... = 36 inches

An Act to provide for the adoption of an uniform system of weights and measures was passed in 1871. The Act orders: "Art. 2. The primary standard of weight shall be called a seer, and shall be a weight of metal in the possession of the Government of India, equal, when weighed in a vacuum, to the weight known in France as the kilogramme = 2·205 lbs. avoirdupois." "Art. 3. The units of weight and measures of capacity shall be, for weights, the said seer; for measures of capacity, a measure containing one such seer of water at its maximum density, weighed in a vacuum. Unless it be otherwise ordered, the sub-divisions of all such weights and measures of capacity shall be expressed in decimal parts." This Act, however, has never been in operation.

JAPAN.—The Mommé ... ... = 2·11 drams or 2·41 dwts. or 120 mommé = 1 lb. avoirdupois

The Kin (Catty) = 160 mommé = 1·322 lb. avoirdupois (0·266 mommé = 1 gramme) or 1·60 lbs. troy

,, Picul (100 kin) ... ... = 132·27 lbs.

,, Kwan = 1,000 mommé... = 8·261 lbs. avoirdupois or 10·04 lbs. troy

,, Shaku ... ... = ·994 foot (3·3 shaku = 1 metre)

,, Kujira Shaku ... ... = 1·242 feet

,, Sün ... ... = 1·193 inches

,, Ken = 6 Shaku ... ... = 5·965 feet

,, Jo = 10 Shaku ... ... = 9·942 feet

,, Chô = 60 Ken ... ... = 357·916 feet, or about $\frac{1}{15}$ mile

,, Ri = 36 Chô ... ... = 2·44 miles

,, Ri (marine) ... ... = 1·15 mile

,, Ri (square) ... ... = 5·9552 square miles

,, Chô = 10 tan ... ... = 2·45 acres

,, Koku, Liquid = 10 To = 100 Sho = 39·7033 gallons

,, Koku, Dry ... ... = 4·9629 bushels

,, Koku (capacity of vessel) = $\frac{1}{10}$ ton

,, To, Liquid ... ... = 3·9703 gallons

,, To, Dry ... ... = 1·9851 peck

RUSSIA.—1 Verst (500 sajènes)... = 3,500 feet, or two-thirds of a statute mile

1 Sajène (3 arshins)... ... = 7 feet

1 Arshin (16 vershok) ... = 28 inches

1 Square Verst ... ... = 0·43941 square mile

1 Dessiatine ... ... = 2·69972 acres

1 Pound (96 zolotniks = 32 lot) = $\frac{9}{10}$ of a pound or 14·4 ounces

1 Pood (40 pounds) ... ... = 36·113 lbs. = 0·32244 cwt. or 100 poods = 1·6121 tons. Baltic Freight is usually quoted per ton of 62 poods

1 Vedro (8 shtoffs) ... ... = $2\frac{3}{4}$ Imperial gallons

1 Chetvert (8 chetveriks) ... = 5·77 Imperial bushels or 46·2 gals.

UNITED STATES.—British weights and measures are usually employed, but the old Winchester gallon and bushel are used instead of the new or Imperial standards. Different States have a legal standard for bushels of certain articles, such as grain and potatoes, varying from 60 lbs. for wheat to 32 for oats.

Wine gallon ... ... = 0·83333 gallon

Ale gallon ... ... = 1·01695 ,,

Bushel ... ... = 0·9692 Imperial bushel

Instead of the British cwt. a cental, of 100 lbs., is used. 1 ton = 2,000 lbs., except coal, which is usually 2,240 lbs. wholesale.

CONCISE TABLES OF CONTINENTAL MONIES.

(Extracted by permission from Bradshaw's Continental Guide.)

(1) A Concise Table of Foreign Monies, Reduced from English into the Currency of Other Countries at Par.

England.	France, Italy, Belgium, Switzerland.	Germany.	Holland.	United States.	Austria in Notes.	Russia in Notes.
£ s. d.	Frs. Cts.	Mks. Pfg.	Fl. Cts.	Dols. Cts.	Kronen.	Roubles.
0 0 0½	0 052	0 04	0 02	0 01	·04	·01
0 0 1	0 104	0 08	0 05	0 02	·08	·03
0 0 2	0 208	0 17	0 19	0 04	·18	·07
0 0 3	0 312	0 25	0 15	0 06	·26	·10
0 0 4	0 416	0 33	0 20	0 08	·38	·14
0 0 5	0 520	0 42	0 25	0 10	·48	·18
0 0 6	0 625	0 50	0 30	0 12	·56	·21
0 0 7	0 729	0 58	0 35	0 14	·65	·25
0 0 8	0 833	0 67	0 40	0 16	·76	·28
0 0 9	0 937	0 75	0 45	0 18	·86	·32
0 0 10	1 040	0 84	0 50	0 20	·96	·36
0 0 11	1 144	0 92	0 55	0 23	1·04	·39
0 1 0	1 25	1 0	0 60	0 25	1·20	·47
0 2 0	2 50	2 0	1 20	0 50	2·40	·95
0 3 0	3 75	3 0	1 80	0 75	3·60	1·42
0 4 0	5 0	4 0	2 40	1 0	4·80	1·90
0 5 0	6 25	5 0	3 0	1 25	6·	2·37
0 6 0	7 50	6 0	3 60	1 50	7·20	2·85
0 7 0	8 75	7 0	4 20	1 75	8·40	3·32
0 8 0	10 0	8 0	4 80	2 0	9·60	3·80
0 9 0	11 25	9 0	5 40	2 25	10·80	4·27
0 10 0	12 50	10 0	6 0	2 50	12·	4·75
0 11 0	13 75	11 0	6 60	2 75	13·20	5·22
0 12 0	15 0	12 0	7 20	3 0	14·40	5·70
0 13 0	16 25	13 0	7 80	3 25	15·60	6·17
0 14 0	17 50	14 0	8 40	3 50	16·80	6·65
0 15 0	18 75	15 0	9 0	3 75	18·	7·12
0 16 0	20 0	16 0	9 60	4 0	19·20	7·60
0 17 0	21 25	17 0	10 20	4 25	20·40	8·07
0 18 0	22 50	18 0	10 80	4 50	21·60	8·55
0 19 0	23 75	19 0	11 40	4 75	22·80	9·02
1 0 0	25 0	20 0	12 0	5 0	24·	9·40
2 0 0	50 0	40 0	24 0	10 0	48·	18·80
3 0 0	75 0	60 0	36 0	15 0	72·	28·20
4 0 0	100 0	80 0	48 0	20 0	96·	37·60
5 0 0	125 0	100 0	60 0	25 0	120·	47·
6 0 0	150 0	120 0	72 0	30 0	144·	56·40
7 0 0	175 0	140 0	84 0	35 0	168·	65·80
8 0 0	200 0	160 0	96 0	40 0	192·	75·20
9 0 0	225 0	180 0	108 0	45 0	216·	84·60
10 0 0	250 0	200 0	120 0	50 0	240·	94·

FOREIGN AND COLONIAL MONIES WITH APPROXIMATE VALUE IN BRITISH CURRENCY.

ARGENTINE REPUBLIC.—Gold coin, 5 dollars. Silver coins, 1 dollar and 50, 20, and 10 centavos. Bronze coins, 2 and 1 centavos. Nickel coins, 20, 10, and 5 centavos. Silver dollar or peso = 4s. Money in circulation is chiefly paper, being converted at 44 cents gold to dollar = 1s. 9d. Gold dollar = 4s.

AUSTRALIA.—The same as in Great Britain.

AUSTRIA-HUNGARY.—Gold coins, 100 krone = £4 3s. 4d.; 20 krone = 16s. 8d.; 10 krone = 8s. 4d.; Single ducat = 11 crowns 29 heller = 9s. $4\frac{3}{4}$d. Silver coin, 1 krone = 100 heller = half gulden old coinage = 10d. Exchange about 24 krone to £. Silver gulden or florins (about 12 = £) = 100 kreutzer continue to be legal tender. Nickel, 20 heller = 10 kreutzer of old coinage = 2d., 10 heller = 5 kreutzer of old coinage = 1d. Bronze, 2 heller = 1 kreutzer = $\frac{1}{5}$d., 1 heller = $\frac{1}{2}$ kreutzer = $\frac{1}{10}$d.

BELGIUM.—The same as France.

BOLIVIA.—100 centavos = 1 boliviano (paper) = about 1s. 7d., or $12\frac{1}{2}$ bolivianos to £. Coins in circulation are—silver, 50, 30, 20, and 10 centavos; nickel, 10 and 5 centavos, and English gold coin. Currency principally paper.

BRAZIL.—Currency paper, worth 1s. $4\frac{1}{2}$d. per milreis (1,000 reis) or nearly 15 milrei = £1. Silver coinage of 2, 1, and $\frac{1}{2}$ milreis pieces in circulation.

BRITISH HONDURAS.—100 centavos = 1 dollar (gold) = 4s. $1\frac{1}{2}$d. British sovereign (= $4·86) and half sovereign, and U.S. gold coins legal. Silver coins—5, 10, 25 and 50 cents legal tender to $10. Bronze—1 cent legal tender to 50 cents.

BULGARIA.—Lev (= franc) = 100 stotinki = $9\frac{1}{2}$d. (stotinka = centime). Gold coins, 10 and 20 leva, but foreign 10 and 20 franc pieces principally in circulation. Silver, $\frac{1}{2}$, 1, 2 and 5 leva. Nickel, $2\frac{1}{2}$, 5, 10, 20 stotinki. Bronze, 1, 2, 5, 10 stotinki.

CANADA.—1 cent. = $\frac{1}{2}$d. 100 cents = 1 dollar = about 4s. $1\frac{1}{2}$d. 4 dollars $86\frac{2}{3}$ cents = £ sterling. U.S. gold coins also legal.

CHILI.—Gold coins, 20 (colon or condor), 10 (doubloon), and 5 (escudo) peso pieces. Silver coins, 1 peso and $\frac{1}{5}$, $\frac{1}{10}$, and $\frac{1}{2}$ of a peso. Bronze coins, $\frac{1}{2}$, 1, 2 and $2\frac{1}{2}$ centavo pieces. Currency is paper—the peso or dollar = about 10d. The restoration of the gold currency is projected under a currency law which was to take effect in 1910, but has been deferred until 1915. Gold peso = 1s. 6d. English sovereign has a legal value of $13\frac{1}{3}$ pesos gold.

CHINA.—1,220 (about) cash = 1 haikwan (or customs) tael = about 2s. $8\frac{1}{4}$d. About 35 cash = 1d. A coin recently issued is the "hundredth of a dollar" worth about $\frac{3}{25}$ of 1d. Silver dollar of same value as Japanese silver yen, is also current. At Hong Kong the dollar (1,000 cash) = about 1s. 11d. and at Shanghai about 2s. 8d. In October, 1908, an Imperial Edict decreed the establishment of a uniform Tael currency—unit silver tael to have a value of between 30d. and 40d.

COCHIN CHINA.—5 sapéques or cash = 1 cent.; 100 cents. = 1 dollar = about 2s.

COLOMBIA.—100 centavos = 1 peso or dollar gold—nominal value 4s. Gold coins, 1, $2\frac{1}{2}$ and 5 dollars. Silver coins, real, peseta, half-dollar and dollar. Very few coins are in circulation, the currency being principally paper, subject to considerable fluctuation. At the legal rate the paper peso = 1 centavo gold, or \$500 = £1.

DENMARK.—100 ore = 1 krone = 1s. $1\frac{1}{4}$d. 18 kroner 19 ore = £ sterling. Gold coins of 20 kroners and 10 kroners. Silver, 2 kroner (rigsdaler), 1 krone and 25 ore.

EGYPT.—$97\frac{1}{4}$ piastres = £ sterling. 100 piastres, or 1,000 milliemes = £ Egyptian (gold) = £1 0s. $6\frac{1}{4}$d. Gold circulating is almost exclusively English. 10 milliemes = 1 piastre = about $2\frac{1}{2}$d. Gold piece of 20 francs = about 77 piastres. Silver coins, 1, 2, 5, 10 and 20 piastres; legal tender to £E2.

ERITREA.—1 tallero = 5 Italian lire. Silver coins, 1, 2, 5 talleros.

FRANCE.—100 centimes = 1 franc = $9\frac{1}{2}$d. 20 franc piece (Louis or Napoleon) = 15s. 10d. About 25 francs 25 centimes = £ sterling. Gold coins of 5, 10, 20, 50, and 100 francs. Silver coins, 20 centimes, $\frac{1}{2}$, 1, 2, and 5 franc pieces. Nickel coin, 25 centimes. Bronze coins, 1, 2, 5, and 10 centimes.

GERMAN EMPIRE.—100 pfennig = 1 mark = about 1s. About 20·45 m. = £ sterling. Gold coins, 20 (doppel-krone), 10 (krone), and 5 (half-krone) marks. Silver coins, 1, 2, 3, and 5 marks and 50 pfennige. Thaler = 3 marks = 2s. 11d. Nickel coins, 20, 10, and 5 pfennige. Bronze coins, 1 and 2 pfennige.

GREECE.—100 lepta = 1 drachma paper = 9d. 27 drachmæ 30 lepta = £1 or about 108 drachmæ per 100 fcs. Foreign gold coins in circulation.

HOLLAND.—100 cents = 1 guilder or florin = 1s. 8d. 12 guilders 10 cents = £ sterling. Gold coins, 10 florins (16s.). Silver coins, 2½ guilders (rijksdaaler), 1 guilder, ½ guilder and 25 cents.

INDIA.—£1 = 15 rupees. 16 annas = 1 rupee = 1s. 4d. 3 pie = 1 pice, 12 pie = 1 anna = 1d. Lac of rupees = 100,000. Crore of rupees = 10,000,000.

ITALY.—100 centesimi = 1 lira = 9½d. About 25 lire 40 centesimi = £1 sterling. Gold coins, 100, 50, 20, and 10 lire. Silver coins, 5, 2, and 1 lira. Nickel coin, 20 centesimi. Bronze coins, 1, 2, 5, and 10 centesimi.

ITALIAN SOMALILAND.—Rupia, value L. It. 1·68 (= £1 1/5 ster.). Silver coins, 1 rupia, ½ rupia, ¼ rupia. Bronze coins, 1 besa (value L. It. 0·0168), 2 besas, 4 besas. 1 rupia is equal to 100 besas.

JAPAN.—10 rin = 1 sen = ¼d., 100 sen = 1 yen or dollar = 2s. 0½d. Gold coins, 5, 10, and 20 yen. Silver coins, 10, 20, and 50 sen. Nickel coin, 5 sen. Bronze coins, 1 sen and 5 rin. The unit of account is the gold yen.

LYBIA.—The same currency as in Italy.

MEXICO.—100 centavos = 1 dollar or peso (silver) = 2s. 0½d.

NORWAY.—100 ore = 1 kroner = 1s. 1¼d. Gold coins, 10 and 20 kroners. Exchange 18·19 krone = £ sterling. Paper money principally used; least value, 5 kroner. Below this amount, silver and copper coins.

PORTUGAL.—100 reis = 1 teston = 4d. 1,000 reis = 1 milreis. Paper milreis = about 4s. 1d. Gold coins, 1, 2, 5, and 10 milreis. Currency, principally paper. Conto = 1,000 milreis. In the Azores, 1 milrei = 3s. 6½d.

ROUMANIA.—1 leu = 100 bani = about 9½d. Gold coins, 5, 10, and 20 lei. Silver, 1 leu, 2 and 5 lei. Nickel, 5, 10 and 20 bani.

RUSSIA.—100 copecks = 1 rouble. Silver or paper rouble = 2s. 1½d. Gold coins—15 roubles (imperial), 10 roubles, 7·50 roubles (half-imperial), 5 roubles. 15 paper roubles = 10 roubles gold = roughly 1 guinea. Currency principally paper.

SERVIA.—Dinar = 1 franc = 9½d. Gold coins, 10 and 20 dinars. Silver, ½, 1, 2, 5 dinars. Bronze, 5 and 10 paras. Nickel, 5, 10, 20 paras.

SPAIN.—100 centimos = 1 peseta—about 26·70 pesetas to the £ sterling. Gold coins are 20, 10 and 5 peseta pieces. Silver coins, 1 and 5 pesetas.

STRAITS SETTLEMENT AND MALAY STATES.—Gold dollar = 2s. 4d. Silver coins—50, 20, 10 and 5 cent pieces—are legal tender to 2 dollars, but ½ dollar is unlimited tender. Copper coins—1, ½ and ¼ cents—are legal tender to 1 dollar.

SWEDEN.—Krona of 100 ore = 1s. 1¼d. or 18·19 kr. to the £1. Gold little used. Currency for 5 kr. or more mostly paper.

TURKEY.—40 paras = 1 piastre = 2¼d. nearly. 100 piastres = 1 lira turca or gold medjidie = 18s. 109½ pias = £1. "Purse," sometimes used in accounts = 500 piastres or 5 liras and is calculated = £4 10s. 0d. Value of piastre varies in different parts of the Turkish Dominions. In Syria, 1 Turkish £ = 130 local piastres and £1 = 143¼ local piastres.

UNITED STATES.—1 cent = about ½d., 100 cents = 1 dollar = 4s. 1½d. 4 dols. 87 cents = £ sterling. Gold coins, 2½ dollar piece, half eagle (5 dollars), 1 eagle (10 dollars), 1 double eagle (20 dollars).

URUGUAY.—100 centavos = 1 dollar (gold) = about 4s. 3d., or $4·70 = £. Only foreign gold coins (which are legal tender) are in circulation. Silver coins, 10, 20 and 50 cents. and 1 dollar. Nickel, 1, 2 and 5 cents.

VENEZUELA.—Medio = about 2½d.; real = about 5d. Monetary unit is silver bolivar = about 9½d., or 1 franc, or 25·25 bols. to the £. Exchange fluctuates slightly from the par, but 25·25 bols. to the £ should be taken as a basis. Currency is based on gold standard—no paper in circulation. Coins are gold, silver and nickel, but principal coin is silver dollar of 5 bols. known as "peso fuerte" or simply "fuerte."

THERMOMETRICAL AND BAROMETRICAL TABLE.

THERMOMETERS.

Réaumur.	Centigrade.	Fahrenheit.	
80'	100'	212°	WATER BOILS (when the bar. is at 30 inch = 760 mm.)
76	95	203	
72	90	194	
68	85	185	
64	80	176	
62·7	78·3	173	Alcohol boils (when the bar. is at 30 inch = 760 mm.)
60	75	167	
56	70	158	
52	65	149	
48	60	140	
44	55	131	
43	53	127	Tallow melts.
40	50	122	
36	45	113	
32	40	104	
30·2	37·8	100	Fever heat commences.
29·3	36·7	98	Blood heat.
28	35	95	
24	30	86	
20	25	77	Summer heat.
19	24	76	
16	20	68	
12	15	59	Temperate.
8	10	50	Temperature of spring water.
4	5	41	
0	0	32	WATER FREEZES.
— 4	— 5	23	
— 8	—10	14	
—12	—15	5	
—14·4	—18	0	ZERO (Fahrenheit).

BAROMETER.

Millim.		Inches.
715	=	28·15
720	=	28·35
725	=	28·54
730	=	28·74
735	=	28·94
740	=	29·13
745	=	29·33
750	=	29·53
755	=	29·73
760	=	29·92
765	=	30·12
770	=	30·32
775	=	30·51
780	=	30·71
785	=	30·91
790	=	31·10

Inches.		Millim.
31	=	787·4
30	=	762·0
29	=	736·6
28	=	711·2
27	=	685·8

Intermediate heights, to be added to above.

Millim.		Inches.
1	=	·039
2	=	·079
3	=	·118
4	=	·158
5	=	·197

Inches.		Millim.
0·1	=	2·5
0·2	=	5·1
0·3	=	7·6
0·4	=	10·1
0·5	=	12·7
0·6	=	15·2
0·7	=	17·8
0·8	=	20·3
0·9	=	22·9

BAROMETER.—The weather glass and rainfall in France are measured by the millimètre = 1-1000th of a mètre = ·0394 inches = 4-100th of an inch.

THERMOMETER TABLE.—On the Continent thermometers are frequently graded for both Centigrade and Réaumur.

TEMPERATURE CONVERSION TABLES.

(By permission of the Proprietors of the Electrician.)

For Converting Temperatures Cent. to Fahr.

°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.
0	+32·0	33	91·4	66	150·8	99	210·2
+1	33·8	34	93·2	67	152·6	100	212·0
2	35·6	35	95·0	68	154·4	105	221·0
3	37·4	36	96·8	69	156·2	110	230·0
4	39·2	37	98·6	70	158·0	115	239·0
5	41·0	38	100·4	71	159·8	120	248·0
6	42·8	39	102·2	72	161·6	125	257·0
7	44·6	40	104·0	73	163·4	130	266·0
8	46·4	41	105·8	74	165·2	135	275·0
9	48·2	42	107·6	75	167·0	140	284·0
10	50·0	43	109·4	76	168·8	145	293·0
11	51·8	44	111·2	77	170·6	150	302·0
12	53·6	45	113·0	78	172·4	155	311·0
13	55·4	46	114·8	79	174·2	160	320·0
14	57·2	47	116·6	80	176·0	165	329·0
15	59·0	48	118·4	81	177·8	170	338·0
16	60·8	49	120·2	82	179·6	175	347·0
17	62·6	50	122·0	83	181·4	180	356·0
18	64·4	51	123·8	84	183·2	185	365·0
19	66·2	52	125·6	85	185·0	190	374·0
20	68·0	53	127·4	86	186·8	195	383·0
21	69·8	54	129·2	87	188·6	200	392·0
22	71·6	55	131·0	88	190·4	210	410·0
23	73·4	56	132·8	89	192·2	220	428·0
24	75·2	57	134·6	90	194·0	230	446·0
25	77·0	58	136·4	91	195·8	240	464·0
26	78·8	59	138·2	92	197·6	250	482·0
27	80·6	60	140·0	93	199·4	260	500·0
28	82·4	61	141·8	94	201·2	270	518·0
29	84·2	62	143·6	95	203·0	280	536·0
30	86·0	63	145·4	96	204·8	290	554·0
31	87·8	64	147·2	97	206·6	300	572·0
32	89·6	65	149·0	98	208·4		

For Converting Temperatures Fahr. to Cent.

°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.
0	−17·78	31	−0·56	62	16·67	93	33·89
+1	17·23	32	—	63	17·23	94	34·45
2	16·67	33	+0·56	64	17·78	95	35·00
3	16·11	34	1·11	65	18·34	96	35·56
4	15·56	35	1·67	66	18·89	97	36·11
5	15·00	36	2·23	67	19·45	98	36·67
6	14·45	37	2·78	68	20·00	99	37·23
7	13·90	38	3·34	69	20·56	100	37·78
8	13·34	39	3·90	70	21·11	101	38·34
9	12·78	40	4·45	71	21·67	102	38·90
10	12·23	41	5·00	72	22·23	103	39·45
11	11·67	42	5·56	73	22·78	104	40·00
12	11·11	43	6·11	74	23·34	105	40·56
13	10·56	44	6·67	75	23·90	106	41·11
14	10·00	45	7·23	76	24·45	107	41·67
15	9·45	46	7·78	77	25·00	108	42·23
16	8·89	47	8·34	78	25·56	109	42·78
17	8·34	48	8·89	79	26·12	110	43·34
18	7·78	49	9·45	80	26·67	111	43·90
19	7·23	50	10·00	81	27·23	112	44·45
20	6·67	51	10·56	82	27·78	113	45·00
21	6·11	52	11·11	83	28·34	114	45·56
22	5·56	53	11·67	84	28·89	115	46·11
23	5·00	54	12·23	85	29·45	116	46·67
24	4·45	55	12·78	86	30·00	117	47·23
25	3·90	56	13·34	87	30·55	118	47·78
26	3·34	57	13·90	88	31·11	119	48·34
27	2·78	58	14·45	89	31·67	120	48·90
28	2·23	59	15·00	90	32·22	121	49·45
29	1·67	60	15·56	91	32·78	122	50·00
30	1·11	61	16·11	92	33·33	123	50·56

CONVERSION TABLES.

(By permission of the Proprietors of the Electrician.)

		Multiply by
To reduce	kilometres to miles	·62
,,	kilometres to yards	1100 (1093·6)
,,	metres to yards	1·1
,,	metres to feet	3·3
,,	centimetres to inches	·4
,,	millimetres to inches	·04
,,	millimetres to mils.	40 (39·4)
,,	miles to kilometres	1·6
,,	miles to metres	1609
,,	yards to kilometres	·0009
,,	yards to metres	·9
,,	feet to metres	·3
,,	inches to centimetres	2·54
,,	inches to millimetres	25 (25·4)
,,	mils. to millimetres	·025
,,	sq. metres to sq. yards	1·2
,,	sq. metres to sq. feet	11 (10·76)
,,	sq. centimetres to sq. inches	·155
,,	sq. millimetres to sq. inches	·0015
,,	sq. yards to sq. metres	·83
,,	sq. feet to sq. metres	·09
,,	sq. inches to sq. centimetres	6·45
,,	sq. inches to sq. millimetres	645
,,	cub. metres to cub. yards	1·3
,,	cub. metres to cub. feet	35·3
,,	cub. cms. to cub. inches	·06
,,	cub. yards to cub. metres	·76
,,	cub. feet to cub. metres	·03
,,	cub. inches to cub. cms.	16·4
,,	kilogrammes to tons	·001
,,	kilogrammes to cwt.	·02
,,	kilogrammes to pounds	2·2

		Multiply by
To reduce	tons per sq. foot to head of water (metres)	10·7
,,	tons per sq. foot to atmospheres	1·06
,,	lbs. per sq. inch to tons per sq. ft.	·064
,,	lbs. per sq. in. to kilogrammes per sq. cm.	·07
,,	lbs. per sq. inch to grammes per sq. cm.	70·3
,,	lbs. per sq. inch head of water (feet)	2·3
,,	lbs. per sq. inch to head of water (metres)	·7
,,	lbs. per sq. inch to atmospheres	·07
,,	kilogrammes per sq. cm. to tons per sq. foot	·9
,,	kilogrammes per sq. cm. to lbs. per sq. inch	14·2
,,	kilogrammes per sq. mm. to lbs. per sq. inch	1422
,,	grammes per sq. cm. to lbs. per sq. in.	·014
,,	head of water (metres) to tons per sq. foot	·09
,,	head of water (feet) to tons per sq. foot	·027
,,	head of water (metres) to lbs. per sq. inch	1·4
,,	head of water (feet) to lbs. per sq. inch	·43
,,	atmosphere to tons per sq. foot	·94
,,	atmosphere to lbs. per sq. inch	14·7
,,	grains per sq. inch to dynes per sq. cm.	9·8

,,	kilogrammes to ounces	35 (35·3)
,,	grammes to ounces	·035
,,	grammes to grains	15·4
,,	milligrammes to grains	·015
,,	tons to kilogrammes	1000(1016)
,,	cwt. to kilogrammes	50 (50·8)
,,	pounds to kilogrammes	·45
,,	pounds to grammes	453 (453·6)
,,	ounces to grammes	28·35
,,	grains to grammes	·065
,,	grains to milligrammes	65 (64·8)
,,	lbs. avoir. to grains troy	7000
,,	gallons to cub. feet	·16
,,	gallons to cub. metres	·0045
,,	gallons to litres	4·5
,,	gallons of water to lbs.	10
,,	cub. feet to gallons	6·2
,,	cub. metres to gallons	220
,,	litres to gallons	·22
,,	lbs. of water to gallons	·1
,,	litres to cub. feet	·035
,,	litres of water to lbs.	2·2
,,	cub. feet to litres	28·3
,,	lbs. of water to litres	·454
,,	cub. feet of water to lbs.	62·3 (62·27)
,,	lbs. of water to cub. feet	·016
,,	feet per minute to miles per hour	·0113
,,	feet per minute to metres per sec.	·005
,,	miles per hour to feet per minute	88
,,	metres per sec. to feet per minute	197
,,	tons per sq. foot to kilogrammes per sq. cm.	1·09
,,	tons per sq. foot to lbs. per sq. in.	15·5
,,	tons per sq. foot to head of water (feet)	36
,,	dynes per sq. cm. to grains per sq. inch	0·1
,,	carcels to candles	9·8
,,	candles to carcels	10·2
,,	English candles to German	1·1
,,	German candles to English	·92
,,	*joules to ergs	10
,,	joules to foot lbs.	·737
,,	joules to kilogrammetres	·1
,,	joules to lbs. deg. F.	·0095
,,	joules to calories	·24
,,	calories to joules	4·2 (4·158)
,,	lbs. deg. F. to joules	1048
,,	kilogrammetres to joules	9·8
,,	foot lbs. to joules	1·35
,,	lbs. deg. F. to foot lbs.	772
,,	lbs. deg. F. to kilogrammetres	107
,,	lbs. deg. F. to calories	252
,,	calories to lbs. deg. F.	·004
,,	kilogrammetres to lbs. deg. F.	·009
,,	kilogrammetres to calories	2·34
,,	kilogrammetres to foot lbs.	7·2
,,	foot lbs. to kilogrammetres	·14
,,	calories to kilogrammetres	·42
,,	H. P. to watts	746
,,	H. P. to foot lbs. per minute	33000
,,	H. P. to kilogrammetres per sec.	76
,,	watts to foot lbs. per minute	44
,,	watts to kilogrammetres per sec.	·1
,,	centimes per car-kilometre to pence per car-mile	·16
,,	pence per car-mile to centimes per car-kilometre	·2

* One *joule* = one *watt second*.

SYNOPSIS OF UNITS.

		Dimensions
I.—FUNDAMENTAL.		
Length—Mass—Time		L—M—T
II.—DERIVED MECHANICAL.		
Area	$=L\times L$	L^2
Volume ...	$=L\times L\times L$	L^3
Velocity ...	$V=L\div T$	LT^{-1}
Momentum ...	$=$ mass $\times$ velocity	$L\,M\,T^{-1}$
Acceleration ...	$A=$ velocity $\div$ time	LT^{-2}
Force	$F=$ mass $\times$ acceleration	$L\,M\,T^{-2}$
Work	$W=$ force $\times$ length	$L^2\,M\,T^{-2}$
Energy (kinetic)	$=\frac{1}{2}$ mass $\times$ velocity^2	$L^2\,M\,T^{-2}$
III.—DERIVED ELECTRO-STATIC.		
Quantity	$q=vQ=\sqrt{\text{force}\times\text{distance}^2}$	$L^{\frac{3}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Current	$c=vI=$ quantity $\div$ time	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-2}$
Electro-motive Force / Difference of Potential	$e=\frac{E}{v}=$ work $\div$ quantity	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Resistance	$r=\frac{R}{v^2}=$ electro-motive force $\div$ current ...	$L^{-1}\,T$
Capacity	$k=v^2K=$ quantity $\div$ electro-motive force ...	L
Sp. Ind. Capacity ...	... $=$ quantity $\div$ another quantity	a numeral
IV.—DERIVED MAGNETIC.		
Strength of Pole ... ... / Quantity of Magnetism ...	$m=\sqrt{\text{force}\times\text{distance}^2}$	$L^{\frac{3}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Moment of a Magnet ...	$ml=$ strength of pole $\times$ length of poles ...	$L^{\frac{5}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Intensity of Magnetisation	$I=$ moment of magnet $\div$ volume	$L^{-\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Magnetic Potential ...	$=$ work $\div$ strength of pole	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
V.—DERIVED ELECTRO-MAGNETIC.		
Current	$C=\frac{c}{v}=$ intensity of field $\times$ length	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}\,T^{-1}$
Quantity	$Q=\frac{q}{v}=$ current $\times$ time $=CT$	$L^{\frac{1}{2}}\,M^{\frac{1}{2}}$
Electro-motive Force / Difference of Potential	$E=ev=$ work $\div$ quantity	$L^{\frac{3}{2}}\,M^{\frac{1}{2}}\,T^{-2}$
Resistance	$R=rv^2=$ electro-motive force $\div$ current ...	$L\,T^{-1}$
Capacity	$K=\frac{k}{v_2}=$ quantity $\div$ electro-motive force ...	$L^{-1}\,T^2$
Sp. Ind. Capacity ...	$=$ displacement $\div$ force	$L^{-2}\,T$
Self-induction, or / "Quadrant"	$L_s=\frac{ET}{C}=\frac{\text{energy}}{C^2}=\frac{H\times(\text{length})^2}{C}$	L
Ratio of electro-magnetic to electro-static unit of quantity, $v=3\times10^{10}$ centimetres per second approximately.		$L\,T^{-1}$

INTERNATIONAL SYMBOLS.

(The symbols given on p. 702 have been taken by special permission from the report of the International Electrotechnical Commission. Copies of this report may be obtained from the General Secretary, 28, Victoria Street, London, S.W.)

RULES FOR QUANTITIES.

(*a*) Instantaneous values of electrical quantities which vary with the time to be represented by small letters. In case of ambiguity, they may be followed by the subscript "t."

(*b*) Virtual or constant values of electrical quantities to be represented by capital letters.

(*c*) Maximum values of periodic electrical and magnetic quantities to be represented by capital letters followed by the subscript "m."

(*d*) In cases where it is desirable to distinguish between magnetic and electric quantities, constant or variable, magnetic quantities to be represented by capital letters of either script, heavy-faced or any special type. Script letters to be only employed for magnetic quantities.

(*e*) Angles to be represented by small Greek letters.

(*f*) Dimensionless and specific quantities to be represented, wherever possible, by small Greek letters.

The I.E.C. will recommend to the International Congress of the Applications of Electricity, to be held in San Francisco in 1915, the adoption of the name "Siemens" for the unit of conductance, denoted by G.

RULES FOR QUANTITIES—*continued.*

Name of Quantity	Symbol	Symbols recommended for the case in which the principal symbol is not suitable
1. Length	l	In dimensional equations the capital letters, L, M, T, are to be employed.
2. Mass	m	
3. Time	t	
4. Angles	$\alpha, \beta, \gamma \ldots$	
5. Acceleration of gravity ...	g	
6. Work	A	W
7. Energy	W	U
8. Power	P	
9. Efficiency	η	
10. Number of turns in unit of time	n	
11. Temperature Centigrade ...	t	θ
12. Temperature absolute ...	T	(Θ)
13. Period	T	
14. $2\pi/T$	ω	
15. Frequency	f	ν †
16. Phase displacement ...	φ	
17. Electromotive force ...	E	
18. Current	I	
19. Resistance	R	
20. Resistivity	ρ	
21. Conductance	G	
22. Quantity of electricity ...	Q	
23. Flux-density, electrostatic	D	
24. Capacity	C	
25. Dielectric constant	ϵ	
26. Self-inductance	L	$\mathfrak{L}$
27. Mutual inductance	M	$\mathfrak{M}$
28. Reactance	X	$\mathfrak{X}$
29. Impedance	Z	$\mathfrak{Z}$
30. Reluctance	S	$\mathfrak{R}$
31. Magnetic flux	Φ	$\mathfrak{F}$
32. Flux-density, magnetic ...	B	$\mathfrak{B}$
33. Magnetic field	H	$\mathfrak{H}$
34. Intensity of Magnetisation	J	$\mathfrak{J}$
35. Permeability	μ	
36. Susceptibility	κ	

Script, heavy-faced, or special type.

* A symbol for the second column is to be supplied by the Austrian and German Committees jointly and inserted without further discussiou by the I.E.C.

† This symbol will be omitted if the Austrian and German Committees agree to do so.

‡ A symbol for the second column is to be supplied by the Austrian and German Committees jointly and inserted without further discussion by the I.E.C.

The symbols 13, 14, 20, 23, 25, 27 to 31 are not so far accepted in Germany.

SYNOPSIS OF PRACTICAL UNITS.

(Symbols to be employed only after numerical values.)

Unit.	Symbol.	Name.	Derivation.	Value. C.G.S.	Value. Equivalent.
E. M. F.	V	Volt.	Ampere × ohm.	10^8	·926 standard Daniell cell, or ·697 standard Clark cell
Resistance	O or Ω*	Ohm.	Absolute.	10^9	106·3 c.m. mercury, 1 sq. mm. section (14·4521 grm.) at 0°C.
Current	A	Ampere.	Absolute.	10^{-1}	
Quantity	Q	Coulomb.	Ampere × second	10^{-1}	1·118 milligrammes of silver deposited per second
Capacity	F	Farad.	Coulomb ÷ volt	10^{-9}	
,,		Microfarad.	1 millionth farad.	10^{-15}	2·5 nauts of D. U. S. cable
Power	W	Watt.	Volt × ampere	10^7	·0013405 or $\frac{1}{746}$ h. p.
Work	J	Joule.	Volt × coulomb.	,,	·7373 ft.-lbs.
Heat	J	Joule.	Amp.² × sec. × ohm.	,,	·238 calorie.
Self-induction	H	Henry	Volt × second ÷ ampere.	10^9	Electro-magnetic energy stored in the system

* Provisional.

The compound units are Volt Coulomb (VC), Watt-hour (WH), Volt-ampere (VA), Ampere-hour (AH), Milliampere (MA), Kilowatt (KW), Kilo-volt-ampere (KVA), Kilowatt-hour (KWH).

PRACTICAL ELECTRIC UNITS.

RESISTANCE, R.—The OHM is equal to 10^9 C.G.S.* units of resistance. It has been agreed to take as the practical unit of resistance the resistance of a specified column of mercury (B.A. Committee on Electrical Standards, 1892; Report of Electrical Standards Committee of the Board of Trade, October 27th, 1892). This specified column of uniform cross-section is defined by its length, 106·3 cm. at 0° C., and its mass, 14·4521 grammes. If the mass of 1 cc. of water at 4° C. be 1 gramme, the area of the cross-section of such a column will be 1 sq. mm. Thus 1 ohm is the resistance of a column of mercury at 0° C. 14·4521 grammes in mass, and 106·3 cm. in length. For industrial purposes standards in solid metal having the same resistance as this specified column are made and deposited at the Board of Trade and elsewhere. These standards are from time to time compared together, and have their values redetermined in terms of a mercury column.

To obtain the relation between resistances measured in B.A. units, and resistances measured in ohms, we have—

1 B.A. unit = ·9866 ohm.

1 ohm = 1·01358 B.A. Units.

* Electro-magnetic system.

Thus, to reduce B.A. units to ohms, we have to multiply by ·9866 (*i.e.*, deduct 1·34 per cent.). German silver coils having a temperature coefficient of resistance of ·044 per cent. per 1° C., adjusted to be B.A. units at 0° C., become ohms at 30°·5 C. Platinum silver coils, having a temperature coefficient of ·028 per cent. per 1° C., adjusted to be B.A. units at 0°, become ohms at 47°·8 C.

The MEGOHM = one million ohms.

The MICROHM = one millionth ohm.

The *Specific Resistance of Mercury* is thus $·9407 \times 10^{-4}$ ohms = 94·07 microhms.

The *Legal Ohm* of the Paris Congress, April, 1884, now superseded by the above B.O.T. ohm, is defined as the resistance of a column of mercury 106 cm. long, and 1 sq. mm. section at 0° C.

ELECTRO-MOTIVE FORCE, E.—The VOLT is equal to 10^8 C.G.S.* units of electro-motive force. The E.M.F. of a Clark cell at 15° C. is 1·434 volts. (See *B.O.T. Report.*) Electro-motive force is equivalent to the difference of potential between two points. The VOLT is the electro-motive force which maintains a current of 1 ampère in a conductor whose resistance is the ohm.

CURRENT, I.—The AMPÈRE is the current, of which the absolute measurement is 10^{-1} C.G.S.* units.

One ampère decomposes ·00009324 gramme of water (H_2O) per second, or deposits 1·118 milligrms. of silver per sec. = 4·025 grms. per hour.

The MILLIAMPÈRE = $\frac{1}{1000}$ of an ampère.

QUANTITY, Q.—The COULOMB is equal to 10^{-1} C.G.S.* units of quantity. It is the quantity of electricity conveyed by an ampère in a second.

CAPACITY, K.—The FARAD is equal to 10^{-9} C.G.S.* units of capacity. It is the capacity defined by the condition that a coulomb charges it to the potential of a volt.

The MICROFARAD, *mfd.* = 10^{-15} C.G.S.* units of capacity, or one-millionth of a Farad.

SELF-INDUCTION, L_s.—The SECOHM,† Quadrant or Henry is equal to 10^9 centimetres or earth's quadrant.

POWER, P_w.—The WATT is equal to 10^7 C.G.S.* units of power. It is the power conveyed by a current of an ampère

* Electro-magnetic system.

† The "secohm" and "quadrant" were the terms used for self-induction until the "Henry" was officially adopted.

through a conductor whose ends differ in potential by a volt; or, in other words, the rate of doing work when an ampère passes through an ohm, and it is equal to 10^7 ergs per second, or a Joule per second ($\frac{1}{746}$ of a H.P.).

$$\therefore E \times I = I^2 \times R = E^2 \div R = \text{Watts},$$

$$\text{and } \frac{E \times I}{746} = \frac{I^2 \times R}{746} = \frac{E^2}{746\,R} = \text{Horse-power}.$$

The *Board of Trade Commercial Unit* is 1,000 volt-ampère-hours or 1,000 Watt-hours; 10 ampères at 100 volts an hour = one B.T. unit, or equal to 1·34 H.P. working for one hour.

HEAT OR WORK, WJ.—The JOULE is equal to 10^7 C.G.S.* units of work or ergs. It is the work done, or heat generated by a Watt in a second—*i.e.*, the work done or heat generated in a second by an ampère flowing through the resistance of an ohm, or the heat generated by a Coulomb running down through a difference of potential of 1 volt. It is therefore the amount of heat equivalent to 10^7 ergs. Assuming Joule's equivalent = 41,890,000 ergs, it is the heat necessary to raise ·24 gramme of water 1° C.

$$\therefore E\ I\ T = I^2\ R\ T = E^2\ T \div R = E\ Q \text{ Joules}.$$

And since 1 H.P. = 550 ft.-lbs. per second,

$$W = \tfrac{550}{746}\ E\ Q = \cdot 7373\ E\ Q \text{ ft.-lb.}$$

HEAT UNITS.

HEAT UNITS.—The French unit of heat is the quantity of heat required to raise 1 gramme mass of water, from 4° (temperature of maximum density) to 5° Cent. = 1 gramme degree Cent. = ·00397 British heat unit. The kilogramme degree Cent. in engineering is called the CALORIE. It is = 3·968 British units of heat (B.Th.U.).

The BRITISH THERMAL UNIT is the amount of heat required to raise 1 pound of water, from 60° Fah. to 61° = 1 pound degree Fah. = 0·2519 calories.

JOULE'S EQUIVALENT,* J, is the amount of ENERGY equivalent to a UNIT OF HEAT. Then, for

1 g.-deg. Cent., $J = 41{\cdot}89 \times 10^6$, say 42×10^6 ergs.
1 Calorie $J = 41{\cdot}89 \times 10^9$, say 42×10^9 ergs.
1 lb.-deg. Cent., $J = 1{\cdot}92 \times 10^{10}$ ergs, or 1,400 ft.-lbs.
1 lb.-deg. Fah., $J = 1{\cdot}07 \times 10^{10}$ ergs, or 778 ft.-lbs.

* See *Science Abstracts*, vol. ii., p. 611, for Rowland's, Griffith's, Schuster's, or the latest values for J.

THE HEAT GENERATED in time, T, by a current, I, through a wire of resistance, R, is

$$\frac{I^2 R T}{J} \quad \frac{E I T}{J}$$

where $J = 42 \times 10^6$ and I, R, and E are expressed either in absolute electro-magnetic or electro-static units, and T in seconds.

For practical use, when I is ampères, R ohms, E volts, and T secs., the heat generated in time $T = I^2 R T \times 0{\cdot}24$; or $0{\cdot}24$ E I T calories. Or, ·0009 E I T British units.

RELATION BETWEEN SPARKING DISTANCES AND IMPRESSED VOLTAGE.

In the Standardisation Rules of the American Institute of Electrical Engineers, the following table of sparking distances in air between opposed sharp needle points for various effective sinusoidal voltages is given :—

Kilovolts sq. root of mean sq.	Inches sparking distance.	Kilovolts sq. root of mean sq.	Inches sparking distance.	Kilovolts sq. root of mean sq.	Inches sparking distance.
5	0·225	80	7·1	200	20·25
10	0·47	90	8·35	210	21·30
15	0·725	100	9·6	220	22·35
20	1·0	110	10·75	230	23·40
25	1·3	120	11·85	240	24·45
30	1·625	130	12·90	250	25·50
35	2·0	140	13·95	260	26·50
40	2·45	150	15·0	270	27·50
45	2·95	160	16·5	280	28·50
50	3·55	170	17·10	290	29·50
60	4·65	180	18·15	300	30·50
70	5·85	190	19·20		

Recent tests show that needle-point gaps are not reliable above 100,000 volts. A sphere gap voltmeter is recommended by S. W. Farnsworth and C. L. Fortescue (Proc. Am. Inst. E. E., Feb., 1913), and the tests made by the latter and L. W. Chubb give the following results :—

Diam. of Spheres in C.M.	Gap in C.M.	Volts.
25	2	60,000
25	4	112,000
25	6	165,000
50	8	215,000
50	10	260,000
50	14	350,000

SPECIFIC INDUCTIVE CAPACITIES.

(By permission of the Proprietors of the Electrician.)

The *specific inductive capacity* of a substance is the ratio of the capacity of a condenser when the plates are separated by this substance to the capacity of the same condenser when its plates are separated by air at about 760 mm. pressure—no change being made in the condenser except in the substitution of air for the substance in question.

The determination of the specific inductive capacity of a substance does not admit of great accuracy on account of the phenomenon of absorption or soaking in of the charge which causes an apparent diminution * in the specific inductive capacity for charges of short duration as compared with those of long duration. The figures given in the following table should, therefore, only be regarded as approximately correct.

Substance.	Specific Inductive Capacity.	Authority.
Flint glass, very light, density 2·87	6·61	J. Hopkinson
,, light, density 3·2	6·72	J. Hopkinson
,, ,,	3·01	Wüllner
,, dense, density 3·66	7·38	J. Hopkinson
,, ,,	3·05	Wüllner
,, extra dense, density 4·5	9·90	J. Hopkinson
,, extra dense	3·16	Wüllner
Crown glass, hard, density 2·485	6·96	J. Hopkinson
,,	3·11	Wüllner
Plate glass	8·45	J. Hopkinson
,,	5·83 to 6·34	Wüllner
White mirror glass	5·83	Schiller
,, ,,	6·34	Siemens
Straw-coloured glass	2·96 to 3·66	Schiller
,, ,,	4·12	Siemens
Paraffin wax	1·977	Gibson & Barclay
,, ,,	1·96	Wüllner
,, ,,	2·32	Boltzman
,, ,,	1·68 to 1·92	Schiller
,, ,,	2·19 to 2·34	Siemens
Indiarubber, pure	2·12	Schiller
,, ,,	2·34	Siemens
,, vulcanised	2·69	Schiller
,, ,,	2·04	Siemens
Resin	2·55	Boltzman
Ebonite	2·21 to 2·76	Schiller
,,	3·15	Boltzman
,,	2·56	Wüllner
,,	2·28	Gordon
Sulphur	2·88 to 3·21	Wüllner
,,	3·84	Boltzman
,,	2·58	Gordon
Shellac	2·74	Gordon
,,	2·95 to 3·73	Wüllner
,,	3·15	Boltzman
Gutta-percha	4·2	Faraday
,,	2·46	Gordon
Mica	5·0	Faraday
Pitch	1·8	Faraday
Petroleum, spirit, Field's	1·92	J. Hopkinson
,, essence of	2·17	Perot
,, oil, Field's	2·07	J. Hopkinson
,, ,, common	2·10	J. Hopkinson
,, ,,	2·04 to 2·07	Silow
,, ,, neutral at 21° C.	2·26	E. B. Rosa
Turpentine, commercial	2·23	J. Hopkinson
,, ,, at 18·6° C.	2·43	E. B. Rosa
,, oil of, at 17·1° C.	1·94	Quincke
,, ,,	2·16 to 2·22	Silow
Castor oil	4·78	J. Hopkinson
Sperm oil	3·02	J. Hopkinson
,, at 20° C.	3·09	E. B. Rosa
Benzine	2·20	Silow
,,	2·24	Perot
,, at 21° C.	2·45	E. B. Rosa
Bisulphide of carbon at about 11° C.	1·97 to 2·22	Quincke
,, ,, ,,	1·81	Gordon
Water at 14° C	83·8	Tereschin
,, 25° C.	75·7	E. B. Rosa
Air at about 0·001 mm. pressure	0·94	Ayrton
,, ,, 5 mm. ,,	0·9985	Ayrton
,, ,, ,, ,,	0·9994	Boltzman
Hydrogen at about 760 mm. pressure	0·9997	Boltzman
,, ,, ,, ,,	0·9998	Ayrton
Carbon dioxide at about 560 mm. pressure	1·0004	Boltzman
,, ,, ,, ,, ,,	1·0008	Ayrton
Olefiant gas at about 760 mm. pressure	1·0007	Boltzman
Sulphur dioxide at about 760 mm. pressure	1·0037	Ayrton

* According to M. Perot the reverse is sometimes the case with impure liquids.

SPECIFIC ELECTRICAL RESISTANCE TABLE.

METALS, ALLOYS, ELECTROLYTES, INSULATORS.

(By permission of the Proprietors of the Electrician.)

METALS AND ALLOYS.

Metal or Alloy.	Resistance Compared with Copper (approx.)	Specific Resistance in C.G.S. Units at 0° C.	Temperature Coefficient per 1° C.
Aluminium, annealed	2	2,946	0·0039
,, hard-drawn... ...	2	3,160	0·0039
Antimony, pressed	22½	35,900	0·0039
Bismuth, pressed...	83	132,650	0·0054
Cadmium	6¼	6,800	—
Carbon, retort	42,000	67×10^6	—
,, arc light (Carré) ...	4,400	7×10^6	—0·0005
,, glow lamp (Edison-Swan)	2,500	4×10^6	—0·00054
Copper, soft	1	1,580	0·00388
,, hard	1	1,616	0·00388
German silver (Cu 4 parts, Ni 2 parts, Zn 1 part)	13¼	21,170	0·00044
Gold, purest soft	1¼	1,952	0·00336
,, hard-drawn	1¼	2,118	0·00365
Iron	6	9,611	0·0048
Lead, pressed	12¼	19,850	0·00387
Lead peroxide, chemically prepared	4×10^6	5590×10^6	—*
Lead peroxide, electrolytically prepared	4×10^6	6780×10^6	—*
Mercury, liquid	59	94,070	0·00072
Manganin (Cu 84 per cent., Mn 12 per cent., Ni 4 per cent.)	26	42,000	0° to 10° C. = +0·000025 10° to 20° C. = +0·000014 20° to 30° C. = +0·000003 30° to 40° C. = 0 40° to 50° C. = —0·000003 50° to 60° C. = —0·000006
Manganese copper (Cu 70 per cent., Mn 30 per cent.)	63	100,600	0·00004
Nickel, pure	7¾	12,290	0·0048
Platinum, pure annealed ...	5	8,222	0·0032
Platinoid (German silver +1 or 2 per cent. of Tungsten)	27¼	43,600	0·00025
Platinum iridium (Pt = 80 per cent., Ir = 20 per cent.)	18⅓	29,375	0·00089
Platinum silver (Pt = 33 per cent., Ag = 66 per cent.)	16¾	26,820	0·00018
Phosphor bronze, commercial ...	5⅓	8,479	0·00064
Silver, annealed	—	1,521	0·00377
,, hard-drawn	—	1,652	—
Tin, pure	6	9,565	0·004
,, pressed	8½	13,360	0·0036
Zinc, pressed	3½	5,690	0·0036

* John Shields, *Chem. News*, "No alteration observed on heating up to 115° C."

TABLE SHOWING RELATIVE VALUES OF STANDARD, BIRMINGHAM AND AMERICAN (BROWN & SHARPE) WIRE GAUGES.

Reprinted by permission from the "Engineer's Year Book of Formula, Rules, Tables, Data and Memoranda" for 1913 by H. R. Kempe, M.Inst.C.E. Published by Crosby Lockwood & Son.

S.W.G.	B.W.G.	A.W.G.	Equivalent in Mils.	Equivalent in Mms.	S.W.G.	B.W.G.	A.W.G.	Equivalent in Mils.	Equivalent in Mms.
7/0			500	12·699	15	15	13	072	1·828
6/0			464	11·785		16		065	1·650
		0000	460	11·683	16		14	064	1·625
	0000		454	11·531		17		058	1·472
5/0			432	10·972			15	057	1·447
	000		425	10·794	17			056	1·421
		000	409	10·388			16	050	1·270
0000			400	10·159		18		049	1·244
	00		380	9·651	18			048	1·218
000			372	9·448			17	045	1·142
		00	365	9·271		19		042	1·066
00			348	8·839	19		18	040	1·016
	0		340	8·635	20		19	036	0140
		0	325	8·254		20		035	8886
0			324	8·229	21	21	20	032	8124
1	1		300	7·620		22		030	7617
		1	289	7·340			21	0284	7213
	2		284	7·213	22			028	7109
2			276	7·010			22	0253	6126
	3		259	6·578		23		025	6347
		2	257	6·527	23			024	6093
3			252	6·400	24	24	23	022	5585
	4		238	6·045	25	25	24	020	5078
4			232	5·892	26	26	25	018	4570
		3	229	5·816	27	27	26	016	4062
	5		220	5·588	28	28	27	014	3555
5			212	5·384	29	29		013	3300
		4	204	5·181			28	0122	3100
	6		203	5·156	30	30		012	3046
6			192	4·876	31		29	011	2800
		5	182	4·622	32			0108	2743
	7		180	4·571	33	31	30	010	2539
7			176	4·470	34	32	31	009	2300
	8		165	4·191	35	33	32	008	2031
		6	162	4·114	36	34	33	007	1777
8			160	4·064	37			0068	1727
	9		148	3·759	38		34	006	1523
9		7	144	3·657			35	0056	1422
	10		134	3·403	39	35	36	005	1269
10		8	128	3·251	40			0048	1219
	11		120	3·047	41		37	0044	1118
11			116	2·946	42	36	38	004	1015
		9	114	2·895	43		39	0036	0914
	12		109	2·768	44		40	0032	0813
12			104	2·641	45			0028	0713
		10	102	2·590	46			0024	0610
	13		095	2·412	47			002	0507
13			092	2·336	48			0016	0406
		11	090	2·286	49			0012	0305
	14		083	2·108	50			001	0253
14		12	080	2·032					

GILBERT'S TABLE (Ordinary Catenary).

z=100=half span.

c=Modulus.	d=dip.	s=length of wire.	l=ordinate at insulator.	90°—t°.		
				°	′	″
2000	2·500511	100·041474	2002·500511	87	8	11
1950	2·564593	100·042440	1952·564593	87	3	46
1900	2·632163	100·045727	1902·632163	86	59	8
1850	2·703298	100·047540	1852·703298	86	54	15
1800	2·778421	100·050163	1802·778421	86	49	6
1750	2·857914	100·054318	1752·857914	86	43	40
1700	2·942018	100·057566	1702·942018	86	37	53
1650	3·031204	100·060788	1653·031204	86	31	46
1600	3·125974	100·064421	1603·125974	86	25	16
1550	3·226852	100·068245	1553·226852	86	18	21
1500	3·334558	100·073939	1503·334558	86	10	59
1450	3·449618	100·078929	1453·449618	86	3	6
1400	3·572907	100·084490	1403·572907	85	54	39
1350	3·705344	100·090750	1353·705344	85	45	35
1300	3·847958	100·097440	1303·847958	85	35	45
1250	4·002035	100·105463	1254·002035	85	25	16
1200	4·168981	100·114680	1204·168981	85	13	51
1150	4·350543	100·125801	1154·350543	85	1	26
1100	4·548545	100·137346	1104·548545	84	47	54
1050	4·765440	100·150553	1054·765410	84	33	5
1000	5·004084	100·165906	1005·004084	84	16	48
980	5·106408	100·173025	985·106408	84	9	49
960	5·213007	100·180582	965·213007	84	2	13
940	5·324098	100·188974	945·324098	83	54	58
920	5·440045	100·196191	925·440045	83	47	4
900	5·561266	100·205825	905·561266	83	38	48
880	5·687876	100·214837	885·687876	83	30	11
860	5·820479	100·225255	865·820479	83	21	9
840	5·959364	100·235949	845·959364	83	11	42
820	6·105033	100·247321	826·105038	83	1	47
800	6·258102	100·260296	806·258102	82	51	23
780	6·418938	100·273356	786·418938	82	40	28
760	6·588360	100·288153	766·588360	82	28	57
740	6·767004	100·304328	746·767004	82	16	50
720	6·955577	100·321527	726·955577	82	4	3
700	7·154926	100·339869	707·154926	81	50	33
680	7·366193	100·360765	687·366193	81	36	15
660	7·590181	100·382517	667·590181	81	21	6
640	7·828368	100·407143	647·828368	81	5	1
620	8·081923	100·433570	628·081923	80	47	54
600	8·352608	100·463404	608·352608	80	29	40
580	8·642033	100·495085	588·642033	80	10	11
560	8·952299	100·532176	568·952299	79	49	27
540	9·283888	100·562366	549·283888	79	27	2
520	9·645021	100·617335	529·645021	79	2	56
500	10·033315	100·667683	510·033315	78	36	59
480	10·454508	100·725490	490·454508	78	8	55
460	10·912412	100·789382	470·912412	77	38	28
440	11·412622	100·863052	451·412622	77	5	23
420	11·961025	100·947150	431·961025	76	29	6
400	12·565207	101·044792	412·565207	75	49	22
380	13·233994	101·158163	393·233994	75	5	35
360	13·978365	101·290757	373·978365	74	17	7
340	14·812141	101·447796	354·812141	73	32	10
320	15·752501	101·635337	335·752501	72	22	46
300	16·821529	101·862069	316·821529	71	14	44
280	18·047685	102·139232	298·047685	69	57	31
260	19·468993	102·483745	279·468993	68	29	13
240	21·126437	102·893226	261·126437	66	47	38
220	23·118850	103·473548	243·118850	64	48	38
200	25·525175	104·219022	225·525175	62	28	34
180	28·559946	105·343499	208·559946	59	39	43
160	32·280531	106·638654	192·280531	56	19	0
140	37·258541	108·722538	177·258541	52	10	2
120	44·134402	111·982596	164·134402	46	58	48
100	54·308027	117·520071	154·308027	40	23	42
95	57·674415	119·517684	152·674415	38	28	45
90	61·511583	121·884206	151·511583	36	26	34
85	65·852160	124·624934	150·852160	34	17	44
80	74·073875	128·153485	151·073875	31	58	28
75	77·147407	132·377616	152·147407	29	32	4
70	84·433443	137·657866	154·433443	26	57	10

Explanatory example of the use of table on p. 710.

Let the distance between the points of support be 2,000 ft. Then x, the half-span, is 1,000 ft. In the table x is represented by 100; therefore every unit in the table represents 10 ft.

Let the required sag be 30 ft., or 3 units of dip. The nearest to this in column 2 is $d = 3{\cdot}031$.

In column 5 we find that the angle which the catenary will make with the vertical through the point of support is 86° 31′ 46″.

In column 3 we find that the actual length of the catenary will be 100·060788 units, or 1000·61 ft.

In column 1 we find that the modulus c is 1,650. This modulus multiplied by the weight per unit length gives the tension at the lowest (mid-) point.

Thus if the wire forming the catenary weighs 100 lbs. per 1,000 yards, or 1·30 lb. per foot, the weight per unit of the table is $\frac{1}{3}$ lb., and the tension at the lowest point will be 1,650 + $\frac{1}{3}$, or 550 lbs., due to weight of wire alone.

The tension at the point of suspension is found by adding to this mid-point tension the product of the sag in feet into the weight of wire per foot; that is, in this case, by adding 1 lb.

THE GREEK ALPHABET.

Large	Small	Name	Commonly used to designate
A	α	alpha	angles, coefficients.
B	β	beta	angles, coefficients.
Γ	γ	gamma	specific gravity.
Δ	δ	delta	density, variation.
E	ϵ	epsilon	base of hyperbolic logarithms.
Z	ζ	zeta	co-ordinates, coefficients.
H	η	eta	hysteresis (Steinmetz) coefficient, efficiency
	θ	theta	angular phase displacement.
I	ι	iota	
K	κ	kappa	dielectric constant.
Λ	λ	lambda	conductivity.
M	μ	mu	permeability.
N	ν	nu	reluctivity.
Ξ	ξ	xi	output coefficient.
O	o	omicron	
Π	π	pi	circumference—radius.
P	ρ	rho	resistivity.
Σ	σ	sigma	(cap.), summation; (small), slip.
T	τ	tau	time phase displacement.
Υ	υ	upsilon	leakage coefficient.
Φ	ϕ	phi	flux.
X	χ	chi	
Ψ	ψ	psi	
Ω	ω	omega	(cap.), ohm; (small), angular velocity.

"THE BEAUFORT SCALE": THE FORCE OF THE WIND.

[Invented by Admiral Beaufort, 1805. Admiral Sir Francis Beaufort, K.C.B., F.R.S., was Hydrographer of the Navy from 1829 to 1855.]

Figures to denote the Force of the Wind.	Description of Wind.	POWER OF THE WIND as regards a well-conditioned Man of War or First-class Clipper Ship.	Rate of the Wind per Hour in Miles.
0	Calm	—	0 to 2
1	Light air	Just sufficient to give steerage way	3–10
2	Light breeze	With which the above ship with all sail set and clean hull would go in smooth water (1–2 knots)	11–15
3	Gentle breeze	(3–4 ,,)	16–20
4	Moderate breeze	(5–6 ,,)	21–25
5	Fresh breeze	In which she could just carry close-hauled: Royals, etc.	26–30
6	Strong breeze	Single Reefs and T.G. sails	31–36
7	Moderate gale	Double Reefs and jib, etc.	37–44
8	Fresh gale	Triple reefs, etc.	45–52
9	Strong gale	Close reefs and courses	53–60
10	Whole gale	In which she could just bear close-reefed main topsail and reefed foresail	61–69
11	Storm	Under storm staysails	70–80
12	Hurricane	Bare poles	above 80

"THE BEAUFORT SCALE": FORMULÆ FOR RECORDING STATE OF THE WEATHER.

B denotes Blue Sky, *i.e.*, clear or hazy atmosphere.

C ,, Cloudy — detached opening clouds.

D ,, Drizzling Rain.

F ,, Fog—FF Thick Fog.

G ,, Gloomy Dark weather.

H ,, Hail.

L ,, Lightning.

M ,, Misty or Hazy—so as to interrupt the view.

O ,, Overcast — *i.e.*, the whole sky covered with an impervious cloud.

P ,, Passing Showers.

Q ,, Squally.

R ,, Rain—continuous rain.

S ,, Snow.

T ,, Thunder.

U denotes Ugly, threatening appearance of the weather.

V ,, Visibility of distant objects.

W ,, Wet dew.

. Dot under any letter, an extraordinary degree.

By the combination of these letters all the ordinary phenomena of the weather may be recorded with certainty and brevity, *e.g.*,

BCM—Blue sky, with detached opening clouds, but hazy round the horizon.

GV—Gloomy dark weather, but distant objects *remarkably* visible.

MEASURES OF TIME.

The earth's axial rotation is the phenomenon by which time is measured everywhere on the earth's surface. Experiment and observation show that, if we assume the earth to rotate uniformly, there are many other phenomena which are as accurately isochronous in their periodicity. That is to say, they pass again and again through all their phases in exactly the same interval of time as measured in terms of the earth's rotation. In the pendulum of a clock and the balance-wheel of a watch we have such isochronism very approximately realised. A little consideration will convince us that the measurement of time is really a comparison of periodic sequences. We cannot conceive any other mode of marking off time intervals than by some kind of motion of a periodic character. Our practical unit of time is essentially terrestrial.

SIDEREAL DAY.—The standard unit of time is the SIDEREAL DAY, being the period in which the earth turns once round on its axis. It is divided into sidereal hours, minutes, and seconds; but these measures of time are used by astronomers only.

MEAN SOLAR TIME.—A SECOND is the time of one swing of a pendulum adjusted so as to make 86,164·09 swings in a sidereal day. Seconds are usually subdivided decimally.

One MEAN SOLAR DAY = 24 hours = 1,440 minutes = 86,400 seconds = 1·00273791 sidereal day.

RELATION BETWEEN TIME AND LONGITUDE.—At any given instant the mean solar time at two stations differs by an amount proportional to their difference of longitude, the time at the eastern station being the earlier.

CORRESPONDING DIFFERENCES.

Longitude.	Time.	Longitude.	Time.
15″	1 second.	75°	5 hours.
1′	4 seconds.	90	6 ,,
15′	1 minute.	105	7 ,,
1°	4 minutes.	120	8 ,,
15°	1 hour.	135	9 ,,
30	2 hours.	150	10 ,,
45	3 ,,	165	11 ,,
60	4 ,,	180	12 ,,

To show the exact date of any event, the meridian at which the time is reckoned must be specified. One degree longitude at Equator = 60 nauts = 69·17 statute miles.

STANDARD, OR ZONE TIME.

Country.	Central Meridian.	Fast or Slow on Greenwich Time.
Western Europe, Algeria	0°	Greenwich Time.
Central Europe, Tunis, Congo, Angola, German South-West Africa	15° E.	1 h. fast
Eastern Europe, British South Africa, Egypt, Portuguese East Africa	30° E.	2 h. fast
Mauritius, Reunion and Seychelles	60° E.	4 h. fast
India (except Calcutta), and Ceylon	82½° E.	5½ h. fast
Calcutta	90° E.	6 h. fast
Burmah	97½° E.	6½ h. fast
Federated Malay States, Straits Settlements, and French Indo-China	105° E.	7 h. fast
Java	109° 48′ 37.5″ E.	7 h. 19 m. 14.5s. fast
Western Australia, Hong Kong, East Coast of China, Kiau Chau, Philippine Islands, British North Borneo, Labuan	120° E.	8 h. fast
Korea	127° 30′ E. ...	8½ h. fast
Japan, Seoul, and Chemulpo ...	135° E.	9 h. fast
South Australia and Guam ...	142° 30′ E. ...	9½ h. fast
New South Wales, Queensland, Tasmania, Victoria, New Guinea, and Caroline Island	150° E.	10 h. fast.
New Zealand	172½° E.	11½ h. fast
Ascension	14° 15′ W. ...	57 m. slow
Iceland, Madeira, Liberia and Portuguese Guinea	15° W. ...	1 h. slow
America:		
Atlantic (New Brunswick, Nova Scotia, Prince Edward Island, Grenada, Trinidad, etc. ...	60° W.	4 h. slow
Eastern (Chili, Panama, Peru, etc.)	75° W.	5 h. slow
Central	90° W.	6 h. slow
Mountain	105° W.	7 h. slow
Pacific (British Columbia, etc.) ...	120° W.	8 h. slow
Alaska	135° W.	9 h. slow
Hawaii or Sandwich Islands ...	157° 30′ W. ...	10½ h. slow
Samoa	172½° W.... ...	11½ h. slow

Greenwich time is used in France, Spain, Portugal, Belgium, Gibraltar, and the Faroes.

MEASURES IN WHICH GEOGRAPHICAL DISTANCES ARE EXPRESSED IN VARIOUS COUNTRIES

		Length in English Yards.		English Miles.		English Miles.		Miles, etc, of different, Countries.
Arabia	Mile	2,148	100 =	122·04	and	100	=	81·93
Austria	Mile	10,126	do.	575·34	,,	do.		17·38
Bohemia	Mile	10,137	do.	575·96	,,	do.		17·36
Brabant	League	6,076	do.	345·22	,,	do.		28·96
Burgundy	League	6,183	do.	351·66	,,	do.		28·46
China	Li	632	do.	35·91	,,	do.		278·48
Denmark	Mile	8,244	do.	468·41	,,	do.		21·35
England	Mile	1,760	do.	100·00	,,	do.		100·00
Flanders	League	6,864	do.	390·00	,,	do.		25·64
France	Kilometre	1,093	do.	62·10	,,	do.		161·02
Hamburg	Mile	8,244	do.	468·41	,,	do.		21·35
Hanover	Mile	11,559	do.	656·76	,,	do.		15·22
Hesse	Mile	10,547	do.	599·26	,,	do.		16·68
Holland	Mile	8,101	do.	460·28	,,	do.		21·72
Hungary	Mile	9,113	do.	517·78	,,	do.		19·31
Italy	Mile	2,025	do.	115·05	,,	do.		86·91
Norway	Mile	12,352	do.	701·83	,,	do.		14·25
Portugal	League	6,760	do.	384·09	,,	do.		26·03
Prussia	Mile	8,237	do.	480·68	,,	do.		21·37
Rome	Mile	1,628	do.	92·50	,,	do.		108·11
Russia	Verst	1,167	do.	66·30	,,	do.		150·81
Saxony	Mile	9,905	do.	562·78	,,	do.		17·76
Silesia	Mile	7,083	do.	402·44	,,	do.		24·84
Spain	Common League of 8,000 Varas	7,416	do.	421·36	,,	do.		23·73
Spain	Legal Legua of 5,000 Varas	4,635	do.	275·34	,,	do.		37·97
Swabia	Mile	10,126	do.	563·35	,,	do.		17·38
Sweden	Mile	11,700	do.	664·77	,,	do.		15·04
Switzerland	Mile	9,153	do.	520·05	,,	do.		19·23
Turkey	Berri	1,826	do.	103·75	,,	do.		96·38
Tuscany	Mile	1,808	do.	102·72	,,	do.		97·34
Westphalia	Mile	12,151	do.	690·39	,,	do.		14·48

LENGTH OF A DEGREE IN LATITUDE AND LONGITUDE

Lat.	Degree of Longitude.		Degree of Latitude.		Lat.	Degree of Longitude.		Degree of Latitude.	
°	Stat. Miles.	Naut. Miles.	Stat. Miles.	Naut. Miles.	°	Stat. Miles.	Naut. Miles.	Stat. Miles.	Naut. Miles.
0	69·160	60·000	68·698	59·600	45	48·986	42·498	69·044	59·899
2	·119	59·964	·699	·601	47	47·251	40·993	·068	·920
4	68·992	·855	·702	·603	49	45·459	39·439	·092	·941
6	·783	·673	·706	·607	51	43·611	37·835	·116	·962
8	·491	·419	·712	·612	53	41·710	36·186	·140	·982
10	·116	·093	·719	·618	55	39·758	34·491	·162	60·002
12	67·659	58·697	·728	·625	57	37·756	32·755	·184	·022
14	·120	·229	·738	·634	59	35·707	30·979	·206	·041
16	66·499	57·690	·750	·645	61	33·615	29·164	·228	·059
18	65·797	·081	·764	·657	63	31·481	27·311	·248	·077
20	·015	56·404	·779	·669	65	29·308	25·425	·268	·094
22	64·154	55·657	·795	·683	67	27·100	23·509	·286	·110
24	63·216	54·843	·813	·699	69	24·857	21·564	·302	·124
26	62·201	53·962	·831	·715	71	22·582	19·593	·318	·137
28	61·110	·016	·850	·731	73	20·282	17·597	·333	·149
30	59·944	52·005	·870	·749	75	17·956	15·578	·345	·161
32	58·706	50·931	·892	·767	77	15·607	13·539	·357	·171
34	57·396	49·794	·914	·786	79	13·238	11·484	·367	·179
36	56·016	48·597	·936	·806	81	10·853	9·417	·375	·186
38	54·568	47·340	·959	·826	83	8·456	7·338	·381	·192
40	53·053	46·026	·983	·846	85	6·048	5·248	·387	·196
42	51·473	44·656	69·007	·866	87	3·632	3·151	·390	·199
44	49·830	43·231	·013	·888	89	1·211	1·050	·392	·201

TABLE FOR FINDING THE TIMES OF SUNRISE AND SUNSET.

Reprinted from Whitaker's Almanack by kind permission of the Proprietors.

This double entry table provides the means for finding, with sufficient accuracy for all practical purposes, the times of sunrise and sunset for any place situated between latitudes 1° and 66°.

To use the table: With the Sun's declination, in the first column, and under the required latitude on the horizontal line, will be found the apparent time of sunset. Subtracting the time so found from 12 *h.* will give the apparent time of sunrise. To obtain the mean or clock time, the numbers in the column headed *before* or *after* clock (which will be found on the second page of each month), giving the difference in time between the mean and true sun for each day in the year, must be applied to the apparent times of sunrise and sunset, as the particular case may require; that is to say, if the true sun is *before* the clock the equation of time must be subtracted from the apparent to obtain the mean or clock time, and if *after*, added.

The table is arranged for northern latitudes, but will serve equally well for places south of the Equator by changing the declination from North to South and *vice versâ*.

If the time of sunrise or sunset should be required for any declination or latitude falling between the arguments in the table, these times may easily be found by simple proportion.

DECLINATION.	LATITUDE.														
	1°	14°	26°	35°	43°	49°	53°	56°	58°	60°	62°	63°	64°	65°	66°
	h. m.	h. m.	h. m.	h. m	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h.m.	h. m.	h. m.
24 N	6 4	6 28	6 53	7 16	7 42	8 7	8 30	8 51	9 8	9 29	9 57	10 15	10 38	11 13	—
23	6 4	6 27	6 50	7 12	7 37	8 1	8 22	8 41	8 57	9 16	9 40	9 55	10 13	10 36	11 12
22	6 4	6 25	6 48	7 9	7 32	7 55	8 14	8 32	8 47	9 4	9 25	9 38	9 53	10 12	10 35
21	6 4	6 24	6 46	7 5	7 27	7 49	8 7	8 24	8 37	8 53	9 12	9 23	9 37	9 51	10 10
20	6 4	6 23	6 43	7 2	7 23	7 43	8 0	8 15	8 28	8 42	8 59	9 10	9 21	9 34	9 49
19	6 4	6 22	6 41	6 59	7 18	7 37	7 53	8 7	8 19	8 32	8 48	8 57	9 7	9 18	9 32
18	6 4	6 21	6 39	6 55	7 14	7 31	7 46	8 0	8 10	8 22	8 37	8 45	8 54	9 4	9 16
17	6 3	6 20	6 37	6 52	7 9	7 26	7 40	7 52	8 2	8 13	8 26	8 34	8 42	8 51	9 1
16	6 3	6 19	6 35	6 49	7 5	7 21	7 33	7 45	7 54	8 4	8 16	8 23	8 30	8 38	8 48
15	6 3	6 18	6 32	6 46	7 1	7 15	7 27	7 39	7 46	7 56	8 6	8 13	8 19	8 27	8 35
14	6 3	6 16	6 30	6 43	6 57	7 10	7 21	7 31	7 39	7 47	7 57	8 3	8 9	8 15	8 23
13	6 3	6 15	6 28	6 40	6 53	7 5	7 15	7 24	7 31	7 39	7 48	7 53	7 59	8 5	8 11
12	6 3	6 14	6 26	6 37	6 49	7 0	7 9	7 18	7 24	7 31	7 39	7 44	7 49	7 54	8 0
11	6 3	6 13	6 24	6 34	6 45	6 55	7 3	7 11	7 17	7 23	7 31	7 35	7 39	7 44	7 49
10	6 3	6 12	6 22	6 31	6 41	6 50	6 58	7 5	7 10	7 16	7 22	7 26	7 30	7 34	7 39
9	6 3	6 11	6 20	6 28	6 37	6 45	6 52	6 58	7 3	7 8	7 14	7 17	7 21	7 25	7 29
8	6 3	6 10	6 18	6 25	6 33	6 41	6 47	6 52	6 56	7 1	7 6	7 9	7 12	7 15	7 19
7	6 3	6 9	6 16	6 22	6 29	6 36	6 41	6 46	6 49	6 53	6 58	7 1	7 3	7 6	7 10
6	6 3	6 8	6 14	6 19	6 25	6 31	6 36	6 40	6 43	6 46	6 50	6 52	6 55	6 57	7 0
5	6 2	6 7	6 12	6 17	6 22	6 26	6 30	6 34	6 36	6 39	6 42	6 44	6 46	6 48	6 51
4	6 2	6 6	6 10	6 14	6 18	6 22	6 25	6 28	6 30	6 32	6 35	6 36	6 38	6 40	6 41
3	6 2	6 5	6 8	6 11	6 14	6 17	6 19	6 22	6 23	6 25	6 27	6 28	6 30	6 31	6 32
2	6 2	6 4	6 6	6 8	6 10	6 12	6 14	6 16	6 17	6 18	6 20	6 20	6 21	6 22	6 23
1 N	6 2	6 3	6 4	6 5	6 7	6 8	6 9	6 10	6 10	6 11	6 13	6 13	6 13	6 14	6 14
0	6 2	6 2	6 2	6 3	6 3	6 4	6 4	6 4	6 4	6 4	6 5	6 5	6 5	6 5	6 5
1 S	6 2	6 1	6 0	6 0	5 59	5 59	5 58	5 58	5 58	5 57	5 57	5 57	5 57	5 56	5 56
2	6 2	6 0	5 58	5 57	5 55	5 54	5 53	5 52	5 51	5 50	5 49	5 49	5 48	5 48	5 47
3	6 2	5 59	5 56	5 54	5 52	5 49	5 48	5 46	5 45	5 43	5 42	5 41	5 40	5 39	5 38
4	6 2	5 58	5 55	5 51	5 48	5 45	5 42	5 40	5 38	5 36	5 34	5 32	5 32	5 31	5 29
5	6 2	5 57	5 53	5 49	5 44	5 40	5 37	5 34	5 32	5 29	5 27	5 25	5 24	5 22	5 20
6	6 2	5 56	5 51	5 46	5 40	5 35	5 31	5 28	5 25	5 22	5 19	5 17	5 15	5 13	5 11
7	6 2	5 55	5 49	5 43	5 37	5 31	5 26	5 22	5 19	5 15	5 11	5 9	5 7	5 4	5 1
8	6 1	5 54	5 47	5 40	5 33	5 26	5 21	5 16	5 12	5 8	5 3	5 1	4 58	4 55	4 52
9	6 1	5 53	5 45	5 37	5 29	5 21	5 16	5 10	5 5	5 1	4 55	4 53	4 49	4 46	4 42
10	6 1	5 52	5 43	5 34	5 25	5 17	5 10	5 3	4 59	4 53	4 47	4 44	4 40	4 37	4 32
11	6 1	5 51	5 41	5 31	5 21	5 12	5 4	4 57	4 52	4 46	4 39	4 35	4 31	4 27	4 22
12	6 1	5 50	5 39	5 28	5 17	5 7	4 58	4 51	4 45	4 38	4 31	4 27	4 22	4 17	4 12
13	6 1	5 49	5 37	5 25	5 13	5 2	4 52	4 44	4 38	4 30	4 22	4 18	4 13	4 7	4 1
14	6 1	5 48	5 34	5 22	5 9	4 57	4 47	4 37	4 30	4 23	4 13	4 8	4 3	3 56	3 50
15	6 1	5 47	5 32	5 19	5 5	4 52	4 41	4 31	4 23	4 14	4 4	3 59	3 53	3 46	3 39
16	6 1	5 46	5 30	5 16	5 1	4 46	4 34	4 24	4 15	4 6	3 55	3 49	3 42	3 35	3 27
17	6 1	5 45	5 28	5 13	4 57	4 41	4 28	4 17	4 8	3 57	3 45	3 39	3 31	3 23	3 14
18	6 1	5 44	5 26	5 10	4 53	4 36	4 22	4 9	4 0	3 48	3 35	3 28	3 20	3 11	3 0
19	6 1	5 43	5 24	5 7	4 48	4 30	4 15	4 2	3 51	3 39	3 25	3 17	3 8	2 58	2 46
20	6 1	5 41	5 22	5 4	4 44	4 25	4 9	3 54	3 43	3 29	3 14	3 5	2 55	2 43	2 30
21	6 1	5 40	5 19	5 1	4 39	4 19	4 2	3 46	3 34	3 19	3 2	2 52	2 41	2 28	2 12
22	6 1	5 39	5 17	4 57	4 35	4 13	3 55	3 38	3 24	3 9	2 50	2 38	2 25	2 10	1 52
23	6 1	5 38	5 15	4 54	4 30	4 7	3 47	3 29	3 15	2 57	2 36	2 23	2 8	1 50	1 27
24 S	6 1	5 37	5 12	4 50	4 25	4 1	3 40	3 20	3 5	2 45	2 21	2 7	1 49	1 26	—

FUNNELS AND HOUSE FLAGS.

Reprinted from Whitaker's Almanack by kind permission of the Proprietors.

Line.	Funnel.	Flag.
Aberdeen	Yellow	Red and blue horizontal stripes; white star in centre
Allan	Red; with white band and black top	Red, white and blue horizontal stripes with red pennant above
American	Black; with white band	White, with blue eagle
Anchor	Black	White burgee, with red anchor
Atlantic Transport	Red; with black top	Red, white and blue horizontal stripes, with stars
Austrian-Lloyd	Black	Blue square, anchor in centre
Bibby	Pink; black top	Red
Booth	Black	White; red diagonal cross, B in centre
British and African	Black	Blue burgee; white cross
British India	Black; with white and black stripes	White burgee; with red diagonal
Bucknall	Black; three white diamonds	Blue; B S L in three white diamonds
Canadian Pacific Rly.	Buff; black top	Three red and three white squares
Chargeurs Réunis	Buff; white band with red stars	White flag with five red stars
Cie. Gén. Trans'que	Red; with black top	White; red ball; name of company in red
Cunard	Red; black top	Red; in centre lion holding globe
City	Buff; black top	Red, initials S S and blue pennant, initials J R E
Dominion	Red; white stripe, black top	Red pennant; white diamond, blue globe within, in centre
Elder Dempster	Black	White burgee; red St. George's Cross, crown in centre
Ellerman	Buff; black top, white band	Blue pennant; J R E in white
Furness	Black	Blue; F in white
Gen. Steam Nav. Co.	Black	White; 1824 under globe in centre, initials in corner
Hamburg-Amerika	Buff	Square divided diagonally into blue and white quarters, shield covering anchor in centre
Houlder	Black; white Maltese Cross on red band	Red; white Maltese Cross
Imperial D. W. India	Yellow	White burgee; red St. George's Cross, crown in centre
Lamport & Holt	Blue; black top, white band	One white longitudinal stripe (L & H in black) between two red stripes
Leyland	Pink; black top	Red
Messageries Maritimes	Black	White; red at corner; letters M M
Nederland	Buff; black top	White; blue cross in centre, red diamond (white N)
Netherlands-American	Buff; white between two green bands	White longitudinal stripe (N A S M) between two green ones
New Zealand S. Co.	Buff	White; red St. George's Cross, initials in squares; red, white and blue pennant above
Nippon Yusen K.	Black	White; five-pointed red star in centre
Norddeutscher-Lloyd	Buff	White; crossed key and anchor under wreath in blue
Orient S. N. Co.	Black	White; blue cross, crown in centre
Pacific Steam Nav. Co.	Black	White; blue St. George's Cross, crown in centre
Prince	Black; red band, white crown	Red burgee; white crown in centre
Red Star	Black; white band	White burgee; one red star
Rotterdam-Lloyd	Black	Wide white cross on red ground; blue square (R L white) in centre
R. Mail S. P. Co.	Buff	White; red diagonal cross and gold
Scandinavian-American	Centre red; top and bottom black	Blue; white Maltese Cross
Shaw, Savile & Albion	Buff; black top	Red cross on white square; one corner blue with white stars and red cross
Union-Castle	Red; black top	Blue; red diagonal cross super-imposed white cross
White Star	Buff; black top	Red burgee; five-pointed star
Wilson	Red; black top	White burgee; red ball

NAUTICAL MEASURES

(*From "Lloyd's Calendar," by permission of the Committee of Lloyd's.*)

12 inches ... ... = 1 foot 6 feet ... ... = 1 fathom

3 feet ... ... = 1 yard 3 nautical miles ... = 1 league

Sea or Nautical Mile = one-sixtieth of a degree of latitude, and varies from 6,046 ft. on the Equator to 6,092 ft. in lat. 60°.

Nautical Mile for speed trials, generally called the Admiralty Measured Mile ... { 6,080 feet / 1·151 statute miles / 1,853 metres

Cable's length = the tenth of a nautical mile; or approximately, 100 fathoms or 200 yards.

A Knot = a nautical mile an hour, is a measure of speed, but is not infrequently, though erroneously, used as synonymous with a nautical mile.

Length of European Measures of Distances compared with the Nautical Mile of 6,080 feet.

	Length in Nautical Miles.		Length in Nautical Miles.
Nautical Mile	1·000	German Ruthen	4·064
British Statute Land Mile	0·868	Italian Mile	1·000
Austrian Mile	4·094	Norwegian Mile	6·097
Danish Mile	4·064	Russian Verst	0·576
French Kilometre	0·539	Swedish Mile	5·769
German Geographical Mile	4·000		

SCOPE OF VISION AT SEA.

The distance at which objects are visible at sea on clear days varies, and is, in miles, about as stated below, at the elevations mentioned :—

Elevation Feet.	Miles.	Elevation Feet.	Miles.	Elevation Feet.	Miles.
5	2·96	50	9·35	500	29·58
10	4·18	100	13·23	1000	33·40
20	5·92	200	18·72	5280	96·18
		300	22·91		

LOCATION ABOARD SHIP.

Looking toward the bow or head of a vessel the

Left-hand side is Port. Right-hand side is Starboard.

To "Port the helm" carries the vessel's head to Starboard; to "Starboard the helm" carries the vessel's head to Port.

BELL TIME ON BOARD SHIP.

The nautical day begins at noon and is divided into "watches" of four hours each, time being indicated by bells striking every half hour.

A.M.	A.M.	A.M.		P.M.	P.M.	P.M.
12.30	4.30	8.30.....1	BELL	12.30	4.30	8.30
1.00	5.00	9.00.....2	BELLS.....	1.00	5.00	9.00
1.30	5.30	9.30.....3	BELLS.....	1.30	5.30	9.30
2.00	6.00	10.00.....4	BELLS.....	2.00	6.00	10.00
2.30	6.30	10.30.....5	BELLS.....	2.30	6.30	10.30
3.00	7.00	11.00.....6	BELLS.....	3.00	7.00	11.00
3.30	7.30	11.30.....7	BELLS.....	3.30	7.30	11.30
4.00	8.00	NOON.....8	BELLS.....	4.00	8.00	MIDNIGHT.

WIRELESS TELEGRAPH PATENTS

FROM the records of the Patent Office the year 1914 seemed to have opened very promisingly, and up to the commencement of hostilities the applications filed with reference to Wireless Telegraphy showed an increase on those of the previous year of nearly 20 per cent. Then matters changed completely, and when it is remembered that the belligerents include some of the most important commercial nations it will easily be understood that the war has had a great "slumping" effect upon Wireless patent expansion. Since the outbreak of war the number of applications have decreased by 30 per cent., compared with those of the similar period of 1913. The fact that Convention Applications have fallen behind has given occasion for the passing of the temporary rules suspending final decisions concerning applications which in the ordinary course of events would have been declared abandoned or void, or accepted but not sealed. Suspension has also been decided upon for the rule which provides that non-payment of current renewal fees shall entail the lapse of patents. Consequently, it is not possible to give this year a graph showing with any exactitude the state of patent development, as in previous editions; but such information as was available up to the time of going to press has been appended to the descriptions which will be found below.

Despite the present "slump," however, the war has opened up an extensive field for improvements in and further application of "Wireless" inventions that cannot fail to attact the attention and exercise the activity of Inventive Genius in the coming years of peace.

PATENTS APPLICATIONS IN 1914

GREAT BRITAIN.

Number.	Date.	Patentee and Description.
194	Jan. 3.	—ERNEST WILSON—Detector for radio-telegraphy or radio-telephony. (*Complete.*)
252	Jan. 5.	—GRAF GEORG VON ARCO and ALEXANDER MEISSNER—Relay arrangements for Wireless Telegraphy and Telephony. (*Complete.*)
440	Jan. 7.	—PERCY A. E. ARMSTRONG—Call-up switch for Wireless Telephones. (*Abandoned.*)

739 Jan. 10.—ARTHUR B. WEBBER and THE STANDARD TIME CO., LTD.—Device for prolonging the period between the active intermitting electric impulses. (*Abandoned.*)

1169 Jan. 15.—WM. H. SHEPHARD and A. MCKECHNIE—Wireless Telegraph or Telephone system. (*Accepted.*)

1556 Jan. 20.—JOHN HAYS HAMMOND, JUN.—Control of moving bodies by radiant energy. (*Accepted.*)

2206 Jan. 27.—FERNAND HOLWECK—Cathodic detectors. (*Complete.*)

2214 Jan. 27.—ROBERT GOLDSCHMIDT—Spark gap devices for Wireless Telegraphy. (*Open to Public Inspection.*)

2413 Jan. 29.—WM. H. SHEPHARD and A. MCKECHNIE—Recording apparatus for use with line or Wireless Telegraph systems. (*Complete.*)

2679 Feb. 2.—JOHN HAYS HAMMOND, JUN.—Methods of controlling distant apparatus by Hertzian waves. (*Accepted.*)

2738 Feb. 2.—ROBERTO C. GALLETTI—Transmission of Wireless signals. (*Complete.*)

2739 Feb. 2.—R. C. GALLETTI and R. MANZETTI—Electric dischargers. (*Complete.*)

2740 Feb. 2.—ROBERTO C. GALLETTI—Method of producing electric impulsive discharges. (*Accepted.*)

2935 Feb. 4.—AUGUSTE L. CHAUDET—Crystal detectors for Wireless Telegraphy. (*Accepted.*)

3080 Feb. 4.—A. T. M. JOHNSON, F. H. VARLEY and ANNIE C. N. TRY—Wireless Telegraphy. (*Complete.*)

3171 Feb. 6.—EGBERT VON LEBEL—Method of periodically modifying high frequency electric currents. (*Accepted.*)

3191 Feb. 6.—GEORGE OWEN SQUIER—Radio-telegraphic and radio-telephonic receiving system. (*Complete.*)

3192 Feb. 6.—EMILE GIRARDEAU—Radio-telegraphic station. (*Accepted.*)

3232 Feb. 7.—W. P. THOMPSON (for RUDOLF GOLDSCHMIDT, Germany)—Frequency transformers. (*Accepted.*)

3371 Feb. 9.—FRANCESCO DE BERNOCHI—System of apparatus for the Wireless electrical operation at a distance of a type-printing machine. (*Sealed.*)

3589 Feb. 11.—Robert B. Ransford (for Compagnie Universelle de Telegraphie et de Telephonie Sans Fil)—Alternating current machine and the like. (*Abandoned.*)

3590—Alternating current machines, transformers, and similar apparatus. (*Abandoned.*)

3591—Method of regulating the length of electric waves in Wireless Telegraphy and Telephony. (*Abandoned.*)

3592-3—Wireless Telegraph or Telephone Transmitters. (*Abandoned.*)

3840 Feb. 14.—William A. Benton and Walter C. Loynes—Wireless telegraphic signal receiving apparatus. (*Abandoned.*)

3963 Feb. 16.—Dr. J. A. Fleming, F.R.S.—Apparatus for generating H.F. oscillations for Wireless Telegraphy and Telephony (*Sealed.*)

4276 Feb. 19.—Frank H. Spicer—Radio-telegraphic timepiece. (*Abandoned.*)

4345 Feb. 19.—Societe Marius Latour—Transformation of frequency of H.F. alternating currents for Wireless Telegraphy and Telephony. (*Complete.*)

4664 Feb. 23.—Polyphos Elektrizitats Ges., M.B.H.—Production of electric waves for Wireless Telegraphy, Telephony and the like. (*Open to Public Inspection.*)

4666 Feb. 23.—Harold Wade (for Harold S. Mackaye, U.S.A.)—System of Wireless Telegraphy. (*Abandoned.*)

5281 March 2.—Henry P. Dwyer—Wireless oscillator. (*Accepted.*)

5370 March 3.—Harry Fothergill—Apparatus for radiating or receiving electro-magnetic waves on aeroplanes, airships and the like. (*Abandoned.*)

5535 March 4.—Gottlieb Leimbach—Wireless Telegraphy. (*Accepted.*)

5718 March 6.—Wm. T. Ditcham—Spark gaps for radio-telegraphy and radio-telephony. (*Abandoned.*)

5829 March 7.—Edward Howl and Frank Perry—Electrolytic detector for use in Wireless Telegraphy and Telephony. (*Abandoned.*)

5934 March 9.—SIGNAL GESELLSCHAFT, M.B.H.—Method of controlling mechanical forces by waves or other forms of energy propagated through a medium. (*Open to Public Inspection.*)

5935 March 9.—Receiving device for subaqueous sound signals. (*Accepted.*)

6171 March 11.—JOHN HAYS HAMMOND, JUN.—Movable bodies such as vessels, aircraft and road vehicles controlled by radiant energy. (*Open to Public Inspection.*)

6389 March 13.—EDOUARD BELIN—Automatic telegraphic or radio-telegraphic transmitters. (*Complete.*)

6588 March 16.—JOHN HAYS HAMMOND, JUN.—Movable bodies such as vessels, aircraft, and road vehicles controlled by radiant energy. (*Complete.*)

6700 March 17.—HENRY FOTHERGILL—Apparatus for radiating and receiving electro-magnetic waves on aeroplanes, airships and the like. (*Abandoned.*)

7257 March 23.—SAMUEL D. WILLIAMS—System of duplex or multiplex Wireless Telegraphy. (*Abandoned.*)

7701 March 26.—LESLIE B. MILLER—Portable transmitters for use in Wireless Telegraphy. (*Abandoned.*)

7922 March 28.—ADRIAN F. SYKES—Microphones especially suitable for Wireless Telegraphy. (*Complete.*)

8568 April 4.—JOHN HAYS HAMMOND, JUN.—Gaseous or vacuised detectors for radiant energy and method of controlling the action thereof. (*Complete.*)

9285 April 14.—WM. J. MELLERSH-JACKSON (for OTTO SCHELLER and C. LORENZ, A.G., Germany)—Method of and connections for tuning antennæ to a plurality of electric waves which are independent of one another. (*Complete.*)

9686 April 20.—J. KUHR and A. W. BRIDGE—Electromagnetic wave detector for Wireless Telegraphy of a mercury and crystal type carborundum or other crystals. (*Complete.*)

10385 April 27.—T. W. STRATFORD-ANDREWS and AXEL ORLING—Receiving arrangement for Wireless Telegraphy. (*Abandoned.*)

10697 April 30.—WM. T. DITCHAM—Spark gaps for radio-telegraphy and radio-telephony. (*Abandoned.*)

11102 May 5.—EGBERT VON LEPEL—Methods of producing electric oscillations. (*Complete.*)

11120 May 5.—NICHOLAS J. JEFFRIES—Antenna for Wireless Telegraphy and Telephony. (*Accepted.*)

11372 May 8.—GISBERT KAPP—Means for actuating signals on locomotives by electro-magnetic induction. (*Abandoned.*)

11708 May 12.—JOSEF SCHIESSLER—Arrangements for Wireless Telegraphy and Telephony. (*Complete.*)

11709 May 12.—Antennæ for Wireless Telegraphy and Telephony. (*Complete.*) (Divided application on No. 2944/13.)

11928 May 14.—RICCARDO ARNO—Generating electro-magnetic oscillations for H.F. currents and methods derived therefrom for producing a continuous wave flux or a continuous electric magnetic flux or continuous current. (*Complete.*)

11934 May 14.—HORACE MANDERS—Method and means for producing oscillatory currents of electricity of small decrement and close wave train from alternating and continuous currents of electricity. (*Complete.*)

12257 May 18.—WM. J. MELLERSH-JACKSON (for FRATELLI MARZI DI G.B., Italy)—Method and means for production of sustained electric oscillations particularly for radio-telegraphy and radio-telephony. (*Complete.*)

12277 May 18.—ADRIAN F. SYKES and SOLOMON FORD—Apparatus for electric signalling especially applicable to Wireless Telegraphy. (*Complete.*)

12364 May 19.—PEDER O. PEDERSON—Improvements in or relating to receivers for Wireless Telegraphy and Telephony for diminishing atmospheric influence on such receivers. (*Complete.*)

12633 May 22.—JOHN HAYS HAMMOND, JUN.—System of radio control. (Divided application on No. 13310/13.) (*Sealed.*)

12652 May 22.—FERNAND HOLWECK—Cathodic detectors. (*Addition to No. 2206/14.*) (*Complete.*)

12910 May 26.—EGMONT C. HOEGERSTAEDT—Method for generating electro-magnetic waves without mechanical motion. (*Complete.*)

13247 & — May 29.—MARCONI'S WIRELESS TELEGRAPH CO., LTD., and H. J. ROUND—Vacuous tubes used as magnifiers and producers of continuous electrical oscillations. (*Complete.*)

13248 — May 29.—Production of continuous electrical oscillations and the utilisation thereof for Wireless Telegraphy and Telephony. (*Complete.*)

13359 — May 30.—EUGENE V. GRATZE—Electric clocks or time-keepers operated and controlled by Wireless waves. (*Abandoned.*)

13374 — June 2.—CHARLES S. LENZ—H.F. current rectifier for rectifying H.F. wave impulses in a Wireless receiving circuit. (*Complete.*)

13472 & 13474 — June 2.—STERLING TELEPHONE AND ELECTRIC CO., LTD., and T. D. WARD MILLER—Crystal and the like detectors. (*Abandoned.*) June 2.—Rotary spark gaps. (*Abandoned.*)

13497 — June 3.—EDOUARD BELIN—Arrangement for regulating timepieces and the like by Wireless signals. (*Complete.*)

13520 — June 3.—SIGNAL GESELLSCHAFT, M.B.H.—Radiating system for signalling by electric waves from aeroplanes. (Addition to Nos. 736 and 23728 of 1913.) (*Complete.*)

14595 — June 17.—ROBERT B. GOLDSCHMIDT—Mechanical selector for electro-magnetic waves applicable to Wireless Telegraph receiving apparatus. (*Complete.*)

14884 — June 20.—E. GIRARDEAU and J. BETHENOD—Spark gaps for radio-telegraphy. (*Complete.*)

14891 — June 20.—SIR A. T. DAWSON and G. T. BACKHOUSE—Receivers for use with electrical apparatus for transmitting and receiving signals. (*Complete.*)

15031 — June 23.—E. GIRARDEAU and J. BETHENOD—Spark gaps for radio-telegraphy. (Addition to No. 14884/14.) (*Complete.*)

15082 — June 23.—ROBERT B. GOLDSCHMIDT—Mechanical selector for electro-magnetic waves applicable to W.T. receiving apparatus. (Addition to No. 14595/14.) (*Complete.*)

15160 June 24.—T. W. STRATFORD-ANDREWS and GALLETTI'S WIRELESS TELEGRAPH AND TELEPHONE CO., LTD.—Electric dischargers more particularly for use in Wireless Telegraphy and Telephony. (*Pending.*)

15182 June 24.—L. C. WILLCOX, B. HIPPISLEY, and E. RUSSELL CLARKE—Wireless receiving apparatus. (*Pending.*)

15388 July 1.—BERNARD STARIE—Detector for electro-magnetic waves or the like. (*Pending.*)

15857 July 2.—PERCY CARR BIRD—Wireless Telegraphy. (*Pending.*)

15881 July 2.—DEUTSCHE TELEPHONWERKE GES., M.B.H.—Detector for electro-magnetic waves. (*Complete.*)

15981 July 4.—RAGHUNATH B. GUPTE—Alarm Marconi bell for ships in fog at sea and for railway trains, aircraft, and the like. (*Pending.*)

16328 July 8.—JOHN HAYS HAMMOND, JUN.—System for the control of moving bodies at a distance by radiant energy. (*Complete.*)

16380 July 9.—ROBERTO C. GALLETTI—Receiving apparatus for Wireless Telegraphy. (*Complete.*)

16659 July 13.—ERFORSCHUNG DES ERDINNERN G., M.B.H.—Process for transmission of electric waves in the interior of the earth. (*Complete.*)

16660 July 13.—Process for directly exciting a Marconi antenna. (*Complete.*)

16988 July 17.—A. PEDERY, F. FORBATH, and D. VARSANYI—Wireless Telegraphy systems. (*Complete.*)

17131 July 20.—SIMON KAHAN—Methods for producing devices consisting of substances liable to changes in their ohmic resistance under the action of light, especially electric light-sensitive preparations and the like. (*Pending.*)

17246 July 21.—GIUSEPPE MUSSI—Transmission of electric impulses over circuits of high electrostatic capacity. (*Complete.*)

17416 July 22.—MARCONI'S WIRELESS TELEGRAPH CO., LTD., and H. J. ROUND—Apparatus for receiving electric signals. (*Pending.*)

17487 July 23.—GEORGE O. SQUIER—Receiving system for radio-telegraphy and radio-telephony. (*Accepted.*)

18009 July 30.—VICTOR BOUCHARDON—Sender for Hertzian waves with polyphase generators. (*Complete.*)

18203 Aug. 1.—MARCONI'S WIRELESS TELEGRAPH CO., LTD., and E. ICHINO—Wireless Telegraph direction finders. (*Pending.*)

18408 Aug. 7.—JOHN HAYS HAMMOND, JUN.—Radio-dynamic control of gyroscopes. (*Complete.*)

18511 Aug. 10.—GIUSEPPE MUSSI—Transmission of electric impulses over circuits of high electrostatic capacity. (Addition to No. 17246/14.) (*Complete.*)

18711 Aug. 15.—WM. CLAUDE WOODLAND—Wireless Telegraphy. (*Accepted.*)

18751 Aug. 17.—BRITISH THOMPSON-HOUSTON CO. (GENERAL ELECTRIC CO., U.S.A.)—Coherers. (*Pending.*)

19054 Aug. 25.—ALBAN J. ROBERTS—Receivers for Wireless systems. (*Complete.*)

19433 Sept. 4.—ALFRED H. COHEN—Means for producing oscillatory currents of high frequency. (*Complete.*)

20319 Sept. 29.—WM. H. SHEPHARD and A. MCKECHNIE—Line or Wireless Telegraph systems. (*Pending.*)

21388 Oct. 22.—BRITISH THOMPSON-HOUSTON CO., LTD.—Wireless signalling systems. (*Pending.*)

21474 Oct. 24.—T. W. STRATFORD-ANDREWS and AXEL ORLING—Receiving arrangements for Wireless Telegraphy. (*Pending.*)

21872 Nov. 2—CHARLES HORTON—Wireless or radio-telegraphy. (*Pending.*)

22609 Nov. 16.—LUCIEN ROUZET—Regulating device applicable to self-induction coils or to winding of Tesla transformers used in Wireless Telegraphy or other application of high frequency. (*Pending.*)

22807 Nov. 20.—MANRICO COMPARE—Wireless control system. (*Pending.*)

22843 Nov. 20.—EUGENE V. GRATZE—Method or system for transmitting power or motion. (*Pending.*)

22897 Nov. 21.—ETTORE BELLINI—Apparatus for directed Wireless Telegraphy and Telephony. (*Complete.*)

24098 Dec. 15.—MARCONI'S WIRELESS TELEGRAPH CO., LTD., and C. S. FRANKLIN—Aerials for Wireless signalling. (*Pending.*)

24231 Dec. 17.—EDWIN H. ARMSTRONG—Receiving system for continuous electric waves. (*Complete.*)

FRANCE.

LIST OF PATENTS GRANTED DURING 1914.

453900 ROUCHE.—Crystal detector. 18498. Patent of Addition.

455018 E. BELIN AND CO.—Improvements in the distant transmission of electric signals. 18402. Patent of Addition.

461024 ABRAHAM.—Receiver for Wireless Telegraphy. 19482. Patent of Addition.

462989 SOCIETE DES TELEGRAPHES MULTIPLES.—Method of converting continuous current into alternating oscillatory current for the production of "Magunna" oscillations for use in Wireless Telegraphy. 18757. Patent of Addition.

464611 MEUNIER.—Instantaneously regulated wave detector.

464711 LEVY-STRAUSS.—Receiver for Wireless Telegraphy.

464822 DELVAL.—Lightning arrester for Wireless Telegraphy.

465152 DELVAL, BLOSSE AND LAFFITTE.—Arrangement for the production of musical sparks.

465153 DELVAL, BLOSSE AND LAFFITTE.—Coupling coil for transmitter.

465154 DELVAL, BLOSSE AND LAFFITTE.—Tuning coil.

465155 DELVAL, BLOSSE AND LAFFITTE.—Crystal detector.

465311 DAPSENSCE AND PERIGAUD.—Double detector for complete readjustment.

465419 SIGNAL GESELLSCHAFT M.B.H.—Wireless Telegraph Stations for the purpose of communicating with aircraft.

465996 COMPAGNIE UNIVERSELLE DE TELEGRAPHIE ET DE TELEPHONIE SANS FIL.—Method of regulating the wave length of a high-frequency machine. 18640 and 18691. Patents of Addition.

466170 SHEPHARD AND MCKECHNIE.—Improvements in Wireless Telegraph systems.

466217 DELVAL, BLOSSE AND LAFFITTE.—Crystal detector.

466416 SCHIESSLER.—Sending station for radio-telegraphy and radio-telephony.

466733 WILLIAMS.—Improved system of duplex and multiplex Wireless Telegraphy.

466826 BELIN.—Apparatus for sending time-signals by automatic or Wireless Telegraphy.

466869 ABRAHAM.—Improvements in selectors for Wireless Telegraphy.

466913 DARMEZIN DU ROUSSET ET DE LOYNES D'AUTEROCHE.—Device for transmitting perfectly pure waves.

467131 WAELES.—Detector specially adapted for Wireless Telegraphy.

467467 LEVY.—System of Wireless transmission and reception over a single series of waves.

467576 TORIKATA, YOKOYAMA AND KITAMURA.—Wireless oscillator.

467747 GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H.—Method of construction for an electric relay working in an atmosphere of ionized gas particularly for Wireless Telegraphy.

468230 BOHL.—Head-phone for Wireless Telegraphy.

468721 BETHENOD AND GIRARDEAU.—Apparatus for duplex working.

469162 LIEMBACH.—System of Wireless Telegraphy in the interior of the earth.

469286 GOLDSCHMIDT.—Spark gap for Wireless Telegraphy.

469290 CONTINENTAL SYNDICATE FOR THE POULSEN RADIO-TELEGRAPHIE AKTIENGESELLSCHAFT. — Transmitting apparatus for Wireless Telegraphy.

469349 CHARRON.—Arrangement of microphones for the strengthening and recording of wireless signals. 1915?. Patent of Addition.

469443 GODY.—Crystals adapted for detecting purposes.

469444 GODY.—Detector for Wireless Telegraphy.

469565 MICHET DE LA PAUME.—Instantaneously regulated receiving station.

469664 DE BERNOCHI.—System of, and apparatus for, the Wireless electrical operation at a distance of a type-printing machine.

469803 DUVAL.—Crystal detector.

470023 ROBLIN.—Relay.

470268 SARGENT.—System of Wireless communication.

470637 BALSILLIE.—Transmitter.

470832 DUCRETET, TAULEIGNE AND CO.—Apparatus for the strengthening and recording of radio-telegraphic signals. 19433. Patent of Addition.

471823 ASSI.—Method of increasing the output of the quenched spark used in the production of electrical oscillations.

472179 HURM.—Receiver.

472273 JEFFRIES.—Antenna.

472679 COMPAGNIE GENERALE DE RADIO-TELEGRAPHIE.—Method of producing waves for Wireless Telegraphy.

472961 GESELLSCHAFT FUR DRAHTLOSE TELEGRAPHIE M.B.H.—Sending station for Wireless Telegraphy.

473039 TURPAIN AND RICHARD.—Recording device for the inscription of Hertzian signals.

473276 ANCEL, COTTY AND CO.—Improvements in apparatus for Wireless Telegraphy.

473277 ANCEL.—Detector.

473660 HOLWECK.—Improvements in electrolytic detectors.

473808 BETHENOD AND GIRARDEAU.—New system of doubly-quenched spark gap suitable for Wireless stations having a musical spark.

473809 BETHENOD AND GIRARDEAU.—Electrolytic detector.

473827 FASQUELLE.—Receiving apparatus.

473847 BETHENOD AND GIRARDEAU.—Apparatus for the elevation of portable masts.

473996 ANCEL.—Recording receiver for Wireless Telegraphy and improved relay.

ITALY.

LIST OF PATENTS GRANTED DURING 1914.

384/31 QUIRINO MAJORANA, Rome.—Improvements in tubes for the transmission of electric discharges.

385/159 GIUSEPPE VISCA, Udine.—Automatic "Visca" transmitter.

394/83 RUDOLF GOLDSCHMIDT, Berlin.—Receiving apparatus for electric waves.

400/17 FABIO MAJORANA, Rome.—New telephonic relay.

401/38 LUCIEN ROUZET, Paris.—Wireless Telegraph stations for the purpose of communicating with aeroplanes.

403/19 FABIO MAJORANA, Rome.—Improvements in generators for Wireless Telegraphy.

407/11 GIOVANNI MEDICINA, Pra, Genoa.—Magneto-microphonic transformer for telephony or radio-telephony.

421/5 NICOLA MELE, Milan.—Wireless Telegraphic transmitter.

421/169 NATIONAL ELECTRIC SIGNALLING CO., Brantrock, U.S.A.—Improvements in the utilisation of the energy of oscillatory currents.

421/115 GUGLIELMO MARCONI, London.—Improvements in transmitters for wireless telegraphy.

421/215 PARIDE MAGINI AND CAMILLO SESTI, Milan.—Steam oscillator for the production of Hertzian waves entirely free from interference arising out of their generation.

422/207 MARCONI'S WIRELESS TELEGRAPH CO., LTD., London.—Improvements in aerials for use in Wireless Telegraphy.

422/242 GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., Berlin.—Method of mounting an electric relay working in an atmosphere of ionized gas, specially adaptable for Wireless Telegraphy and Telephony.

422/243 Transmitting station for Wireless Telegraphy and Telephony.

423/15 WM. H. SHEPHARD AND A. MCKECHNIE, London.—Improvements in systems of Wireless Telegraphy and Telephony.

423/32 PARIDE MAGINI, ERNESTO LAVIOSA AND RAFFAELE JOIME, Spezia, Genoa.—Auto-tuner for Wireless Telegraphy.

423/97 GIUSEPPE CAPUTI, Rome.—Persistent electric oscillator.

423/216 GUGLIELMO MARCONI, London.—Improvements in transmitting apparatus for use in Wireless Telegraphy and Telephony.

424/52 NATIONAL WIRELESS TELEPHONE AND TELEGRAPH CO., San Francisco.—Apparatus for the production of high-frequency alternating currents for Wireless Telegraphy and Telephony.

424/72 JOSEPH SCHIESSLER, Baden.—Transmitting station for Wireless Telegraphy and Telephony.

424/139 KONTINENTALE SYNDICAT FOR POULSEN RADIO-TELEGRAPHI AKTIESELSKAB, Copenhagen.—Transmitting apparatus for Wireless Telegraphy.

426/213 PARIDE MAGINI, Florence.—New system of Wireless syntonization.

427/214 EMILE GIRARDEAU AND JOSEPH BETHENOD, Paris.—Automatic adjustment for electric arcs, specially applicable for the production of electric oscillations at high frequency.

428/216 MANRICO CAMPARE, Livorno.—Regulator of distance mechanism by means of electric waves.

429/199 SALVATORE LANDI, Genoa.—Gas and heat microphone for Wireless transmission.

431/135 GUGLIELMO MARCONI, London.—Improvements in means for generating alternating electric currents.

431/151 NICHOLAS JAMES JEFFRIES, New Jersey, U.S.A.—Improvements in aerials for Wireless Telegraphy and Telephony.

431/167 MARCONI'S WIRELESS TELEGRAPH CO., LTD., London.—Improvements in apparatus for receiving submarine signals.

432/243 COMMERCIAL WIRELESS AND DEVELOPMENT CO., California, U.S.A.—Telephonic apparatus applicable to Wireless Telegraphy.

432/249 SALVATORE LINDI, Sestri Ponente, Italy.—Apparatus for producing continuous electro-magnetic currents by using the spark of the discharge of the secondary circuit as a conducting means for the current of the relative primary and then as a means of interruption.

433/97 CARLO PONTI and TITO VESTONI, Bologna.—System of preventing the interception of communications in Wireless installations.

UNITED STATES OF AMERICA.

LIST OF PATENTS GRANTED DURING 1914.

1086530 Feb. 10.—FRANK P. HERRGUTH (Assignor to the Universal Wireless Telegraph and Telephone Co. of California)—Method of transmitting vocal and other sounds by means of electro-magnetic waves without the use of wires.

1087113 Feb. 17.—RUDOLF GOLDSCHMIDT, Berlin—Machine for the reception of electric waves.

1087126 Feb. 17.—B. MACKU, L. MANDELSTAM and N. PAPALEXI—Arrangement for producing slightly-damped electrical oscillations.

1087549 Feb. 17.—VALDEMAR POULSEN, Copenhagen—Receiver for signals transmitted by Wireless Telegraphy.

1087892 Feb. 17.—W. SCHLOEMILCH and O. VON BRONK, Germany—Method of and means for receiving electrical oscillations.

1088686 March 3.—W. T. DITCHAM, Twickenham, England—Transmitter for Wireless Telephony.

1089091 March 3.—W. E. D. STOKES and G. W. DAVIS, New Jersey—Receiving device for Wireless Telegraph systems.

1091127 March 24.—ROBERT R. GOLDTHORP, Connecticut—Receiving apparatus for Wireless Telegraphy.

1091768 March 31.—FREDERICK G. SARGENT, Massachusetts—Method of and apparatus for selective Wireless Telegraphy.

1092294 April 7.—JOSEF SCHIESSLER, Vienna—Receiving apparatus for alternative Wireless Telegraphy and Telephony.

1093240 April 14.—JOHN G. BALSILLIE, Australia—Wireless Telegraph receiver.

1095342 May 5.—HERBERT MERTON, London, England—Wireless Telegraph receiver.

1096065 May 12.—EARL G. STALNAKER, Illinois—Apparatus for adjusting or varying the oscillation-responsiveness of circuits such as those of Wireless Telegraph systems.

1096142 May 12.—E. WEINTRAUB, Massachusetts (Assignor to the General Electric Company, New York)—Improved means of indicating and detecting ethereal vibrations as used in Wireless Telegraphy.

1096717 May 12.—CHARLES D. HERROLD, California—Oscillator for use in transmission by Wireless Telegraphy and Telephony.

1097872 May 26.—THOMAS J. MURPHY, New York—High-tension apparatus for use in Wireless Telegraphy.

1097974 May 26.—WALTON HARRISON, New York—Receiver for communication by Wireless Telegraphy or Telephony.

1098379 & 1098380 June 2.—JOHN HAYS HAMMOND, JUN., Massachusetts —System of selective control. Improvements in receiving apparatus, particularly automatic tickers, for radio-telegraphy.

1099861 June 9.—JOSEPH RAES, New York—Collapsible towers especially adapted for use in portable stations for Wireless Telegraphy.

1099865 June 9.—EARL G. STALNAKER, Illinois—High frequency system of transmission and receiving apparatus for Wireless Telegraphy and Telephony.

1101148 June 23.—JOSEF SCHIESSLER, Vienna—Apparatus for the production and strengthening of high frequency oscillations for Wireless Telegraphy and Telephony.

1101175 June 23.—EMILE GIRARDEAU, Paris—Improvement in aerials for Wireless Telegraphy.

1101491 June 23.—EMILE GIRARDEAU and JOSEPH BETHENOD, Paris—Improvements in or relating to systems for producing high-frequency currents.

1101533 June 30.—LEE DE FOREST, New York (Assignor to the De Forest Radio-Telephone Co., New York) —Improvements in transmitting and receiving systems adapted to directional and duplex Wireless Telegraphy.

1101914 1101915 June 30.—REGINALD A. FESSENDEN, Massachusetts— Improvement in antennæ for the transmission and reception of wireless impulses.

1102184 June 30.—RALPH C. BROWNE (Assignor to the Browne Apparatus Co.), Massachusetts—Improvements in detectors for Wireless Telegraphy.

1102442 July 7.—FREDERICK G. SARGENT, Massachusetts—Apparatus for selective Wireless Telegraphy.

1103822 July 14.—WERNER OTTO, Berlin—High-tension oscillator.

1104065 July 21.—BENJAMIN J. MIESSNER, Washington—Improvements in detectors for wireless apparatus.

1104073 July 21.—GREENLEAF W. PICKARD, Massachusetts (Assignor to the Wireless Speciality Apparatus Co., New York)—Improvements in detectors for Wireless Telegraphy and Telephony.

1104256 July 21.—RUDOLF GOLDSCHMIDT, Germany—Improvements in apparatus for and method of receiving electric waves.

1104712 July 21.—WM. H. SHEPHARD and A. E. MCKECHNIE,
1104746 London, England—Improvements in or relating to Wireless Telegraph or Telephone systems.

1105029 July 28.—EMILE GIRARDEAU, Paris—Improvement in automatic commutators for radio-telegraphic plants with indirect excitation.

1105984 Aug. 4.—HORACE MANDERS, London, England—Apparatus for the production of continuous electrical oscillations.

1106729 Aug. 11.—LUCIEN ROUZET, Paris—Improvements in Wireless Telegraph installations for aerial vessels.

1106874 Aug. 11.—PETER L. JENSEN (Assignor to the Com-
1106875 mercial Wireless and Development Co.), San Francisco—New and useful improvements in wireless apparatus.

1106945 Aug. 11.—NICHOLAS J. JEFFRIES, New Jersey—New and useful improvements in antennæ for Wireless Telegraphy.

1109909 Sept. 8.—HENRY P. DWYER (Assignor to the Dwyer Wireless Telegraph and Telephone Co.), San Francisco—Improved oscillator for generating electro-magnetic waves for use in Wireless Telegraphy and Telephony.

1110253 Sept. 8.—ALFRED H. COHEN, San Francisco—Improved means for producing oscillatory currents of high frequency for Wireless Telegraphy and Telephony.

1112411 Sept. 29.—ROBERT T. ACKLEY, Ohio—Improvements in wave detectors employed in wireless communication.

1113149 Oct. 6.—EDWIN H. ARMSTRONG, New York—Improvements in Wireless Receiving Systems.

1114626 Oct. 20.—THOMAS B. MILLER, Washington—Improvement in Series-Multiple switches and condensers for Wireless Telegraph Systems.

1114840 Oct. 27.—WILLIAM C. WOODLAND (Assignor to the Packard Electric Co.), Warren, Ohio—Method of increasing the group frequency or pitch of the tone heard at the receiving station of a Wireless Telegraph system.

1115530 Nov. 3.—JOHN HAYS HAMMOND, JUN., Massachusetts—Improved system of radio-dynamic directive control.

1115823 Nov. 3.—ALBERT A. JAHNKE, Point Richmond, California (Assignor to the National Wireless Telephone and Telegraph Co., San Francisco)—Apparatus for the production of high frequency oscillating currents for Wireless Telegraphy and Telephony.

1115902 Nov. 3.—ALLEN J. COUGHENOUR, Kansas—Improved detector for use in wireless signalling systems.

1116059 Nov. 3.—WALTER HAHNEMANN, Kiel, Germany—Improved antenna structures on aeroplanes for wireless signalling.

1116111 Nov. 3.—RICHARD PFUND, New York—Improved station for the transmission and reception of electro-magnetic wave energy.

1116183 Nov. 3.—EZECHIEL WEINTRAUB (Assignor to the General Electric Co.), New York—Improvements in receivers for Wireless Telegraphy.

1116309 Nov. 3.—GUGLIELMO MARCONI, London, England (Assignor to the Marconi Wireless Telegraph Company of America, New York)—Duplex system of Wireless Telegraphy.

1116588 Nov. 10.—WALTON HARRISON, New York—Improvements in receivers for wireless communication.

1117681 Nov. 17.—JOHN LOEFFLER, California—Improvements in spark gaps for Wireless Telegraphy.

1118004 Nov. 24.—WALTON HARRISON, New York—New method of transmitting sounds by means of Hertzian waves.

1118228 Nov. 24.—GREENLEAF W. PICKARD, Massachusetts (Assignor to the Wireless Speciality Apparatus Co., New York)—Oscillation detector for Wireless Telegraphy.

1119952 Dec. 8.—WALTON HARRISON, New York—Improved transmitter for wireless communication.

1120054 Dec. 8.—WALTON HARRISON, New York—New and improved system for signalling through space.

1122027 Dec. 22.—MENDEL OSNOS, Berlin (Assignor to the General Electric Co., New York)—Method of tuning alternating current circuits.

1122358 Dec. 29.—LESTER STEWART BARR, Washington—Improvements in detectors for Wireless or Hertzian wave Telegraphy.

1122594 Dec. 29.—WALTON HARRISON, New York—Art of transmitting sounds by means of Hertzian waves.

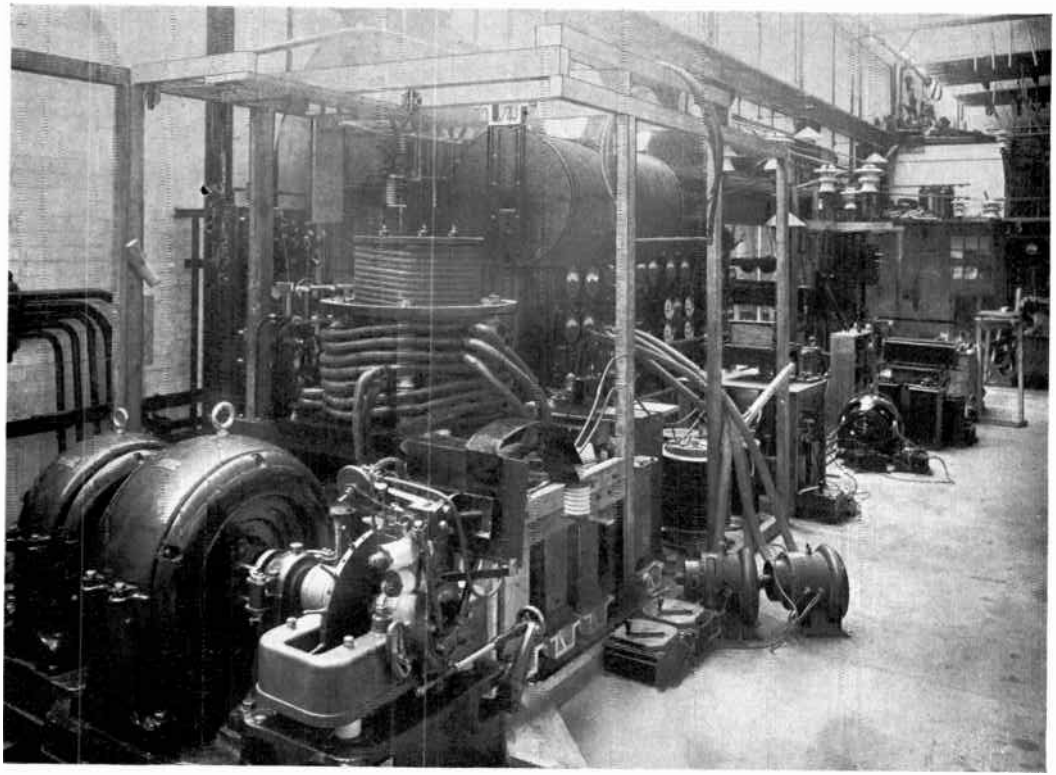
1122975 Dec. 29.—THOMAS B. MILLER, Washington—System for generating electric currents of high frequency for use in Wireless Telegraphy.

1123098 Dec. 29.—LOUIS COHEN, Massachusetts—System of distribution for oscillatory electrical currents.

1123118 Dec. 29.—LEE DE FOREST, New York (Assignor to Radio-Telephone and Telegraph Co. of America)—Improvement in signalling systems employing electro-magnetic waves.

1123119 Dec. 29.—LEE DE FOREST, New York (Assignor to the De Forest Radio-Telephone and Telegraph Co. of America)—System for securing secrecy of
& communication by Wireless Telegraphy or Telephony.

1123120 Arc mechanism for systems of space communication.



Medium Power Battleship Wireless Transmitter. Designed for instantaneous change of wavelength.

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PARTICULARS OF THE LEADING COMPANIES ENGAGED IN THE COMMERCIAL DEVELOPMENT OF WIRELESS TELEGRAPHY

Amalgamated Wireless (Australasia) Limited

Incorporated.—July 11th, 1913, in State of New South Wales.

Head Office.—"Wireless House," 97, Clarence Street, Sydney.

New Zealand Office.—Australasia Chambers, Wellington.

Directors.—Hugh Robert Denison (Chairman and Managing Director), John Macallum Jolly, Charles P. Bartholomew, Ernest T. Fisk (Technical Manager), John H. Forrest.

Secretary.—John H. Forrest.

Capital.—£140,000 in 140,000 shares of £1 each. Issued 140,000 shares of £1 each, all fully paid up. The financial year of the Company ends at June 30th, and the first annual general meeting was held on August 27th, 1914.

The Company owns a perpetual licence to use and exploit the Marconi and Telefunken patents in the Commonwealth of Australia and Dominion of New Zealand and in that part of the Pacific and Indian Oceans bounded by the 20 deg. north and 60 deg. south latitude and the 110 deg. west and 110 deg. east longitude.

Accounts.—The first accounts were made up to June 30th, 1914. The profit and loss account showed that the gross profit from trading account, radiotelegraphic traffic, ships' subsidies, royalties, etc., amounted to £29,344 5s., and after deducting all expenses (including depreciation), amounting to £20,727 17s. 4d., there was a net profit of £8,616 7s. 8d. A dividend of 4 per cent. was declared, and after passing £3,000 to patents reserve account the balance was carried forward. The Company now controls under subsidy agreements for fixed terms seventy-five passenger and cargo vessels.

Compagnie Française Maritime et Coloniale de Télégraphie Sans Fil

Incorporated.—24th April, 1903.

Head Office.—35, Boulevard des Capucines, Paris, France.

Directors.—Baron de la Chevreliere, Commendatore G. Marconi, Alfred Musnier, John Dal Piaz, Charles Roux.

Secretary.—F. Gondry.

Engineer.—M. Tauléra.

Capital.—Authorised, 500,000 francs in 5,000 shares of 100 francs each. Issued, 100,000 francs in 1,000 shares of 100 francs, each fully paid, and 200 Profit shares having no capital denomination. The financial year of the Company ends at December 31st in each year. Dividends at the rate of 5 per cent. per annum have been paid on the capital shares of the Company in respect of each of the years 1906, 1907, 1908, 1909, 1910, and 1911, and 10 per cent. for the years 1912 and 1913. The Company owns and operates the wireless telegraph apparatus on nearly 100 vessels.

The Company holds the exclusive licence of Marconi's Wireless Telegraph Company, Limited, and the Marconi International Marine Communication Company, Limited, for France, its colonies and dependencies, and vessels flying the French flag.

Compagnie Générale de Radiotelegraphie, Société Anonyme

Incorporated.—January 15th, 1914.

Head Office.—63, Boulevard Haussmann, Paris.

Directors.—Monsieur d'Arsonval (President), MM. Gabion and Bitterli.

Manager.—Monsieur Tronchon.

Capital.—1,500,000 francs, divided into 3,000 shares of 500 francs each, all issued and paid up.

This Company purchased the assets of the Cie Générale Radiotélégraphique in liquidation. The Company owns and operates the patents of Lepel and Joly.

Compagnie Universelle de Télégraphie et de Téléphonie Sans Fil.

Incorporated.—September 25th, 1912.

Head Office.—20 bis, Rue la Boëtie, Paris.

Directors.—Lazare Weiller (Président), Marcel Bloch, Emile Chalançon, Baron de la Chevreliere, Alexandre Imbert, Godfrey C. Isaacs, René Robard, Ernest Georges Sins.

Secretary.—Georges Tharel.

Capital.—10,000,000 francs divided into 100,000 shares of 100 francs each, all subscribed and paid for in cash. 100,000 Parts Bénéficiaires have also been issued.

The financial year ends at March 31st.

The Company has acquired the whole of the patents in respect of wireless telegraphy or telephony which have been taken out in the name of Professor Rudolph Goldschmidt, and a right to any further inventions made by him in respect of wireless telegraphy or telephony, and any patents for which he may apply in connection with such inventions for all countries except Germany, its colonies and dependencies.

In 1913 Marconi's Wireless Telegraph Company, Limited, acquired an interest in the above Company.

Compañía Marconi de Telegrafía Sin Hilos Del Rio de La Plata

Incorporated.—August 4th, 1906.

Head Office.—Tornquist Building, 132, San Martin, Buenos Aires, Argentine.

Directors.—Captain Guillermo Jose Nunes (President), Señor Florence O'Driscoll (Managing Director), Colonel Sir Thomas Holdich, K.C.M.G., K.C.I.E., C.B., Godfrey C. Isaacs, Commendatore G. Marconi, Señor J. A. Pilling, Señor Carlos Pereira Pinto, Dr. Julio Pueyrredon, Señor Enrique Schlieper, Sydney St. J. Steadman, Señor Antonio Terrarosa.

Secretary.—Señor Enrique Schlieper.

Engineer.—E. Berry.

Capital.—$2,000,000 gold, represented by 250,000 shares of $5 gold each, series "AA," fully paid, and 150,000 Preference shares (5 per cent. non-cumulative) of $5 gold each, series

" BB," 35 per cent. has been called up on the " BB " shares. The balance is payable in instalments of 10 per cent. with not less than thirty days' notice. The financial year of the Company ends at May 31st.

The Company owns the Marconi patents and patent rights for the Argentine Republic, and has licences from Marconi's Wireless Telegraph Company, Limited, and the Marconi International Marine Communication Company, Limited, to work the Marconi system in the Republics of Argentine, Uruguay, and Paraguay. The Company has the permission of the Government to erect wireless telegraph stations within the territorial limits of the Argentine Republic and on vessels flying the Argentine flag. The Company is constructing a high-power wireless station in the Argentine Republic to communicate direct with a similar station in Europe, and the Argentine Government approved this project on August 10th, 1912.

Compañia Nacional de Telegrafia Sin Hilos

Incorporated.—December 24th, 1910.

Head Office.—Calle de Alcala 43, Madrid.

Directors.—Exco. Sr. General Don Jose de Bascaran, Excmo. Sr. Conde de Albiz Don Antonio Comyn, Sr. Don Eduardo Estelat, Godfrey C. Isaacs, Sr. Don Jaime Macnaughton, Commendatore G. Marconi, Sr. Don Francisco Setuain.

Secretary.—Sr. Don José Asensio.

Capital.—6,500,000 pesetas divided into 8,000 6 per cent. Participating Preference shares of 500 pesetas each, and 5,000 Ordinary shares of 500 pesetas each.

The financial year ends on December 31st.

This Company was formed to take over from La Compañia Concesionairia de Servicio Publico Espanol de Telegrafia sin Hilos, who were unable to carry out their obligations, the concession from the Spanish Government for the construction and exploitation of a public wireless telegraph service in Spain and its colonies. The Company has ten wireless telegraph land stations erected and working at Aranjuez, near Madrid, Cadiz, Barcelona, Teneriffe, Las Palmas, Vigo, Soller, Finisterre, Santander, and Cape Palos, and has further stations in course of construction. The Company holds an exclusive licence from Marconi's Wireless Telegraph Company, Limited, to use and exploit its

patents in Spain and her colonies, except on vessels of the mercantile marine.

The Company proposes to establish a direct wireless telegraph service between Spain and England by means of the Marconi Company's station at Poldhu, Cornwall.

Deutsche Betriebs Gesellschaft für Drahtlose Telegraphie m.b.H.

Incorporated.—January 14th, 1911.

Head Office.—Tempelhofer Ufer 9, Berlin, S.W. 61.

Directors.—Dr. Franke, Commerzienrat Mamroth, Commendatore G. Marconi, M. Travailleur, Georg Count von Arco, Geheimer Legationsrat Fritz Rose.

Manager.—Hans Bredow.

Capital.—2,500,000 marks.

The Company exploits wireless telegraphy on vessels of the mercantile marine of Germany and Austria-Hungary. The system of wireless telegraphy installed by them is known as the "Debeg." At December 31st, 1913, the "Debeg" owned and operated the wireless telegraphic apparatus on 295 vessels. The financial year of the Company ends at September 30th in each year.

Gesellschaft für Drahtlose Telegraphie m.b.H. (Telefunken).

Incorporated.—June 15th, 1903.

Head Office.—Tempelhofer Ufer 9, Berlin.

Directors.—Count von Arco, Hans Bredow, Karl Solff (Vice-Director).

Founded by the Allgemeine Elektrizitäts-Gesellschaft, Berlin, and Siemens and Halske A.G., Berlin, for the exploitation of the patents of Professor Slaby, Professor Braun, and Count von Arco all over the world.

The Company, whose shares are in the sole possession of the Allgemeine Elektrizitäts-Gesellschaft and Siemens and Halske, Berlin, is interested in the following Companies :—

Deutsche Betriebsgesellschaft für drahtlose Telegraphie m.b.H., Berlin, S.W.

Deutsche Südseegesellschaft für drahtlose Telegraphie A.G., Berlin.

Société Anonyme Internationale de Télégraphie sans Fil, Brussels.

Atlantic Communication Company, New York.

Telefunken East Asiatic Wireless Telegraph Co., Shanghai.

Amalgamated Wireless (Australasia), Ltd., Sydney.

Marconi International Marine Communication Company, Limited

Incorporated.—April 25th, 1900.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Commendatore G. Marconi, G. C. Isaacs (Managing Director), Major S. Flood-Page, Alfonso Marconi, H. S. Saunders, M. Travailleur, Captain H. Riall Sankey, R.E. (retired).

Manager.—W. W. Bradfield.

Secretary and Deputy Manager.—H. W. Allen, F.C.I.S.

Marine Superintendent.—Captain C. V. Daly.

Capital.—Authorised, £350,000 in £1 shares. Issued, £306,084 in 306,084 shares, fully paid. 5½ per cent. First Mortgage Debentures (Bearer). Authorised, £250,000. Issued and outstanding, £121,880 in £20 bonds. Secured (without trust deed) as a floating charge on the undertaking and all the property. Redeemable at par July 1st, 1941. Interest payable January 1st and July 1st.

Dividends.—5 per cent. for 1910, 7 per cent. for 1911, 10 per cent. for 1912, and 10 per cent. for 1913, and an interim dividend of 5 per cent. in respect of 1914 was paid February 1st, 1915.

The accounts are made up to December 31st in each year.

This Company was formed for the purpose of working throughout the world, except in the United States of America, Hawaii, Chili, and colonies or dependencies of those States, an exclusive licence for all maritime (being mercantile or yachting) purposes granted by Marconi's Wireless Telegraph Company, Limited. The Company has transferred to Associated Companies its rights in Canada, Argentina, Uruguay, Australasia, and all European countries and their dependencies except Great Britain and Ireland and Italy. In 1909 the Company and Marconi's Wireless Telegraph Company, Limited, entered into an agreement with the Post Office, which provided, in consideration of

the payment of £15,000, for the transfer to the Post Office of the coast stations in the United Kingdom. This Company owns and operates the wireless telegraph apparatus on about 900 vessels of the mercantile marine.

Marconi's Wireless Telegraph Company, Limited

Incorporated.—July 20th, 1897, as "Wireless Telegraph and Signal Co., Ltd."; name changed as above in March, 1900.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Commendatore G. Marconi, LL.D., D.Sc. (Chairman), Godfrey C. Isaacs (Managing Director), Major S. Flood-Page, Captain H. Riall Sankey, R.E. (ret.), H. S. Saunders, Samuel Geoghegan, M.I.Mech.E., M.Inst.C.E.I., Alfonso Marconi.

Manager.—W. W. Bradfield.

Secretary and Deputy Manager.—Henry W. Allen, F.C.I.S.

Chief Engineer—Andrew Gray.

This Company was formed to acquire Mr. Guglielmo Marconi's patents for Wireless Telegraphy in all countries except Italy, its colonies and dependencies. The Company has substantial interests in the following companies:—

Marconi Wireless Telegraph Company of America.
Marconi Wireless Telegraph Company of Canada, Limited.
Spanish and General Wireless Trust, Limited.
Société Anonymé Internationale de Télégraphie sans fil.
Russian Company of Wireless Telegraphs and Telephones.
The Marconi International Marine Communication Company, Limited.
Compañia Marconi de Telégrafia sin Hilos del Rio de la Plata.
Relay Automatic Telephone Company, Limited.
Compagnie Universelle de Télégraphie et de Téléphonie sans fil.
Amalgamated Wireless (Australasia), Limited.

At December 31st, 1913, the shares held in associated companies were of a par value of £2,421,220, and were taken into account at their cost price, namely, £1,298,743. In October, 1911, the Company took over the patents of the Lodge-Muirhead Syndicate, Limited. The Company has in hand important contracts for the erection of Wireless Telegraph stations in nearly

every part of the world. The Company owns the high-power Wireless Telegraph stations at Clifden, Ireland, and Poldhu, Cornwall, and is erecting other high-power Wireless Telegraph stations for account of its subsidiary companies in Wales, New York, San Francisco, Honolulu, Buenos Aires, etc. In 1912 the Company erected new and extensive works at Chelmsford to enable it to cope with its rapidly increasing business.

Accounts and Dividends.—Accounts are made up at December 31st and usually submitted in June following. In respect of each of the years 1911, 1912, and 1913 the Company paid dividends of 17 per cent. on the Preference shares and 20 per cent. on the Ordinary shares.

Capital.—Authorised, £1,500,000 in 1,250,000 Ordinary shares of £1 each, and 250,000 Cumulative Participating Preference shares of £1 each. The Preference shares are entitled to a cumulative dividend of 7 per cent., and, after the Ordinary shares have received a 10 per cent. non-cumulative dividend, to share *pari passu* with the latter shares in surplus profits remaining. Issued, 250,000 Preference shares and 1,222,688 Ordinary shares.

On July 30th, 1913, the Company entered into a contract with the British Postmaster-General for the erection of long-distance Wireless Telegraph stations in (1) England, (2) Egypt, (3) East Africa, (4) South Africa, (5) India, (6) Singapore or the Malay Peninsula, and under this contract the Company is entitled, in addition to the contract price for the supply of the stations, to a percentage of the gross receipts of each station during such period not exceeding 28 years (subject to the provision for determination by the Postmaster-General at the expiration of 18 years), as any apparatus covered by any patent owned by the Company shall be used.

Marconi Wireless Telegraph Company of America

Incorporated.—November 22nd, 1899, under the laws of New Jersey.

New York Office.—Woolworth Building, 233, Broadway, New York, U.S.A.

Directors.—Hon. J. W. Griggs (President), Commendatore G. Marconi, Edward J. Nally, John Bottomley (Vice-Presidents), Major S. Flood-Page, John L. Griggs, Godfrey C. Isaacs, James W. Pyke, James R. Sheffield, George S. de Sousa, Edward L. Young, J. Van Vechten Olcott.

Vice-President and General Manager.—Edward J. Nally.

Secretary and Treasurer.—John Bottomley.

Chief Engineer.—F. M. Sammis.

Traffic Manager.—G. S. de Sousa.

Capital.—Increased to $10,000,000, divided into 2,000,000 shares of $5 each on April 18th, 1912. Special settling day on the London Stock Exchange, June 19th, 1912, in 2,000,000 shares. The financial year ends December 31st.

The Company has the sole right to use and exploit the Marconi patents in the United States of America, the Hawaiian Islands, Philippine Islands, Cuba, Porto Rico, Alaska, and the Aleutian Islands, and also the patents of Sir Oliver Lodge, Professor Michael Pupin, Thomas A. Edison, and Dr. James A. Fleming.

The Company owns in the United States some sixty land stations for communication with ships at sea, including a high-power station at Cape Cod capable of transmitting to vessels at sea to a distance of 2,000 miles. On December 31st, 1913, the Company owned and operated the wireless apparatus on about 450 ships of the mercantile marine.

High-power Stations.—The stations situated at New Brunswick and Belmar, New Jersey, for communication with Great Britain, have now been completed, and, but for the outbreak of the European war, would now be in operation with the English Company's station in Wales. During the year a commercial service has been established between stations at Bolinas and Marshalls, California, and stations at Kahuku and Koko Head, near Honolulu, Hawaiian Islands. Stations are also in course of construction in the Hawaiian Islands for communication with a station which is being erected by the Japanese Government. It is anticipated that early in 1915 a direct service will be established between the stations at Marion and Chatham, Mass., and the Norwegian Government station at Stavanger. Stations are also in course of construction at Ketchikan, Alaska, and at Astoria, in the State of Oregon, and it is expected that these will be ready for service early in 1915. Communication between Alaska and the United States has in the past been rather difficult, owing to the many interruptions in the cables. During the year 1914 some very important contracts have been carried out for the United States Government. On August 1st, 1913, the Company paid a dividend of 2 per cent. in respect of the year ended

January 31st, 1913. At December 31st, 1913, there was a balance to the credit of the Company's profit and loss account of $214,693·54. The Company is party to an agreement with the Western Union Telegraph Company of the United States and the Great North-Western Company of Canada, under which it has the use of the 25,000 telegraph offices of these two cable companies in the United States and Canada for the collection and delivery of Marconigrams.

Marconi Wireless Telegraph Company of Canada, Limited

Incorporated.—By special Act of the Dominion of Canada on August 13th, 1903.

Head Office.—Shaughnessy Building, 137, McGill Street, Montreal.

Directors.—Andrew A. Allan (President), Commendatore G. Marconi (Vice-President), Robert Bickerdike, M.P., G. M. Bosworth, J. N. Greenshields, K.C., Godfrey C. Isaacs, W. D. Birchall, J. H. Lauer (General Manager), E. J. Nally.

Secretary and Treasurer.—A. E. Reoch.

Capital.—Authorised and issued capital, $5,000,000 in 1,000,000 shares of $5 each, fully paid. Special settling day on the London Stock Exchange, March 22nd, 1912, in 1,000,000 shares. The financial year of the Company ends at January 31st.

The Company owns the sole right to use and exploit the Marconi patents in the Dominion of Canada and the Colony of Newfoundland.

The Company concluded an agreement on April 5th, 1911, with the Canadian Government, which provided that the Company should operate and maintain on behalf of the Canadian Government the Wireless Telegraph stations on the eastern coasts of Canada, twenty in all, for a period of twenty years. On September 17th, 1912, a further agreement was entered into with the Canadian Government providing that the Marconi Company should operate and maintain, on behalf of the Canadian Government, nine Wireless Telegraph stations on the Great Lakes. This agreement to run concurrently with the one concluded on April 5th, 1911.

An agreement between the Newfoundland Government and the Company came into force on April 20th, 1912, under which the Canadian Marconi Company has an exclusive licence to work Wireless Telegraph stations in the Colony of Newfoundland. The agreement also provides for the Company to operate eight Wire-

less Telegraph land stations on behalf of the Government, and to erect and operate four further such stations.

The Company receives under the above two agreements subsidies amounting to approximately $100,000 per annum.

Under the agreements with the Newfoundland and Canadian Governments the following stations are operated:—

Ten stations for the Newfoundland Government, the controlling station of which, at Fogo, is the property of the Company.

Twenty-two stations in Eastern Canada and Newfoundland for the Canadian Government, four of which are the property of the Company.

Eight stations on the Great Lakes on behalf of the Canadian Government.

The Marconi Wireless Telegraph Company of Canada, Limited, owns the high-power Wireless Telegraph station at Glace Bay, by which, in conjunction with the station at Clifden, Ireland, a public Wireless Telegraph Service is conducted with Great Britain and the Continent of Europe. The Company owns and operates the Wireless Telegraph apparatus on nearly 100 vessels.

Improvements are being made to the Cape Race station which will give it a range of over 500 miles by day.

Under contract with the Canadian Government the Company has established permanent communication between Le Pas, Manitoba, and Port Nelson, Hudson Bay, a distance of 350 miles.

Russian Company of Wireless Telegraphs and Telephones

Incorporated.—October 8th, 1908.

Head Office.—14, Lopuchinskaia, Petrograd, Russia.

Directors.—Commendatore G. Marconi, G. C. Isaacs, S. M. Eisenstein, Pierre de Balinski, M. Salberg, Adrian Simpson (Managing Director), Admiral I. F. Bostrem, I.R.N. (retired).

Secretary.—Leon Eisenstein.

Capital.—Originally 1,200,000 roubles in 12,000 shares of 100 roubles each. This capital was increased to 1,800,000 roubles in November, 1911, in order to enable the Company to acquire a license from Marconi's Wireless Telegraph Company, Limited. The capital was further increased in 1913 to 2,400,000 roubles and in 1914 to 3,000,000 roubles, divided into 30,000 shares of 100 roubles each.

The financial year ends December 31st (Russian date).

Dividends.—In respect of the years 1912 and 1913 dividends of 6 per cent. have been paid.

The Company owns the Russian patents taken out in the name of S. M. Eisenstein, and also holds an exclusive licence to use and exploit the Marconi Company's patents in Russia (excluding stations for international communication or on vessels of Russian Mercantile Marine).

The Company has supplied the Russian Government with a large number of Wireless Telegraph stations, and has now a very large amount of work in hand for that Government. Communication has been established and messages exchanged between the Company's station at Petrograd and the Marconi Company's high-power station in Wales.

Société Anonyme Internationale de Télégraphie Sans Fil

Incorporated.—March 31st, 1913.

Head Office.—13, Rue Brederode, Brussels.

Directors.—M. Travailleur (Managing Director), Major S. Flood-Page, Godfrey C. Isaacs, Commendatore G. Marconi, Captain H. Riall Sankey, Count Georg von Arco, Hans Bredow, Dr. Adolf Franke, Paul Mamroth, F. Cattier, G. Perier.

Capital.—2,250,000 francs, divided into 4,500 shares of 500 francs each, all issued and fully paid.

The financial year ends at December 31st, and for the year 1913 the Company paid a dividend of 7½ per cent.

The Company exploits Wireless Telegraphy on vessels of the mercantile marine of all European countries excepting the United Kingdom of Great Britain and Ireland, Germany, Austria-Hungary, Italy and France, and at the present time owns and operates Wireless Telegraph apparatus on nearly 200 vessels.

Société Francaise Radio-Electrique, Société Anonyme.

Incorporated.—April 4th, 1910.

Head Office.—10, Rue Auber, Paris.

Directors.—Monsieur le Comte de Beaumont (President), MM. Fondere, Girardeau, Desachy, de Rivaud, Desclaux, Vinet, de la Taille, Dumont, and Bassee.

Managers.—MM. Girardeau and Desachy.

Capital.—1,500,000 francs, divided into 15,000 shares of 100 francs each. For the year 1912 a dividend of 10 per cent. was paid.

The Company owns and operates the patents of Bethenod and Girardeau.

Spanish and General Wireless Trust, Limited

Incorporated.—February 16th, 1912.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Godfrey C. Isaacs (Managing Director), Alfonso Marconi, Major S. Flood-Page, Captain H. Riall Sankey, Henry S. Saunders.

Secretary.—Henry W. Allen, F.C.I.S.

Capital.—Authorised, £350,000 in 350,000 shares of £1 each. Issued, 249,007 shares of £1 each. The object of the Company is to hold shares in the subsidiary Marconi Companies, in particular those of the Compania Nacioñal de Telegrafia sin Hilos, the denomination of whose shares renders them difficult to negotiate on the London Stock Exchange. The Company holds at present 12,350 Bearer shares of 500 pesetas each in La Compania Nacioñal de Telegrafia sin Hilos.

At June 30th, 1914, the profit and loss account showed a credit balance of £3,586 7s. 4d.

The Wireless Press, Limited
(Private Company)

Incorporated.—October 7th, 1910, under the title of "The Marconi Press Agency, Ltd." Name changed July 11th, 1914.

Head Office.—Marconi House, Strand, London, W.C.

Directors.—Godfrey C. Isaacs, Captain H. Riall Sankey, R.E. (retired), Henry S. Saunders, Major J. E. Cochrane, W. W. Bradfield, Captain C. V. Daly, and Henry W. Allen (Manager).

Secretary.—H. W. Corby, F.C.I.S.

Capital.—£2,000 in 2,000 shares of £1 each.

The Company is the publisher of "The Wireless World" (monthly), "The Year Book of Wireless Telegraphy and Telephony," "Handbook of Technical Instruction for Wireless Telegraphists" (Hawkhead), "The Elementary Principles of Wireless Telegraphy" (Bangay), etc.

BIOGRAPHICAL NOTICES

ABRAHAM, HENRI.—General Secretary of the Société Française de Physique from 1901 to 1913. He is now Professor of Physics at the Sorbonne in Paris.

ARCO, GRAF, GEORG VON.—Born at Grossgorschütz, Germany, and received his education at Berlin University and the Technical High School, Charlottenburg. In 1898 he was appointed assistant to the late Professor Slaby in the department of Wireless Telegraphy; later he joined the Allgemeine Elektrizitäts Gesellschaft, Berlin, continuing at the same time his work on the Slaby-Arco system of wireless telegraphy, and in 1903 received the appointment of manager of the Gesellschaft für Drahtlose Telegraphie. In December, 1906, he carried out practical wireless telephony over a distance of 35 km. (21·70 miles). In 1912 he exhibited high-frequency apparatus at the International Radiotelegraph Congress in London. He is on the board of directors of the Deutsche Betriebs Gesellschaft für Drahtlose Telegraphie.

ARTOM, DR. ALESSANDRO.—Professor of Telegraphy and Wireless Telegraphy at the Royal Polytechnic School of Turin. He was born in Asti on May 6th, 1867. In 1889 he obtained the diploma of electrical engineering and was nominated assistant professor to Galileo Ferraris, who considered him one of his most promising pupils. Professor Artom has published several papers on electricity and on a new system of wireless telegraphy. He has devoted himself especially to the problem of directional electrical radiation, with important results. He employed independent crossed straight antennæ with the object of creating circular and elliptically polarised electric waves.

AUSTIN, LOUIS WINSLOW, Ph.D.—Head of the U.S. Naval Radiotelegraphic Laboratory, Washington, D.C. Son of Professor L. A. Austin, of Middlebury College; educated at Middlebury College, Clark University, and the Universities of Strassburg and Berlin. For a time assistant professor of physics at the University of Wisconsin, then on the staff of the Physikalisch-Technische Reichsanstalt, Berlin, and since

1908 in present position. Especially interested in quantitative high frequency measurements. Delegate to the International Radiotelegraphic Congress of London. President of the Institute of Radio Engineers, 1914.

BAKER, T. THORNE.—Born March 19th, 1881. Educated at Mercers' School, London, and passed Intermediate Science examination at the University of London. After five years' work as research chemist he went to Paris in 1907 for the *Daily Mirror* to take up Prof. Korn's system of photo-telegraphy, and superintended the operation of the system between Manchester, Paris, and London.

BEGGEROW, DR. HANS.—Born September 30th, 1874. Educated at the University of Berlin and Freisburg-breisgan, where he obtained his Doctorate. Since 1901 he has been in the German Admiralty as expert in all matters concerning wireless telegraphy, and since 1906 he has occupied a similar position in the Prussian Army.

BELLINI, DR. EITORE.—Born at Foligno, Italy, on April 13th, 1876, and educated at Naples University. In 1901 he was appointed Electrical Engineer to the Royal Italian Navy, and in 1906 he became Chief of the Naval Electrical Laboratory at Venice, in which latter capacity he was responsible for carrying out research work dealing with the employment of Wireless Telegraphy on warships and submarines. Later, in conjunction with Capt. Tosi, he invented the Radiogoniometer, an apparatus for directive Wireless Telegraphy. In 1910 the Bellini-Tosi system was installed at the Boulogne-sur-Mer station of the French Post Office.

BLONDEL, ANDRÉ E.—Born in Chaumont, France, in 1863, and graduated at the Paris University. He has been a frequent contributor to learned societies and technical journals on several subjects, including Wireless Telegraphy, in connection with which he invented in 1893, a new apparatus which is known as the "Oscillograph," and which opened a fresh field for the study of alternate currents. He was the first to explain, mathematically, in 1893, the effect of inertia in the hunting of alternators. Among his other work in Wireless telegraphy mention should be made of the following: directed waves produced by a double aerial oscillating on the fifth harmonic, a system of acoustically syntonic wireless telegraphy, etc.

BLONDLOT, PROFESSOR PROSPER RENE.—Born at Nancy in 1849. After completing his scientific studies in Paris, he returned to his native city, where he became Professor at the Faculty of Sciences. He is now an Hon. Professor and Correspondent of the Institute of France. Professor Blondlot has devoted considerable study to the problem of electromagnetic waves, the main object of his researches being to determine the speed of propagation of such waves.

BRANLY, EDOUARD.—Born at Amiens on October 23rd, 1844. He studied at the St. Quentin College, afterwards at Henry IV. College, Paris. He is a Fellow of the University, Doctor of Physical Science, and Doctor of Medicine. Some of his works relate to the electrical conductivity of radio-conductors. In 1900 the International Jury of Superior Precept Instruction awarded him a *grand prix* for his exhibition of radio-conductors, and the French Minister of Public Instruction made him a "Chevalier of the Legion of Honour" in recognition of the part he has played in connection with the discovery of "Wireless Telegraphy." He has constructed various independent distributing apparatus for producing tele-mechanical effects without wires. In January, 1911, he was elected a member of the Academy of Science, Paris.

BRAUN, PROF. FERDINAND.—Born at Fulda on June 6th, 1850, and studied at Marbourg and Berlin, graduating at the latter place in 1872. In October, 1895, he was appointed Director of the Physikalische Institut at Strassburg. His early works refer to mechanical oscillations, but for many years he has devoted his genius mainly to electrical research, with special attention to Wireless Telegraphy. He has held several academic appointments of the highest importance, and is the author of numerous books and papers on Wireless Telegraphy and kindred subjects. In December, 1910, he received (with Mr. Marconi) the Nobel Prize for Physics.

BRIGHT, CHARLES, F.R.S.E., M.Inst.C.E., M.I.Mech.E., M.I.E.E.—Consulting Engineer and Electrician to the Commonwealth of Australia. Born in London 1863 and educated at Lancing College and King's College. In 1881 he was articled to his father, the late Sir Charles Tilston Bright. Since that date he has been engaged, both as engineer and electrician, in the construction, testing, laying, and repairing

of some 25,000 miles of submarine cable. He represented Australia as sole delegate at the International Radiotelegraphic Conference of 1912. He is a Vice-President of the Wireless Society of London.

BROWN, SIDNEY GEORGE.—Born in 1873 in Chicago, U.S.A., of English parents, and brought to England at an early age. He received his education at Harrogate and London University. He made a special study of submarine telegraphy and is the inventor of the magnifying cable relay. In 1898 he invented the drum cable relay and the magnetic shunt. Since that date he has also devoted much attention to telephony and wireless telegraphy and has achieved some important results. He is a Vice-President of the Wireless Society of London.

BURSTYN, DR. W.—Born in Austria in 1877, and educated at the University of Vienna. He started his career as an electrical engineer with the Siemens-Schuckert Werke at Charlottenburg, and with the Gesellschaft für Drahtlose Telegraphie.

CHAMBERLAIN, EUGENE TYLER.—Son of General Frank Chamberlain. He was born in Albany, N.Y., on September 28th, 1856. Educated at the Albany Academy and Harvard College, graduating with honours in Metaphysics in 1878. After being in business for two years, he took up journalism and acted as legislative and political correspondent to the Associated Press, becoming assistant editor of the *Albany Journal* and editor of the *Albany Argus* until 1893, when he came to Washington and was appointed Commissioner of Navigation by President Cleveland. In 1903, on the creation of the Department of Commerce and Labour, he joined others in urging the importance of wireless telegraphy as a means of promoting safety of life on merchant vessels at sea, and he has since participated in legislation on this subject.

CHREE, CHARLES.—Born 1860. Graduated M.A. at Aberdeen University in 1879, with first-class honours in Mathematics and Natural Philosophy. Graduated B.A. in Cambridge University in 1883, sixth wrangler, first-class honours in final part of Mathematical and Natural Sciences Triposes. Fellow of King's College, Cambridge, in 1885; re-elected as research fellow in 1891. Superintendent of Kew Observatory since 1893. Sc.D. of Cambridge; Hon. LL.D. of Aberdeen; F.R.S. Ex-President of Physical Society of London.

During the last fifteen years he has been largely concerned with geophysics, especially terrestial magnetism and atmospheric electricity. Author of "Studies in Terrestial Magnetism" and a contributor of articles in the last edition of the Encyclopædia Britannica. He is a member of the British Association Committee for Radio-Telegraphic Investigation.

CLARKE, E. RUSSELL.—Born in 1871, he was educated at Charterhouse and Pembroke College, Cambridge, where he took a first-class in the Mathematical Tripos of 1893, and was equally successful in the Mechanical Science Tripos of the succeeding year. He became a barrister of the Inner Temple in 1895. He specialises in cases of a scientific nature, and has an expert knowledge of the laws on patents, designs, and trade-marks. He is an associate of the Institution of Civil Engineers, an associate and member of council of the Institution of Electrical Engineers, a member of council of the Institution of Automobile Engineers, and a Vice-President of the Wireless Society of London. For the last twelve years Mr. Clarke has been closely interested in the development of wireless telegraphy, and has erected two stations, one in London, and one at Penbydwl, Abergavenny, in Wales.

COHEN, LOUIS.—Born in 1876, he studied electrical engineering in Armour Institute of Technology, 1897-1901, and physics and mathematics in the University of Chicago and Columbia University, 1902-1905. He was on the Scientific Staff of the Bureau of Standards from 1905 to 1909 and Assistant Professor at the George Washington University, 1907-1909. In 1909 he was appointed chief of the research department of the National Electric Signalling Co., to take charge of the development of wireless apparatus. During his connection with that company he has also carried on extensive investigations in connection with the Heterodyne receiver. Since the latter part of 1912 he has been engaged in developing his own inventions in wireless telegraphy, particularly the Electrostatically Coupled Receiver, and recently he has also taken up the practice of consulting and research engineering. He is the author of the book "Formulæ and Tables for the Calculation of Alternating Current Problems," and has

published scientific and technical papers dealing with problems in wireless telegraphy and kindred subjects.

CROOKES, SIR WILLIAM, O.M., D.Sc. (Hon), LL.D.—Born in London June 17th, 1832. He entered the Royal College of Chemistry in 1848 as a pupil of Dr. Hofmann, and gained the Ashburton Scholarship in 1849. Later he became senior assistant to Dr. Hofmann, which position he retained until 1854, when he obtained the appointment of Superintendent of the Meteorological Department of Radcliffe Observatory, Oxford. He was elected a fellow of the Royal Society in 1863. Although his career has been mainly devoted to chemical research, he has carried out a long series of original investigations in radiotelegraphy and has also published some interesting articles on the subject. He is a past president of the British Association, the Chemical Society, and the Institution of Electrical Engineers. In November, 1913, he was elected President of the Royal Society.

DE FOREST, DR. LEE.—Born at Iowa, U.S.A.; graduated at Yale College. Since 1896 he has been actively interested in wireless telegraphy and has made some important advances in both the scientific and commercial development of wireless telegraphy and telephony. Recently he has devoted himself mainly to research work in wireless telephony.

DUBILIER, WILLIAM.—Born in 1888, he studied electrical engineering at the Technical Institute, New York, and the Cooper Institute. He has been engaged in wireless research work for over ten years and has obtained a large number of patents on wireless telegraph and telephone apparatus. He has published a large number of scientific and technical papers on the subject of wireless telegraphy and telephony.

DUDDELL, W., F.R.S.—Born in London in 1872 and educated privately in this country and in France. He carried out research work at the Central Technical College, London, between 1893 and 1900. In 1908 he read, in conjunction with Dr. E. W. Marchant, a paper on "Experiments on Alternate-current Arcs by the Aid of Oscillographs" before the Institution of Electrical Engineers, and in 1900 he read a paper on "Rapid Variations of Current through the Direct-current Arc." He received a gold medal for oscillographs at the Paris Exhibition of 1900, and at St. Louis in 1904. He was President of the Institution of Electrical Engineers for two

years, 1912-1914. He was also a member of the technical committee appointed by the Government in 1912 to consider the question of long-distance wireless telegraphy. He is at present acting as Consulting Engineer for Wireless Telegraphy at the Post Office.

ECCLES, W. H., D.Sc., A.R.C.S., M.I.E.E.—Born in Furness, Lancs., in 1875, and entered the Royal College of Science, South Kensington, in 1894. Three years later he was appointed demonstrator in the Physics Laboratory at the College, and in 1898 he graduated at the London University with first-class honours in Physics. In 1899 he entered Mr. Marconi's laboratory at Chelmsford and spent a great part of his time in the investigation of electrical oscillations of air wires and in "jiggers." He also devised a laboratory method for testing and classifying coherers, and results of a later study of coherers were presented as his D.Sc. thesis. In 1901 Dr. Eccles was appointed head of the department of mathematics and physics at the South Western Polytechnic, Chelsea, and he is now University Reader in Graphics at the University of London. He is a member of the Council of the Physical Society and examiner in mathematics at the London University, and secretary of the British Association Committee on Radiotelegraphic Investigations.

EICHHORN, GUSTAV, PH.D.—Born at Düsseldorf (Germany) on December 1st, 1867. After leaving the Realgymnasium he took up the study of physics, but this was interrupted by the death of his father, and for ten years he devoted himself to a business career; then he returned to the profession of his choice and continued his interrupted studies. After three years at Berlin, Munich, and Zürich, he took the degree in physics (Phil. Dr.) at the last-named University. He entered a wireless telegraph laboratory, and soon after he was appointed manager of experimental stations on the Baltic, where, for about eighteen months he conducted a number of investigations. The results of these are incorporated in a book which was published in England and Germany. He has contributed to various technical journals and has invented a device which is used in connection with wave meters and other instruments. He returned to Zürich in 1905 and introduced wireless telegraphy to the Swiss Military Authorities. Two years later he launched the *Jahrbuch de drahtlosen Telegraphie und Telephonie,* which is now a well-known publication. He is still

engaged in practical and theoretical work in wireless telegraphy and telephony.

ERSKINE-MURRAY, JAMES, D.Sc., F.R.S.E., M.I.E.E.—Born in Edinburgh on October 24th, 1868, and after a course of six years' study under the late Lord Kelvin at Glasgow University he entered Trinity College, Cambridge, as a research student. In 1898 he was appointed experimental assistant to Mr. Marconi. In 1900 he took up the post of lecturer and demonstrator in physics and electrical engineering at the University College, Nottingham, and in 1905 he was appointed to the lectureship in electrical engineering at the George Coates' Technical College, Paisley. In 1905 he took up consulting work in radiotelegraphy, and since 1907 has held the post of lecturer at the Northampton Institute, London. He has contributed papers to numerous learned societies, and is the author of several works on wireless telegraphy. In 1913 he joined the firm of Clark, Forde and Taylor, consulting engineers, and the firm is now Clark, Forde, Taylor, and Erskine-Murray.

FERRIÉ, LT.-COLONEL.—He is attached to the department of the Ministry for War, France, as Technical Director of Military Wireless Telegraphy, and is in charge of the installation at the Eiffel Tower, Paris.

FESSENDEN, REGINALD AUBREY.—Born at Milton, Canada, on October 6th, 1866. Educated at New York and Port Hope, Ontario. In 1886 he was appointed inspecting engineer to the Edison Company, N.Y. In 1892 he took up teaching work and conducted classes in physics and electrical engineering at Western University, and in 1893 he was appointed Professor of Electrical Engineering at Western University of Philadelphia. In 1900 he was appointed special agent to the U.S. Weather Bureau. Since that date he has devoted much attention to the development of a system of wireless telegraphy known by his name, and he has also carried out important experiments in wireless telephony. He has contributed articles on wireless telegraphy and telephony to many technical journals.

FLEMING, DR. JOHN AMBROSE, F.R.S.—Born in Lancaster on November 29th, 1849. Educated at University College School, London; University College; the Royal School of Mines; and St. John's College, Cambridge; Hughes Gold

Medallist of the Royal Society. He was appointed demonstrator in mechanics and applied science to the University of Cambridge, and when University College, Nottingham, was opened in 1881 Dr. Fleming was selected as first occupant of the chair of mathematics and physics. He resigned this professorship shortly afterwards to remove to London. On the creation of the Pender Chair of Electrical Engineering in 1885, the Council of the University College, London, appointed Dr. Fleming first occupant of that chair. After the incorporation of the University College with the University of London the title of Dr. Fleming's chair was changed to that of Pender Professor in the University of London. In 1912 Dr. Fleming was appointed University Professor of Electrical Engineering in the University of London. He is the author of numerous well-known text-books, amongst which may be mentioned particularly his books on Wireless Telegraphy. He has given many courses of lectures at the Royal Society of Arts and the Royal Institution on Wireless Telegraphy and other subjects.

FLOOD-PAGE, MAJOR SAMUEL.—He has served in military campaigns in India, and besides active service he was occupied with administrative work. He joined Marconi's Wireless Co., Ltd., in 1899, as managing director, and still remains a director of the company.

FROUIN, M.—He is Director of the French Telegraphs and was one of his country's representatives at the International Radiotelegraphic Conference held in London in 1912.

GEOGHEGAN, SAMUEL.—In 1875 he was appointed Chief Mechanical Engineer to Messrs. Arthur Guinness and Co., of Dublin, in whose service he spent 30 years. He is a member of the Institution of Mechanical Engineers, the Midland Institution of Mining, Civil and Mechanical Engineers, the Institution of Civil Engineers of Ireland, and a member of the Council of the Royal Dublin Society. Director Marconi's Wireless Telegraph Co., Ltd.

GLAZEBROOK, DR. R. T., F.R.S.—Born at Liverpool, September 18th, 1854. Educated at Trinity College, Cambridge, where, after taking his degree, he commenced a study of physics at the Cavendish Laboratories under Clerk Maxwell. In 1899 he was appointed by the Royal Society as the first director

of the National Physical Laboratory, which position he still holds. He is a member of the technical committee enquiring into the Imperial Wireless Scheme.

GOLDSCHMIDT, PROFESSOR DR. RUDOLF.—Born March 19th, 1876, at Neu-Buckow, Mecklenburg, Germany. After finishing his education at Wiemar Municipal School, he studied engineering at Charlottenburg and Darmstadt Technical High School. In Darmstadt he obtained his degree as electrical engineer in January, 1898, and then became assistant to Professor Kittler. In 1900 he obtained the college and travelling scholarship, which enabled him to visit engineering works in Belgium, England, and France. Later in the same year he was appointed engineer in the laboratory of the A.E.G. in Berlin. In 1901-2 he occupied the position of chief laboratory engineer and designer to Kolben and Co., Ltd., in Prague. He came to England in connection with the Willesden Electricity Supply Station, and was later appointed chief engineer to Messrs. Crompton and Co., of Chelmsford. In 1905 he joined the Westinghouse Company in Manchester. After private preparation he passed the German *abitur*-examination and obtained the degree of Dr. Eng. In 1907 he returned to Germany as lecturer at Darmstadt Technical College. Here he practised as a consulting engineer, and also pursued the development of several inventions, chiefly occupying himself with the invention and design of high-frequency alternators for wireless telegraphy. In 1911 he became manager of the "Hochfrequenz-Maschinen Aktiengesellschaft für drahtlose Telegraphie" in Berlin, a company formed for the utilisation of his inventions in wireless telegraphy. In this position he established two large wireless stations at Eilvesen, Province of Hanover, and Tuckerton, New Jersey, U.S.A., for wireless communication between Germany and America.

HOPE-JONES, FRANK.—Chairman of the Wireless Society of London. He was born in 1867, and from 1890 to 1895 he was associated with his elder brother, Robert Hope-Jones, in some of his earliest applications of electricity to organ-building. Since then he has established the business of electric time service on a scientific basis. He is a member of the Institution of Electrical Engineers, the British Horological Institution, etc., and is author of numerous contributions to

technical journals and to the Proceedings of Scientific Societies.

HOWE, PROF. GEORGE WILLIAM OSBORN, D.Sc., M.I.E.E.—Born 1875, at Charlton, Kent. Educated at Woolwich Polytechnic and Durham University. After nine years with Siemens Bros. at Woolwich and Siemens and Halske at Charlottenburg, and two years as lecturer at Hull Technical School, he was appointed lecturer and later Assistant-Professor of Electrical Engineering at the City and Guilds Engineering College. He is a D.Sc. of Durham and an honorary D.Sc. of Adelaide University. He has read several papers on radiotelegraphy before the British Association, the Physical Society, etc., and in 1912 was awarded the silver medal by the Royal Society of Arts for his paper on "Some Recent Developments in Wireless Telegraphy." He is on the Council of the Physical Society, and is a member of the Radiotelegraphic Research Committee of the British Association and of the British Committee of the International Radiotelegraphic Commission.

ISAACS, GODFREY C.—Educated in England, France and Germany. He began life in his father's business and at 18 years of age he was manager of the great concern which he had entered as a lad. In 1910 he was appointed Managing Director of Marconi's Wireless Telegraph Co., Ltd., and the Marconi International Marine Communication Co., Ltd.

JANET, PAUL.—Professor of Physics at the University of Paris, Director of the Central Laboratory and of the High School of Electricity. He was born on January 10th, 1863, in Paris, and studied at the Lycée Louis-le-Grand and afterwards at the High School. He is a member of the French Society of Physics, the International Society of Electricians, and the Society of Civil Engineers of France. From 1886 to 1894 he was Professor of Physics at the University of Grenoble. Professor Janet has published several important works, and from the point of view of Wireless Telegraphy he was the first to make a successful experiment in electric resonance by means of high-frequency currents in 1892; this is the phenomena used to-day in wavemeters.

JAUREGG, DR. FRIEDRICH RITTER WAGNER VON.—Born on May 8th, 1858, at Wels, Upper Austria. Entered the service of the Austrian Government in 1880, and after many years'

service in the postal and telegraph administration in Vienna, was transferred to the Board of Trade, where from 1896 to 1906 he was Chief of the Postal and Telegraph Organisation Staff. Since 1906 he has filled the position of Chief of Section and General-Director of Postal and Telegraph Business, in which position he figures as the chief of the Wireless Telegraph Section.

KENNEDY, SIR A. W. B., F.R.S.—Born in London, March 17th, 1847. He has had great mechanical engineering experience and has been President of the Institution of Civil Engineers and the Institution of Mechanical Engineers. He has designed electric lighting and power stations for many corporations, and has also been engaged in traction work. He received the honour of knighthood in 1905 on account of his services to the Admiralty. He was a member of the technical committee which was appointed by the Postmaster-General to consider the Imperial Wireless scheme.

KORN, PROFESSOR ARTHUR.—Born at Breslau, Germany, May 20th, 1870. Dr. Korn studied at Leipzig and Paris in Mathematics and Physics. In 1903 he was appointed Professor of Physics at the University of Munich, retiring from that position in 1908. He is best known as the inventor of a system of telegraphic transmission of photographs, and in 1907 the first photograph was transmitted under his system from Munich to Berlin, a distance of 600 kilometres. Professor Korn has also invented a system of telautography. His work, entitled "Elektrische Fernphotographie und Aehnliches," appeared at Leipzig in 1904, and a larger work, entitled "Handbuch der Phototelegraphie und Telautographie," was published by him in 1911, in collaboration with Dr. Glatzel.

LODGE, SIR OLIVER, F.R.S.—Born at Penkhall, Staffs., on June 12th, 1851. He was educated at the Newport (Salop) Grammar School, and was intended for a business career, but being attracted to science he entered University College, London, in 1872, and graduated D.Sc. five years later. He was reader in natural philosophy at Bedford College for Women, then professor of physics in University College, Liverpool, before being appointed, in 1900, the first Principal of the new Birmingham University. He was knighted in 1902. He has distinguished himself in various spheres of

thought, and his original work includes investigations on lightning, the seat of the electromotive force in the voltaic cell, the phenomena of electrolysis and the speed of the ion, the motion of the ether near the earth, and electromagnetic waves and wireless telegraphy. His patent for syntonic wireless telegraphy has been acquired by the Marconi Co. He presided over the mathematical and physical section of the British Association in 1891 and was President of the Association last year. He has also served as President of the Physical Society and the Society for Psychical Research. He has made many important contributions to the literature of science and has written various books and papers of a metaphysical and theological character.

LOMBARDI, DR. LUIGI.—Born on August 21st, 1867, at Dronero (Italy). In 1890 he obtained the diploma of civil engineering at the Royal Engineering School of Turin. He gained the diploma in electricity at the Industrial Museum of Turin in 1891 and won the Gori-Feroni prize. He has been professor of electricity at the Zurich University (1891-1896), at the Industrial Museum of Turin (1897-1900), and since 1911 at the Royal Polytechnic School in Naples. He has published a book on the "Scientific Principles of Electricity" and a text-book on electricity, besides numerous papers on kindred subjects. He is the author of a study on the employment of condensers for the transmission of electricity, which obtained for him the Kremer Prize of the Lombard Institute. He is the inventor of a special high-tension electrical condenser. He was a delegate of the Italian Government at the St. Louis International Congress of Electricity, and has been President of several International Congresses and Scientific Societies. He has done much to further the development of wireless telegraphy and through his efforts a special course on wireless telegraphy has been established at the Royal Polytechnic School in Naples, where he has erected a wireless telegraph station.

LORING, COMMANDER F. G., R.N., M.I.E.E.—Inspector of Wireless Telegraphy at the General Post Office. He entered the Navy in 1882 (retired 1910). He was lieutenant on board H.M.S. *Victoria* when that vessel was rammed and sunk by H.M.S. *Camperdown* off Tripoli in 1893, and received the bronze medal of the Royal Humane Society for saving two

lives. In charge of the Admiralty shore wireless telegraph stations from 1902-8. In 1906 he acted as delegate for the Admiralty at the Berlin International Conference on Wireless Telegraphy. In 1908 he was appointed Inspector of Wireless Telegraphy and he represented the Post Office at the International Conference on Wireless Telegraphy held in London in 1912. At the International Conference on the Safety of Life at Sea (London, January, 1914) he acted as technical adviser to the Board of Trade on all matters connected with Wireless Telegraphy.

MADGE, HENRY ASHLEY, B.A., A.M.I.E.E.—Born February, 1879, he was educated at Peterhouse, Cambridge (1898-1902), where he took honours in Mathematics and Mechanical Science (Engineering). From July, 1902, to September, 1903, he was employed by Marconi's Wireless Telegraph Co., Ltd., as junior engineer; from October, 1903, to January, 1904, he was at the Royal Naval College, Greenwich; from February, 1904, to March, 1905, Naval Instructor in H.M.S. *Vernon;* and in April, 1905, was appointed Expert in Wireless Telegraphy in H.M.S. *Vernon.*

MARCHANT, EDGAR WALFORD, D.Sc., M.I.E.E.—David Jardine Professor of Electrical Engineering in the University of Liverpool. Born in 1876; educated at the Central Technical College, he obtained Siemens's medal and was elected to a Salomon's Scholarship of the Institution of Electrical Engineers. After serving an apprenticeship he was appointed Superintendent of Lord Blythswood's Laboratories and Workshops at Renfrew, N.B., where he carried out a number of investigations, including experiments in Wireless Telegraphy. Subsequently he acted for a year as senior assistant to Professor Silvanus P. Thompson, and in 1901 was appointed Lecturer and later (1903) Professor of Electrical Engineering in the University of Liverpool. He has published papers on the magnetisation of iron under the influence of a high-frequency discharge from a condenser, on the conditions affecting variations in strength of wireless signals, and on many other subjects. He was elected Chairman of the Manchester Local Section of the Institution of Electrical Engineers in 1913-14, and is a Vice-President of the Liverpool Engineering Society and of the Wireless Society of London. He was one of the British delegates at

the International Scientific Commission on Wireless Telegraphy, held at Brussels in April, 1914.

MARCHANT, W. H.—Born in London, March 22nd, 1881. Took up experimental work in connection with Wireless Telegraphy in 1904. From 1906-1911 he served with the Deforest Syndicate, Poulsen Company, and Lepel and Anglo-German Wireless Companies, being chiefly engaged in experimental work. Since 1911 he has devoted himself mainly to literary work and to teaching.

MARCONI, ALFONSO.—Born at Bologna in 1865, he is about eight years older than his distinguished brother. He was educated at the Bedford Grammar School in England and later at Technical Colleges in Florence and Leghorn. He joined the board of Marconi's Wireless Telegraph Company and the Marconi International Marine Communication Co., Ltd., in July, 1909.

MARCONI, COMMENDATORE GUGLIELMO, LL.D., D.Sc.—Born at Bologna, in Italy, on April 25th, 1874, he is Irish on his mother's side. He was educated at Leghorn and Bologna University, and first began to interest himself in the problem of Wireless Telegraphy in 1895. In the following year he came to England, and took out the first patent ever granted for a practical system of Wireless Telegraphy by the use of electric waves. His first experiments in England were made at Westbourne Park. Shortly afterwards Mr. Marconi saw Sir W. H. Preece, and at his request made some experiments for him and the Post Office officials. Some further experiments were made in May, 1897, in the Bristol Channel, when Lavernock and Flatholm were successfully connected, and afterwards Lavernock and Brean Down, across the Channel, a distance of nine miles. On the invitation of the Italian Government Mr. Marconi subsequently went to Spezia, where his system was put to practical test on board two Italian battleships. A station was erected on land, and the ships were kept in constant telegraphic communication with the shore up to a distance of 12 miles. The Italian Government conferred upon Mr. Marconi the honour of knighthood, and his system is now used extensively in Italy. On his return to England further experiments were conducted at Salisbury (between Salisbury and Bath, a distance of 34 miles). On July 20th, 1897, the Wireless Tele-

graph and Signal Co., Ltd.—now known as Marconi's Wireless Telegraph Co., Ltd.—was established, and two permanent stations were put up. In July, 1898, the Dublin *Express* gave day by day a Wireless Telegraphic report of the yacht races during Kingstown Regatta week, and proved the usefulness and facility with which the system can be applied to commercial purposes. Later Mr. Marconi established communication between the late Queen's residence at Osborne House, Isle of Wight, and the Royal yacht *Osborne,* and Her late Majesty was kept apprised of the progress made by the King during the process of recovery from a serious accident. In the week ending December 24th, 1898, Mr. Marconi was engaged in installing apparatus to provide communication between a lighthouse and a lightship on the South Coast, the Trinity House authorities having placed a room at the South Foreland lighthouse at Mr. Marconi's disposal for the purpose. Mr. Marconi is a member of the Institution of Electrical Engineers, and read a paper on "Wireless Telegraphy" before the members in 1899. He journeyed to the United States in connection with the America Cup Yacht racing for 1899, between *Columbia* and *Shamrock I.* In the same year a number of the ships of the British Navy were equipped with Marconi apparatus. Early in 1901 telegraphic communication was established between two points more than 250 miles distant, and at the end of that year Mr. Marconi transmitted signals from Poldhu, in Cornwall, to St. John's, Newfoundland. In February, 1902, Mr. Marconi received on board the s.s. *Philadelphia,* in the presence of the officers, good messages on the tape when at a distance of over 1,500 miles from the transmitting station, and signals at over 2,000 miles. In December, 1902, the station established at Cape Breton, Nova Scotia, under a contract with the Canadian Government, for transatlantic Wireless Telegraphy, was put into communication with the Cornwall station at Poldhu, and inaugural messages were transmitted to H.M. the King of England, H.M. the King of Italy, and others, and to *The Times* newspaper. In October, 1903, during the voyage of the R.M.S. *Lucania,* Mr. Marconi established communication between this ship and the Marconi stations at Glace Bay, Canada, and Poldhu, Cornwall, England, and a bulletin was published and issued

daily to each passenger. At the end of October, 1903, Mr. Marconi, at the invitation of the British Admiralty, sailed on board H.M.S. *Duncan* from Portsmouth to Gibraltar, and throughout the voyage messages were received on board from the Marconi station at Poldhu. A powerful station at Clifden, on the West Coast of Ireland, was opened early in 1907, by means of which communication with the American Continent (Glace Bay) was first established. Mr. Marconi's work has been recognised by many governments and seats of learning; he has been decorated by the King of Italy and the Czar of Russia, is an honorary doctor of many universities, including Oxford, Glasgow, Aberdeen, Liverpool, and Pennsylvania, besides having received the freedom of the principal Italian cities. In 1909 (in conjunction with Professor Braun) he was accorded what is perhaps the highest distinction that can be obtained by any scientist—the Nobel Prize for Physics. On July 24th, 1914, in a personal interview with Mr. Marconi, the King bestowed upon him the Honorary Knighthood of the Grand Cross of the Victorian Order. He also holds many scientific awards granted by various societies and institutions.

NORMAN, SIR HENRY, M.P.—He is well known to the public as a politician, a keen traveller, and an accomplished man of letters. Sir Henry has always made the study of electricity one of his hobbies, and has followed the progress of wireless telegraphy with enthusiasm. He has a private wireless station in the grounds of "Honeyhanger," his home at Hazlemere. In 1912 he was appointed Chairman of the War Office Committee considering the use of wireless telegraphy in the field.

OSTHEIM, DR. RUDOLF RITTER SPEIL VON.—Born in 1868, he entered the Austrian State Service in 1892, and after serving in various branches of the post and telegraph department he was appointed in 1896 to the Board of Trade, and since 1908 has been at the head of the administration of the telephone and wireless systems.

POULSEN, VALDEMAR.—Born in Copenhagen, November 23rd, 1869. After pursuing a course of study at the University of Copenhagen he entered the technical department of the Copenhagen Telephone Company in 1893, and for a number of years superintended electrical testing operations. In

1904, in a paper sent to the Electrical Congress in St. Louis, he explained a method of producing continuous electrical oscillations of a relative high frequency and of a high intensity. He has been assisted by Professor Pedersen in the practical development of this method, which forms the basis of the Poulsen System of Wireless Telegraphy.

PREECE, LLEWELLYN.—Son of the late Sir William H. Preece. He is one of the principal partners in the firm of Preece, Cardew & Snell, Consulting Engineers to the Crown Agents to the Colonies, and to the High Commissioners of New Zealand and South Africa. During the last thirteen years he has been largely responsible for the wireless telegraph work in connection with the Crown Colonies, which has been placed in the hands of his firm.

PUPIN, DR. MICHAEL I.—Director of Research Laboratory of Columbia University, U.S.A. Born in Hungary, October 4th, 1858, of pure Serb ancestry. In 1874 he went to the United States, where he studied at the Columbia University, graduating in 1883. His study was continued at Cambridge, England, and at Berlin, and, returning to the United States, he became Professor of Mathematical Physics at the Columbia University in 1891. Among his first original work may be mentioned the development of electrical resonance, before the introduction of wireless telegraphy. Patents issued to him on electrical selectivity were licensed to Marconi's Wireless Telegraph Company in 1903. He has worked extensively in the development of his inventions in connection with telephones and telegraphs, and many of his improvements are known by his name throughout the world. For the past two years he has been engaged in the development of a new method of electrical selectivity to be used in connection with wireless telegraphy. He has also been engaged in research work in wireless telephony.

RAYLEIGH, THE RT. HON. LORD.—Born on November 12th, 1842. He was educated at Torquay and at Trinity College, Cambridge. In 1865 he graduated in the Mathematical Tripos as Senior Wrangler, and was awarded the first "Smith's Prize." His work in Physics has been of a varied and thorough character. He has contributed to the Royal Society some important communications on the "Propagation of Electrical Waves Round the Bend of the Earth."

REDFIELD, WILLIAM COX.—United States Secretary of Commerce. Born at Albany, N.Y., June 18th, 1858. From 1885 to 1905 he was engaged in the manufacture of iron and steel forgings, tools, etc., at Brooklyn. From 1902-3 he acted as Commissioner of Public Works for the Borough of Brooklyn, and in 1910 was elected to the 62nd Congress to represent the 5th New York District. He was Director of the Equitable Life Assurance Society of New York from 1905 to 1913, being appointed to that position by Grover Cleveland. As Secretary of Commerce he is closely associated with Wireless Telegraphy in the United States, the department of which he is the chief being responsible for the enforcement of the wireless communication laws and the International Radiotelegraphic Convention.

RIGHI, PROFESSOR AUGUSTO.—Born at Bologna in 1850, and educated at the University there. He was Professor of Physics from 1873 to 1880 at the Bologna Technical Institute; 1880 to 1885 at the Palermo University; from 1885 to 1889 at the Padua University; and since 1890 at the Bologna University. Professor Righi has published many important papers on physics, among which may be mentioned "Hertzian Waves," in 1900; "Telegraphy Without Wires" (in collaboration with B. Dessau), in 1902, etc.

SANKEY, CAPTAIN H. RIALL.—Born at Nenagh in Ireland in 1853 and educated in Switzerland and at the Royal Military Academy, Woolwich, and the School of Military Engineering, Chatham. He had a distinguished career in the Royal Engineers before retiring from the Army to devote himself entirely to engineering work. He is a member of the British Association Committee for Radiotelegraphic Investigation and a director of Marconi's Wireless Telegraph Co., Ltd.

SALTZMAN, MAJOR C. McK.—He is a native of the State of Iowa, and graduated at the United States Military Academy at West Point in 1896. As a Cavalry officer he participated in the battles near Santiago de Cuba of the Spanish-American War of 1898, and later as a Signal Officer participated in the Philippine Insurrection in the Philippine Islands. In 1901 he was transferred to the Signal Corps of the U.S. Army, and has since been identified with the electrical, cable and radio work of the U.S. Army. Major Saltzman for several years

has been in charge of the Electrical Laboratory of the Signal Corps in Washington, where radio equipment of the U.S. Army is designed and tested. He represented the United States at the International Radiotelegraphic Conference in London in June, 1912.

SAUNDERS, HENRY SPEARMAN.—Born April, 1841, he is the son of the Hon. Frederick Saunders, who was Treasurer of Ceylon, to which office the latter was succeeded by his eldest son, Sir Frederick Richard Saunders, K.C.M.G. Mr. Henry S. Saunders joined his parents in Ceylon at the age of 18, and he devoted himself with conspicuous ability and success to the public and commercial life of the colony. He was instrumental in carrying through important schemes of railway extension and the construction of roads, and his services in the latter respect gained for him the appreciation of the Director of Public Works. On returning to England about thirteen years ago Mr. Saunders joined the board of Marconi's Wireless Telegraph Co. He accompanied Mr. Marconi to America on board the ss. *Philadelphia* in 1902, and he was one of the first directors of the Marconi International Marine Communication Co., Ltd.

SOLARI, MARQUIS LUIGI.—Born in Turin, he was promoted officer of the Italian Royal Navy in 1890. He obtained the diploma of Electrical Engineering at the University of Turin in 1889. In 1900 he was in charge of the Laboratory of Wireless Telegraphy at the Royal Dockyard of Spezia. He superintended the installation of several land and ship stations. In 1902 he was in charge of the wireless telegraph station on board the Italian warship *Carlo Alberto* during the historic voyages of that vessel across the Atlantic and in the Mediterranean Sea, conducted under the personal direction of Senator Marconi. The Marquis Solari wrote the official report of those voyages. In 1903 he was a delegate of the Italian Government at the Berlin Wireless Conference. In 1904-1905 he was in charge of the Wireless Telegraph Department of the Italian Ministry of Posts and Telegraphs, and in the month of September, 1904, as official delegate of the Italian Government at the International Congress of Electricity held in St. Louis, U.S.A., he read a paper on the Development of Wireless Telegraphy. He is joint inventor with Professor Lori, of the Padua University, of a magnetic

relay. He has published several papers on wireless telegraphy in various periodicals and reviews. Since 1906 he has devoted himself to the development of the Marconi system in Italy, Spain, Portugal, and in the Balkan States and in other countries.

SQUIER, LT.-COL. GEORGE OWEN.—Military attaché to the American Embassy in London. Educated at John Hopkins University, Baltimore, where he gained the degree of Doctor of Physics in 1893, and worked as a research student under the late Professor Rowland. He was working in the laboratory of the late Sir William Preece at the Post Office at the time that Mr. Marconi conducted his early demonstrations before the officials of that organisation. On June 28th, 1911, an important treatise by him, dealing with multiplex telephony and telegraphy by means of waves guided by wires, was read before the American Institute of Electrical Engineers. He is the author of numerous papers on the subject of wireless telegraphy and has devoted special attention to the use of wireless telegraphy in military operations. In 1912 he was awarded the Elliott Cresson Gold Medal for his researches in multiplex telephony.

SWINBURNE, JAMES, F.R.S.—Born at Inverness on February 28th, 1858, and educated at Clifton College. He has had a wide experience, and as far back as 1881 he was employed by Messrs. J. W. Swan & Co., to organise their lamp factory in Paris; later he went on a similar mission to America. He has practised as a consulting engineer since 1894, and has attained considerable eminence in various branches of science. As an expert on wireless telegraphy his fame has been recognised by the Government, who in 1912 appointed him a member of the Technical Committee considering the Imperial Wireless Scheme. He is also a member of various scientific societies, and is on the Council of some. In 1902-3 he was President of the Institution of Electrical Engineers.

SWINTON, ALAN A. CAMPBELL.—Born in Scotland in 1863, he commenced his career in 1882 in the famous Elswick Works of Armstrong, Whitworth & Co., and two years later succeeded to the position of Electrical Engineer to the Company. In 1897 he went to London, where, since that date, he has practised as a Consulting Electrical Engineer, and has been responsible for the carrying out of many important

electrical installations. He is a member of the Institutions of Civil, Electrical and Mechanical Engineers, and is Past-President of the Rontgen Society. He has devoted considerable attention to scientific research, including Wireless Telegraphy, and is President of the Wireless Society of London.

TISSOT, CAPTAIN C.—Born at Brest in 1868, he entered the Naval School in 1884, taking up the study of science. Later he was appointed to the Chair of Physics at the Naval School. As Captain of Frigate, he is now chief of the technical research department at the Central Naval Laboratory in Paris. He was one of the first to devote himself to the study of Wireless Telegraphy in France and has been largely instrumental in its technical development as well as its application to the French Navy. On the purely scientific side, Captain Tissot has carried out some valuable experiments to secure exact measurements in Wireless Telegraphy. He has also studied problems concerning detectors and made investigations concerning the practical applications of Wireless Telegraphy and Telephony. It is due to Captain Tissot's initiative and to his efforts at the Bureau des Longitudes in Paris, in 1907, that the Eiffel Tower service of time signals was established in 1910.

TRAVAILLEUR, MAURICE.—Born at Brussels in 1871 and graduated as engineer at Brussels University in 1893. At the age of 26 he was appointed electrical engineer to the late King of the Belgians. He was one of the founders of La Compagnie de Télégraphie Sans Fil in 1901, of which he is now managing director, besides being on the Boards of Marconi's Wireless Telegraph Co., Ltd., and the Deutsche Betriebs Gesellschaft für Drahtlose Telegraphie, and other companies.

TURPAIN, PROFESSOR ALBERT.—Born at La Rochelle on December 2nd, 1867, he was employed in the Department of Posts and Telegraphs of France from 1884 to 1887. In 1888 he became a licentiate in physical science, and three years later a licentiate in mathematics, obtaining his doctorate of science in 1889. Since 1894, when, as a tutor of physics at the Faculty of Science at Bordeaux, he succeeded in sending messages by means of Wireless Telegraphy from the equipment which was erected in the college buildings, he has experimented in Wireless Telegraphy with successful results. He applied himself to the question of tuning and in 1899 he

experimented with a means for determining the direction of electromagnetic waves; he took up these experiments again in 1912. In 1911 he succeeded in obtaining graphic records of time signals by means of a micro-ampere-meter over a distance of 300 km. between Poitiers and Paris. He carried out successful experiments in recording photographically wireless telegraph signals which passed between Paris and Poitiers.

VANNI, DR. GIUSEPPE.—Born at Albano Laziale (Rome) in 1862. Graduated in science in 1887, and went to Strasburg in 1890, where, under Professor Kohlrausch, of the Physical Institute, he occupied himself especially with the study of electrical measurements. In 1894 he was appointed to teach physics at the Collegio Romano, Rome, where he remained till 1912; when he was nominated professor and director of the physical laboratory of the Military Radiotelegraphic Institute in Rome. In 1912 he took part in the International Radiotelegraphic Conference of London as a member of the Italian delegation, and also at the Conferences held in Paris in 1912 and 1913. His works are principally concerned with electrology, electrical engineering, and electrical waves. By means of a hydraulic microphone of his invention he made interesting experiments in wireless telephony, and his paper on the "Progress and Actual State of Wireless Telegraphy and Telephony" gained for him in 1914 the Cagnola prize of the Royal Lombard Institute of Science and Literature, in Milan.

WALTER, L. H., M.A., A.M.I.E.E.—Born in London in 1870, and educated at private schools in England and at Hanover, Germany; also at Trinity College, Cambridge (1894-1898), where he took honours in Natural Sciences. He then became experimental assistant to Sir Hiram S. Maxim. In 1903 he was appointed Editor of *Science Abstracts*, when that publication was taken over by the Institution of Electrical Engineers, which position he still holds. He has invented several forms of detectors of electrical oscillations. In 1905 he drew attention to the advantages of directive Wireless Telegraphy, and, associating himself with Captain Tosi and Dr. Bellini, at that time making their first experiments, he introduced the directive system, and the wireless compass, into England.

WIEN, PROFESSOR MAX.—Born at Königsberg in 1866. He made a special study of the subject of physics under Helmholtz and others and assisted Röntgen from 1891 to 1893. He is at present at the University of Jena and has devoted considerable attention to the study of electromagnetic waves and their propagation.

ZENNECK, PROFESSOR J.—Born April 15th, 1871, in Wurtemburg. The son of a clergyman, he was intended for a similar career, and studied for four years in a Theological College at Tübingen. While at Tübingen he studied mathematics and natural history, particularly zoology, from 1889 to 1894, and in the latter year he passed the State examination in these subjects; he obtained his doctorate in 1894. After a course of natural history studies in London and elsewhere he devoted himself entirely to physics and from 1895 to 1899 he was an assistant in the Physical Institute in Strassburg. In 1899 to 1900 he was engaged in making tests with Wireless Telegraphy in the North Sea. Five years later he became lecturer and assistant professor of Physics in the Technical College, Dantzic, and in 1906 he was appointed professor of Physics at the Technical College, Brunswick. This position he vacated in 1909, when he joined one of the largest mechanical works in Germany, and in 1911 he returned to Dantzic as professor of the Technical College, a position which he still holds with distinction.

OBITUARY.

THYS, GENERAL ALBERT.—Died in Brussels, February 10th, 1915. He was a reserve officer of the General Headquarters Staff of the Belgian Army, and has been termed, not unjustly, the "Cecil Rhodes of Belgium." He has closely identified himself with Wireless Telegraphy ever since it was first demonstrated as a commercial possibility, and his great influence, financial resources, and untiring industry contributed in no slight degree to its early establishment, not only on the Continent, but in "lands beyond the sea." Up to the date of his death General Thys presided as Chairman over the Compagnie de Télégraphie Sans Fil, at Brussels, besides holding the position of a Director of Marconi's Wireless Telegraph Co., Ltd., and of the Deutsche Betriebs Gesellschaft für Drahtlose Telegrafie m.b.H.

LITERATURE OF WIRELESS TELEGRAPHY AND TELEPHONY.

THE literature upon the subject of wireless telegraphy and telephony has now become so large that the following collection of representative books and journals should be found useful. The bibliography is by no means complete, but we think that few, if any, of the important works are not included. In addition, there are the reports of the various International Radiotelegraphic Conferences and the "Nomenclature" issued by the Berne Bureau.

THE BOOKS MENTIONED IN THE FOLLOWING PAGES AND OTHERS CAN BE OBTAINED, AT THE PUBLISHED PRICE, FROM THE WIRELESS PRESS, LTD., MARCONI HOUSE, STRAND, LONDON, W.C., ON RECEIPT OF REMITTANCE AND COST OF POSTAGE.

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The Elements of Electrical Transmission. By O. J. FERGUSON. Pp. 466. 15s. net. Macmillan & Co., Ltd.

Experimental Wireless Stations: Their Theory, Design, Construction, and Operation. By P. E. EDELMANN. 81 illustrations. Pp. 224. Crown 8vo. 6s. 6d. net. London: S. Rentell & Co.

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Making Wireless Outfits. Pp. 61. 27 illustrations. D. Van Nostrand Co., New York City.

Manual of Wireless Telegraphy. By A. FREDERICK COLLINS. Pp. 300. 129 illustrations. $1.50.

Manual of Wireless Telegraphy (Illustrated). By A. F. COLLINS. 12mo. Pp. 232. (New York, 1906.) Cloth, net $1.50; leather, $2.00.

Manual of Wireless Telegraphy for the Use of Naval Electricians. By LIEUTENANT S. S. ROBISON. Pp. 129. 60 illustrations. $1.75.

Maxwell's Theory and Wireless Telegraphy. By F. K. VREELAND. Pp. 250. Illustrated. $2.00. McGraw-Hill Book Co., Inc.

Methods of Measuring Electrical Resistance. By EDWIN F. NORTHRUP, Ph.D., New York. McGraw-Hill Book Co., Inc. Pp. 390. $4.00.

Operator's Wireless Telegraph and Telephone Handbook. Price $1.00. New York.

Operators' Wireless Telegraph Handbook (Treatise on Construction and Operation of Wireless Telegraph and Telephone) By V. H. LAUGHTER. Pp. 180. 86 illustrations. $1.00.

Practical Uses of the Wave Meter in Wireless Telegraphy. By Lieut. J. O. MAVBORGNE. Pp. 74. 4s. 2d. net. McGraw-Hill Book Co., Inc.

Principles of Wireless Telegraphy (a book for students and those engaged in operating and constructing wireless telegraph apparatus). By DR. GEO. W. PIERCE. Pp. 350. 12s. 6d. net. McGraw-Hill Book Co., Inc., New York and London.

Wireless Operators' Pocketbook of Information and Diagrams. By LEON W. BISHOP. Pp. 200. Illustrated. $1.00.

Wireless Telegraphy and Telephony. By C. I. HOPPOUGH. Pp. 236. Many illustrations. $1.50.

Wireless Telegraphy and Telephony Popularly Explained. By W. W. MASSIE and CHAS. R. UNDERHILL, with a special article by NIKOLA TESLA. 12mo., cloth. Pp. 82. 29 illustrations. $1.00 net. D. Van Nostrand Co., New York City.

Wireless Telegraphy: Its Origins, Development, Inventions, and Apparatus. By CHARLES HENRY SEWALL. "Patented Telephony," "The Future of Long-distance Communication," with 85 diagrams and engravings. 8vo., cloth. Pp. 229. Illustrated. $2.00 net. D. Van Nostrand Co., New York City.

Wireless Telegraphy: Its History, Theory, and Practice (with Illustrations). By A. F. COLLINS. 8vo., cloth. Pp. 299. (New York, 1905.) $3.00. McGraw-Hill Book Co., Inc.

Wireless Telegraph Stations of the World (Including Shore Stations, Merchants' Vessels, and Vessels of the United States Navy, etc.; also Calls and Wave-lengths of Stations). Corrected to January 1st, 1912. $35. Issued by the Navy Department.

Wireless Telegraph Construction for Amateurs. 3rd edition, revised and enlarged. By ALFRED POWELL MORGAN. 167 illustrations. Pp. 236. $1.50. D. Van Nostrand Co.

Wireless Telegraphy and Telephony (Simply Explained). By ALFRED POWELL MORGAN. Pp. 154. 156 illustrations. $1.00.

Wireless Telegraphy: Theory and Practice. By WM. MAVER, Jr. Pp. 368. 258 illustrations. $1.50, reduced from $3.00. June 1st, 1913.

Wireless Telegraphy and Wireless Telephony. By A. E. KENNELLY. Illustrated. $1.00. D. Van Nostrand Co.

Wireless Telegraphy and Wireless Telephony. By ASHLEY-HAYWARD. Pp. 140. Illustrated. $1.00. American School of Correspondence, Chicago.

Wireless Telegraphy (with 79 illustrations). By G. EICHHORN. 8vo., cloth. Pp. 116.

Wireless Telegraphy for Amateurs and Students. By T. M. ST. JOHN. Pp. 171. 155 illustrations. 12mo., cloth. (New York, 1906.) Net, $1.00. D. Van Nostrand Co.

Wireless Telegraphy (a Popular Exposition). By G. W. TONZELMANN. Illustrated. 12mo., cloth. (New York, 1901.) $0.75. D. Van Nostrand Co.

PERIODICALS.

GREAT BRITAIN.

The Wireless World. London: Marconi House, Strand, W.C. 3d. monthly. Post free 5s. per annum.

Electrical Review. London. 4d. weekly.

Electrician. London. 6d. weekly.

Electrical Times. London. 2d. weekly.

Electricity. London. 1d. weekly.

Electrical Engineering. London. 1d. weekly.

Electrical Industries and Investments. 1d. weekly.

FRANCE.

L'Industrie Électrique. Paris. Weekly.

La Lumière Électrique. Paris. 1.50 francs weekly.

T.S.F. Revue Mensuelle de Radiotélégraphie & Radiotéléphone. Paris. 1 fr. monthly.

GERMANY.

Electrotechnische Zeitschrift. Berlin. Weekly. M.20 (per annum).

Jahrbuch der drahtlosen Telegraphie und Telephonie. Editor, G. EICHHORN. Leipzig Verlag, J. A. Barth (and Zürich, Switzerland). Six issues per annum. Price, M.20.

ITALY.

La Elettricitá. Rome.

RUSSIA.

The Messenger of Wireless Telegraphy. St. Petersburg: Lopouchinskaja 14. Monthly.

UNITED STATES OF AMERICA.

The Wireless Age. New York: 450, Fourth Avenue, N.Y. City. 15 cents monthly.

Electrical World. New York. 10 cents weekly.

DIRECTORY OF WIRELESS SOCIETIES.

GREAT BRITAIN.

Wireless Society of London—R. H. Klein, 18, Crediton Road, West Hampstead, N.W.

Barnsley Amateur Wireless Society—G. W. Wigglesworth, 2, Blenheim Grove, Barnsley.

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Northampton Wireless Society—A. E. Farmer, "Gorphwysfa," Garrick Road, Northampton.

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Radio Scientific Society—R. J. Thompson, Broad Street, Sale, Cheshire.

Stoke-on-Trent Wireless Club—F. Pamment, Marlborough Office, 20, Chancery Lane, Longton, Staffs.

AUSTRALASIA.

New Zealand Amateur Wireless Association—Prof. T. H. Laby, Canterbury College, Christchurch, New Zealand.

New Zealand Amateur Wireless Club—F. Kellegher, Sec., 19, Adams Terrace, Wellington.

Radio Club, Perth, W. Australia.

Wireless Institute of New South Wales—Malcolm Perry, Sec., Box 2, King Street Post Office, Sydney, N.S.W.

Wireless Institute of Victoria—C. R. Dodson, Sec., Box 1006, G.P.O., Melbourne, Victoria.

UNITED STATES OF AMERICA AND CANADA.

Institute of Radio Engineers—David Sarnoff, Sec., 71, Broadway, New York City.

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Allegheny County (Pa.) Wireless Association—Leetsdale, Pa.

Alpha Wireless Association—Box 57, Valparaiso, Ind.

Amateur Wireless Association of New Bedford—84, Dunbar Street, New Bedford, Mass.

Amateur Wireless Association of Schenectady—R. F. D. Route, No. 49, Schenectady, N.Y.

Amateur Wireless Association of Schenectady—405, Lenox Road, Schenectady, N.Y.

Amateur Wireless Club of Geneva—448, Castle Street, Geneva, N.Y.

Amateur Wireless Club of California—E. S. Martin, Box 55, Capitola, Cal.

American Radio Relay League of Hartford, Ct.—Hiram P. Maxim, Hartford, Ct.

Arkansas Wireless Association—Geo. A. Ranch, 419 W, 25th Street, Little Rock, Ark.

Atlanta Wireless Association—159, Capitol Avenue, Atlanta, Ga.

Austin Wireless Association—406, West 10th Street, Austin, Texas.

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Berkshire Wireless Club—18, Dean Street, Adams, Mass.

Boise Radio Club—715, North 9th Street, Boise, Idaho.

Boys' Experimental Club—Box 214, Virginia, Minn.

Bridgeton Wireless Club—275, Bank Street, Bridgeton, N.J.

Bronx Wireless Association—500, East 165th Street, Bronx, N.Y.

Brooklyn Wireless Club—131, Ryerson Street, Brooklyn, N.Y.

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Cincinnati Wireless Signal Club—1839, Hopkins Street, Cincinnati, Ohio.

Colorado Wireless Association—W. F. Lapham, 1545, Milwaukee Street, Denver, Colo.

Danvers Wireless Association—Franklin Street, Danvers, Mass.

De Kalb Radio-Transmission Club—205, Augusta Avenue, De Kalb, Ill.

Detroit Y.M.C.A. Radio Club—Detroit, Mich.

Dorchester Wireless Association—R. F. Lufkin, 222, Harvard Street, Dorchester, Mass.

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East Side Y.M.C.A. Radio Club—H. Saddenwater, 162, East 66th Street, New York City.

East Tennessee Wireless Association—723, North Third Avenue, Knoxville, Tenn.

Electro and Mechanical Association of Columbus, Ohio—512, West State Street, Columbus, Ohio.

Everett Wireless Association—2716, Grand Avenue, Everett, Wash.

Ever Ready Wireless Club—167, East 71st Street, New York, N.Y.

Experimental Club of Cincinnati—1214, Jackson Street, Cincinnati, Ohio.

Fargo Wireless Association—518, Ninth Street, Fargo, N.D.

Flushing Wireless Association—24, Madison Avenue, Flushing, N.Y.

Frontier Wireless Club—1034, Elmwood Avenue, Buffalo, N.Y.

The Germantown Wireless Club—5801, Germantown Avenue, Germantown, Pa.

Gramercy Wireless Club—207, East 25th Street, New York, N.Y.

Granby High School Electricity Club—Granby, Mass.

Greater Boston Wireless Association—41, Lawrence Street, Wakefield, Mass.

Guilford County (N.C.) Wireless Association—Greensboro, N.C.

Hamilton Wireless Association—405, Franklin Street, Hamilton, Ohio.

Hamlin Wireless Association—2729 Noble Avenue, Chicago, Ill.

Hannibal Amateur Wireless Club—1306, Hill Street, Hannibal, Mo.

Haverhill Wireless Association—Haverhill, Mass.

Harriman Wireless Association—801, Clinton Street, Harriman, Tenn.

Hartford Wireless Association—320, Wethersfield Avenue, Hartford, Conn.

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Lane Radio Association—2147, Lincoln Place, Chicago, Ill.

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Oregon State Wireless Association—Lents, Oregon.

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Pittsburg Wireless Association—6031, Kirkwood Street, Pittsburg, Pa.

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Power City Wireless Association—Niagara Falls, N.Y.

Progressive Wireless Club—Poplar Bluff, Missouri.

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Radio Intercommunication Club—25, Terrence Street, Springfield, Mass.

Ranger Nautical Signal and Wireless Club—Nautical Training School, State House, Boston, Mass.

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Roslindale Wireless Association—962 South Street, Roslindale, Mass.

Sacramento Wireless Signal Club—2119, H Street, Sacramento, Cal.

St. Paul Wireless Club—1911, Ashland Avenue, St. Paul, Minn.

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Springfield Wireless Association—323, King Street, Springfield, Mass.

Spring Hill Amateur Wireless Association—2, Benton Road, Somerville, Mass.

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Sullivan Wireless Association—Sullivan, Ill.

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Tri-State Wireless Association—Room 101, Falls Bldg., Memphis, Penn.

"Two Hundred Meter Radio Club of Newton"—A. M. Hunt, 17, Gibson Road, Newtonville, Mass.

United Wireless Relay Club—102, High Street, Passaic, N.J.

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Western Division High School Wireless Association—Milwaukee, Wis.

Western Wireless Union of America—A. C. Cameron, 19, S. Fifth Avenue, Chicago, Ill., U.S.A.

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Wireless and Electrical Association—Lindsborg, Kans.

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Wireless Association of Southern California—935, Denver Avenue, Los Angeles, Cal.

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Wireless Society of Springfield—P.O. Box 562, Springfield, Mass.

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Young Experimenters' Society—R. G. Taylor, Box 487, Coaticook. P.Q., Canada.

Young Marconis' Wireless Association—P. H. Bolton, 236, Williamson Ave., Youngstown, Ohio.

Y.M.C.A. Wireless Association—Secretary, Drummond Street, Montreal, Canada.

Y.M.C.A. Wireless Club—211, West Fourth Street, Williamsport, Pa.

Zanesville Wireless Association—105, South Seventh Avenue, Zanesville, Ohio.

CODE SIGNALS

In the following pages are shown general alphabetical tables for making international code signals by means of the fixed semaphore, and signals by means of the British movable semaphore. Through the courtesy of Messrs. James Brown and Son, Glasgow, we are able to reproduce from "Brown's Signalling" tables showing the British method of semaphoring by hand flags. In the British method, the person intending to semaphore makes the international code signal V O X, "I am going to semaphore to you," and sets his semaphore at the alphabetical signal, with the indicator out, and waits until the ship to which the semaphore signal is to be made hoists her answering pennant "close up." Then he will proceed with the communication by spelling, making a momentary pause between each sign or letter; the arms are to be dropped between each word or group, the indicator only remaining out.

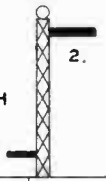
Should the answering pennant be dipped by the person taking in the signal, the last *two* words are to be repeated until the answering pennant is again hoisted "close up," which denotes that the person taking in the semaphore signal is ready to read and write down the signal. It is to be dipped when a word is lost, and the person making the signal is then to repeat the *two* last words until the answering pennant is hoisted again "close up."

The British method of semaphoring by flags held in the hand which is shown is exactly the same as the British movable semaphore system, the positions of the apparatus which denote the letters, numbers, and special signs being identical in each case, the only difference being in the apparatus employed.

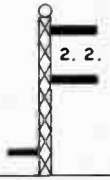
The French method of semaphoring by hand flags is based on the same principle as the British method, but the positions in which the flags are held to denote the letters, etc., are different.

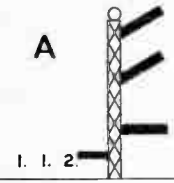
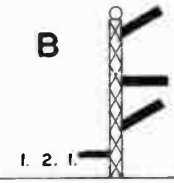
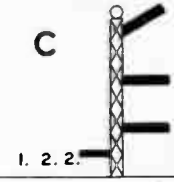
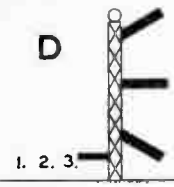
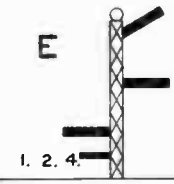
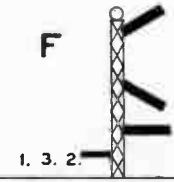
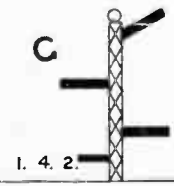
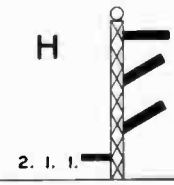
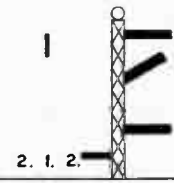
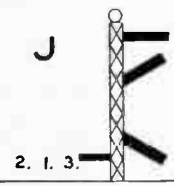
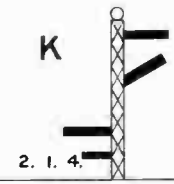
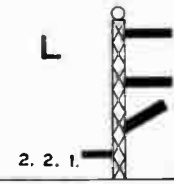
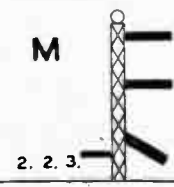
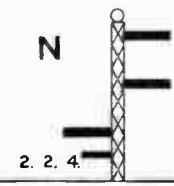
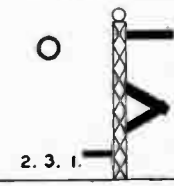
GENERAL ALPHABETICAL TABLE FOR MAKING THE INTERNATIONAL CODE SIGNALS BY MEANS OF DISTANT SIGNALS BY FIXED SEMAPHORE.

PREPARATIVE, ANSWERING, OR STOP, AFTER EACH COMPLETE SIGNAL

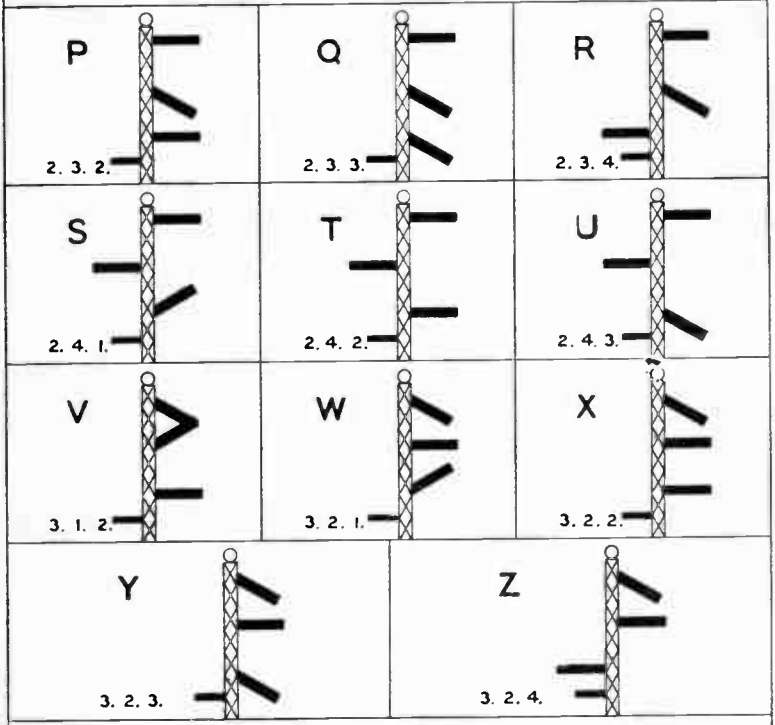


ANNUL THE WHOLE SIGNAL

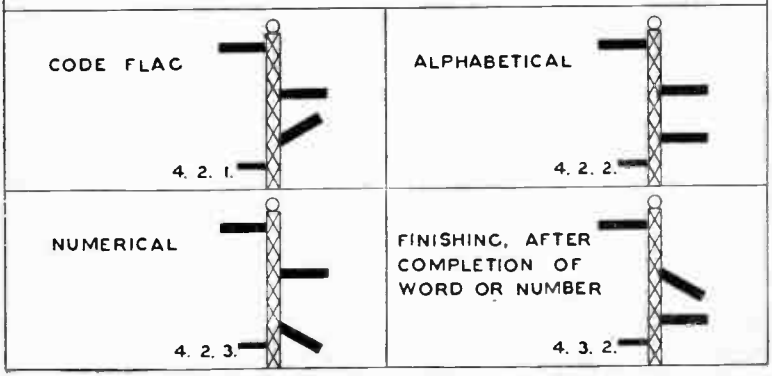


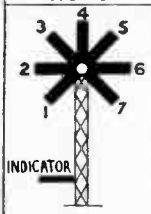
A  1. 1. 2.	B  1. 2. 1.	C  1. 2. 2.
D  1. 2. 3.	E  1. 2. 4.	F  1. 3. 2.
G  1. 4. 2.	H  2. 1. 1.	I  2. 1. 2.
J  2. 1. 3.	K  2. 1. 4.	L  2. 2. 1.
M  2. 2. 3.	N  2. 2. 4.	O  2. 3. 1.

GENERAL ALPHABETICAL TABLE FOR MAKING THE INTERNATIONAL CODE SIGNALS BY MEANS OF DISTANT SIGNALS BY FIXED SEMAPHORE.



SPECIAL SIGNS.



SEMAPHORE SIGNS	GOVERNING SIGNS			
				
	PREPARATIVE. WHEN CLOSED THE FINISH.	ALPHABETICAL	NUMERICAL	ANNUL OR NEGATIVE
SIGN				
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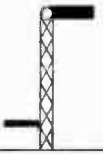
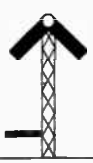
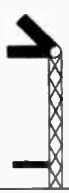
NUMERICAL	1	2	3	4
SIGN				
ALPHABETICAL	E	F	G	H
NUMERICAL	5	6	7	8
SIGN				
ALPHABETICAL	I	J	K	L
NUMERICAL	9	ALSO ALPHABETICAL	O	

NOTE.— IF A NUMERICAL SIGNAL IS TO BE FOLLOWED BY WORDS, THE END OF THE NUMERICAL SIGNIFICATION OF THE SIGNS IS SHOWN BY THE ALPHABETICAL SIGN BEING MADE, INDICATING THAT SPELLING IS AGAIN TO COMMENCE.

SIGN				
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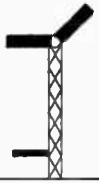
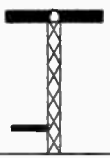
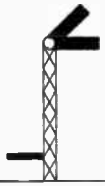
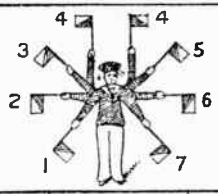
SIGN				
ALPHABETICAL	Q	R	S	T
SIGN				
ALPHABETICAL	U	V	W	X
SIGN				
ALPHABETICAL	Y	Z		

NOTE.— IF A NUMERICAL SIGNAL IS TO BE FOLLOWED BY WORDS, THE END OF THE NUMERICAL SIGNIFICATION OF THE SIGNS IS SHOWN BY THE ALPHABETICAL SIGN BEING MADE, INDICATING THAT SPELLING IS AGAIN TO COMMENCE.



SIGN				
ALPHABETICAL	A	B	C	D
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ALPHABETICAL	E	F	G	H
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SIGN				
ALPHABETICAL	I	J	K	L
NUMERICAL	9	ALSO THE ALPHABETICAL	O	
SIGN				
ALPHABETICAL	M	N	O	P

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SIGN				
ALPHABETICAL	Q	R	S	T
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ALPHABETICAL	Y	Z		
SIGN				
	ALPHABETICAL	NUMERICAL	ANNUL	

Reproduced from "Brown's Signalling" by kind permission of the Publishers, Messrs. Jones, Brown & Son, Glasgow.

LLOYD'S SIGNAL STATIONS.

THE Society of Lloyd's has, with the sanction of Parliament, the control and working of signal stations in Great Britain and Ireland and in many places abroad. Various foreign Governments have also recognised the advantage of reports from signal stations and semaphores being universally collected and forwarded on identical conditions. These have arranged that reports from or to their semaphores can be obtained or forwarded through Lloyd's.

The charges for forwarding information from or transmitting advices by means of signal stations are moderate. Shipowners, charterers, merchants, or consignees can obtain telegraphic intelligence with regard to any vessel in which they may be interested, or postal advices if so preferred, or can transmit orders to such vessels by communication with Lloyd's.

Harbour and dock authorities, Chambers of Commerce, Exchanges, and such institutions that may require a large number of reports, can arrange with Lloyd's for receiving full and regular advices from Lloyd's signal stations on moderate terms. When a number of reports are taken a substantial reduction is made in the fees. Shipowners or others who wish to be supplied with reports of vessels from any signal stations are requested to communicate with the Secretary of Lloyd's, London, E.C.

An arrangement has been concluded with Marconi's Wireless Telegraph Co. and the Marconi International Marine Communication Company, by which all maritime intelligence received by wireless telegraphy at any station worked by either of these companies, including Poldhu and similar stations primarily used for shore-to-shore or overland telegraphy, shall forthwith be communicated to Lloyd's. Masters of vessels equipped with wireless apparatus are accordingly requested to forward to the nearest wireless telegraph station any maritime intelligence—*e.g.*, wrecks, derelicts, casualties, vessels in distress, etc., with a view to its being forthwith communicated to Lloyd's. No charge for transmission will be made against vessels for such messages, therefore masters are requested to communicate such intelligence as freely as possible. The following Lloyd's stations in the United Kingdom are fitted with wireless apparatus :—

North Foreland.	Niton.
Fastnet.	Brow Head.
The Lizard.	Rosslare.
Malin Head.	Inishtrahull.

Abroad wireless apparatus has been installed for signalling purposes at—

Suez.	Port Said.

THE MORSE CODE.

The Morse code as used by all countries except America is called the "Continental Morse," and is a dot and dash system throughout, with a maximum of four elements in any letter; an element is either a dot or a dash.

Whatever the speed at which signals are sent, the following rules must be remembered and strictly adhered to:

A dash is equal in length to three dots.

A space between two elements in a letter is equal in length to one dot.

The space between letters in a word is equal in length to a dash.

The space between words in a sentence is equal in length to two dashes.

THE EUROPEAN OR CONTINENTAL MORSE CODE.

a - —	m — —	z — — - -	
ä - — - —	n — -		
á or å - — — - —	ñ — — - — —		Numerals.
b — - - -	o — — —	1 - — — — —	
c — - — -	ö — — — -	2 - - — — —	
ch — — — —	p - — — -	3 - - - — —	
d — - -	q — — - —	4 - - - - —	
e -	r - — -	5 - - - - -	
é - - — - -	s - - -	6 — - - - -	
f - - — -	t —	7 — — - - -	
g — — -	u - - —	8 — — — - -	
h - - - -	ü - - — —	9 — — — — -	
i - -	v - - - —	0 — — — — —	
j - — — —	w - — —	. - - - - - -	
k — - —	x — - - -	? - - — — - -	
l - — - -	y — - — —	! — — - - — —	

AMERICAN MORSE CODE.

A - —	N — -		Numerals.
B — - - -	O - -	1 - — — -	
C - - -	P - - - - -	2 - - — - -	
D — - -	Q - - —	3 - - - — -	
E -	R - - -	4 - - - - —	
F - — -	S - - -	5 — — —	
G — ——	T —	6 - - - - - -	
H - - - -	U - - —	7 — — - -	
I - -	V - - - —	8 — - - - -	
J — - — -	W - — —	9 — - - —	
K — - —	X - — - -	0 — - - - —	
L ——	Y - - - -	. - - — — - -	
M — —	Z - - - -	? — - - — -	
		! — — — -	

OFFICES AND REPRESENTATIVES OF MARCONI'S WIRELESS TELEGRAPH COMPANY ABROAD

AMSTERDAM	Marconi's Wireless Telegraph Co., Ltd., 113 Ruyterkade
BANGKOK	Col. G. Kluzer, Bangkok, Siam
BOGOTA	Lino de Pombo, Bogota, Colombia
BUCHAREST	Marcel Porn, Str. Eroului 7, bis
CHRISTIANIA	Storm Bull & Co., Christiania
COPENHAGEN	Sophus Berendsen, Ltd., G. L. Torv 24
LISBON	Agencia Technica e Commercial Rua Victor Cordon 1a
RIO DE JANEIRO	E. W. Salis, 62 Rua Julio Cezar
ROME	Marquis L. Solari, Via del Collegio Romano 15
SOFIA	Société Balkanique Commerciale et Industrielle, Sofia
STOCKHOLM	Ulrich Salchow, Hamngatan 5a
VALPARAISO	M. Saldias Ross, c/o Bank of Chas. Edwards & Co.

THE NEW ZEALAND SHIPPING COMPANY

LIMITED

Incorporated in New Zealand.

DIRECT SERVICE OF SWIFT ROYAL MAIL STEAMERS

ROUTE:

OUTWARDS. . **London, Teneriffe, Cape Town, Hobart, New Zealand.**

HOMEWARDS. **New Zealand, Montevideo and/or Rio de Janeiro, Teneriffe, Southampton, London.**

These Steamers are particularly adapted for the New Zealand trade: are of the highest class, lighted throughout with electric light, and are fitted with every modern improvement for the safety, comfort, and convenience of passengers. The Mail Steamers are fitted with the Marconi System of Wireless Telegraphy.

Steamers are despatched every fourth Thursday from London and from New Zealand. Passengers booked to Teneriffe and Cape Town, and to Australia and Tasmanian ports via Hobart.

FLEET:

Mail Steamers.

	Tons Register
REMUERA (Twin Screw) ...	11,276
ROTORUA (Triple Screw) ...	11,130
RUAHINE (Twin Screw) ...	10,758
RUAPEHU (Twin Screw) ...	7,885
TONGARIRO ,, ,, ...	7,816
TURAKINA ,, ,, ...	8,349

Intermediate and Cargo Steamers.

HORORATA (Twin Screw) ...	9,000
HURUNUI ,, ,, ...	8,901
KAIKOURA ,, ,, ...	5,998
OPAWA ,, ,, ...	7,230
ORARI ,, ,, ...	7,207
OTAKI (Triple Screw) ...	7,420
PAPAROA (Twin Screw) ...	6,744
RAKAIA	5,628
RIMUTAKA (Twin Screw) ...	7,952
WAIMATE	5,610
WHAKATANE	5,754
PIAKO (building)	8,000

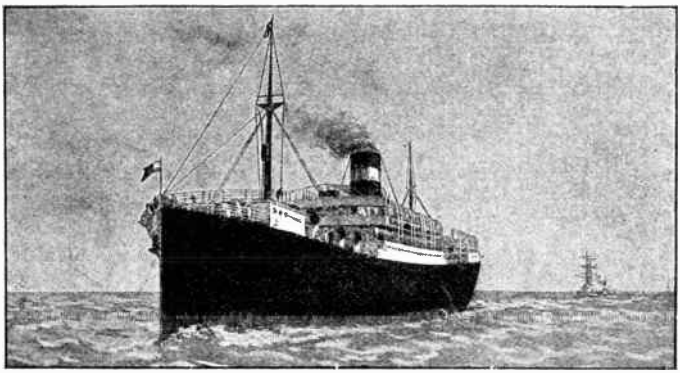
Head Offices: 138 Leadenhall St., London, E.C.

And Christchurch, New Zealand.

For Freight and Passage apply to

J. B. WESTRAY & CO., 138 Leadenhall Street, London, E.C.

CANADA



DONALDSON LINE.

WEEKLY SAILING TO

QUEBEC & MONTREAL (in Summer)

And ST. JOHN, N.B. (in Winter).

T.S.S. "ATHENIA" (10,000 tons). **T.S.S. "CASSANDRA"** (9,000 tons).
T.S.S. "SATURNIA" (9,000 tons). **T.S.S. "LETITIA"** (9,000 tons).

These fast Twin-Screw Vessels have been specially constructed to cater for **Second Cabin** and **Third Class** Passengers.

No First Class Passengers being carried, **Second Cabin accommodation** has been erected in the steadiest part of the Steamers—viz., amidships—and in consequence Promenade Decks, etc., for Second Cabin Passengers are particularly extensive.

Third Class accommodation is also of the most up-to-date character, and will be found particularly suitable for families.

Very special accommodation at Lowest Rates.

Electric Light throughout. Marconi System Wireless Telegraphy.

For further particulars apply to—

DONALDSON BROTHERS, LTD.

54, 56 & 58 BOTHWELL STREET, GLASGOW.

F. & S.

FEDERAL & SHIRE LINES

FEDERAL & SHIRE FLEET

		Tons D.W.		Tons D.W.
ARGYLLSHIRE	Twin Screw	12,500	MIDDLESEX	11,000
SHROPSHIRE	,,	12,500	NAIRNSHIRE	10,000
WILTSHIRE	,,	12,500	MORAYSHIRE	9,750
AYRSHIRE	,,	11,900	BANFFSHIRE	9,550
WESTMEATH	,,	11,500	KENT	9,500
ESSEX	,,	11,400	SURREY	9,500
SUFFOLK	,,	11,400	SUSSEX	9,500
DORSET	,,	11,300	WAIPARA	9,500
SOMERSET	,,	11,300	DURHAM	9,400
ROSCOMMON	,,	10,500	CARPENTARIA	9,300
ABERDEENSHIRE (New)	,,	10,300	LIMERICK	9,300
CORNWALL (New)	,,	10,300	BUTESHIRE	9,250
DEVON (New)	,,	10,300		

Total Tonnage, 263,250.

These steamers are specially fitted for carriage of Frozen and Chilled produce, also for conveyance of 1st and 3rd Class Passengers.

WIRELESS TELEGRAPHY.

"SERVICES":—

From **Avonmouth, Manchester and Liverpool,** *via* Cape Town or Durban

To **ADELAIDE, MELBOURNE, SYDNEY and BRISBANE,** returning

To **London, Liverpool and Avonmouth,** *via* Suez Canal.
—Regular Service of Twin-Screw Steamers every four weeks.

From **Avonmouth, Glasgow, Manchester and Liverpool** *via* Cape Town or Durban,

To **AUCKLAND, WELLINGTON, LYTTELTON and DUNEDIN,** returning

To **Avonmouth, Manchester, Liverpool and Glasgow** *via* Cape Horn.
—Regular Service every four weeks, under Contract with the New Zealand Government.

From **London,** *via* Suez Canal and Torres Straits,

To **THURSDAY IS., CAIRNS, TOWNSVILLE. ROCKHAMPTON and BRISBANE,** returning

To **Liverpool and London.**
—Regular Service every four weeks, under Contract with the Queensland Government.

Head Offices:

FEDERAL STEAM NAVIGATION CO., LTD.,
2, Fenchurch Avenue, London, E.C.

TURNBULL, MARTIN & CO.,
112, Fenchurch Street, London, E.C.

ELDERS & FYFFES, LIMITED

DIRECT PASSENGER SERVICES

To the West Indies and Central America.
Weekly sailings from Bristol, Liverpool and Rotterdam.

THROUGH BOOKINGS (via Panama)

To Pacific Ports of Colombia, Ecuador, Peru, Chile, Costa Rica, Nicaragua, Salvador, Guatemala, Mexico, and California.

FLEET.

	Tons		Tons		Tons
Camito	6,500	Patuca	6,000	Reventazon	4,100
Cavina	6,503	Chagres	5,300	Manistee	3,900
Coronado	6,500	Aracataca	4,200	Matina	3,900
Bayano	6,000	Manzanares	4,200	Miami	3,900
Changuinola	6,000	Tortuguero	4,200	Nicoya	3,900
Motagua	6,000	Barranca	4,100	Pacuare	3,900
Patia	6,000	Chirripo	4,100	Zent	3,900

All vessels fitted with Marconi Wireless Telegraphy.

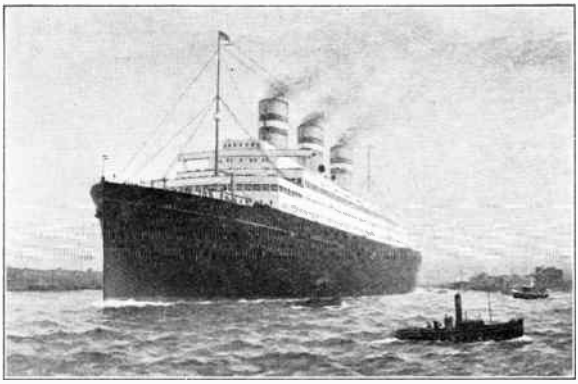
For further particulars apply to—

ELDERS & FYFFES, Ltd., 31 Bow Street, London, W.C.

Wm. H. Müller & Co., Rotterdam. United Fruit Company, at Kingston and Port Antonio, Jamaica; Port Limon and San José, Costa Rica; Colon, Panama; and Santa Marta, Colombia.

HOLLAND - AMERICA LINE

Royal Dutch Mail and Passenger Steamers between
ROTTERDAM AND NEW YORK.



Triple-Screw Steamer "STATENDAM," 35,000 tons register, 45,000 tons displacement, building

FREIGHT STEAMERS between ROTTERDAM and Boston—Philadelphia—Baltimore—Newport News—Norfolk—Savannah—New Orleans—Cuba—Mexico.

For rates of passage and freight apply to the HOLLAND-AMERICA LINE, ROTTERDAM, or to its Agents.

R·M·S·P. & P·S·N·C

TO

SOUTH AMERICA

Via Spain, Portugal, Madeira, Canary Islands, St. Vincent & Falkland Islands.

Fortnightly to

West Indies—Panama Canal

British Guiana, Colombia, Panama (for Pacific Ports).

Fortnightly Mail and Passenger Service between

CANADA, WEST INDIES AND DEMERARA.

Circular Cruises to

Morocco · Canary Islands · Madeira.

For further particulars apply

THE ROYAL MAIL STEAM PACKET COMPANY,
THE PACIFIC STEAM NAVIGATION COMPANY.

London—18 Moorgate St., E.C., & 32 Cockspur St., S.W. *Liverpool*—31 James St.

WHITE STAR LINE

ROYAL & UNITED STATES MAIL STEAMERS

Fleet includes "OLYMPIC," 46,359 Tons, and "BRITANNIC," 50,000 Tons (Launched), the two largest British Steamers.

ROYAL & UNITED STATES MAIL SERVICE

SOUTHAMPTON—CHERBOURG—NEW YORK

Also Regular Services from LIVERPOOL to NEW YORK, BOSTON, QUEBEC, MONTREAL, HALIFAX, PORTLAND, CAPE TOWN and AUSTRALIA; LONDON to CAPETOWN and NEW ZEALAND; NEW YORK and BOSTON to MEDITERRANEAN.

WHITE STAR LINE, Southampton; 1, Cockspur Street, S.W., and 38, Leadenhall Street E.C., London; and 30, James Street, Liverpool.

WHITE STAR-DOMINION LINE

TO CANADA

FLEET INCLUDES the palatial new Steamers "LAURENTIC" (Triple-Screw), 14,892 tons, and "MEGANTIC" (Twin-Screw), 14,878 tons, which are two of the largest Steamers employed in the Canadian Trade.

Regular Sailings from Liverpool to Quebec and Montreal during the Summer, and from **Liverpool to Halifax and Portland** during the Winter.

Excellent Accommodation for First, Second and Third Class Passengers at Lowest Rates

WHITE STAR-DOMINION LINE—1, Cockspur Street, S.W., and 38, Leadenhall Street, E.C., London; West India House, Bristol; 30, James Street, Liverpool.

AMERICAN LINE

LIVERPOOL to NEW YORK.
LIVERPOOL to PHILADELPHIA

The Steamers of these Services carry one Class Cabin (Second Class) and Third Class Passengers only.

AMERICAN LINE—1, Cockspur Street, London, S.W.; 38, Leadenhall Street, London, E.C.; 30, James Street, Liverpool.

Joseph Chadwick & Sons

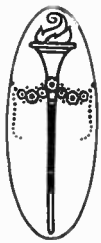
LIVERPOOL.
601 Tower Buildings.
Telegrams: "Drumlin."
Telephone: 487 Central.

Codes: Scott's 1906 Edition; Bentley's Phrase.

Steamship Owners

Insurance Brokers

Coal Merchants



LIVERPOOL AGENTS FOR:—

Marconi International Marine Communication Co., Ltd.

British Anti-Fouling Composition & Paint Co., Ltd.

Utrecht Collieries, Durban.

CHADWICK, WEIR & CO., LTD.,
Buenos Ayres.

Agents for:—

American & Rio Plata Line (New York/River Plate Service).
Andrew Weir & Co.
B. J. Sutherland & Co.
West Hartlepool Steam Navigation Co.
J. & C. Harrison, Ltd., etc.

BRITISH INDIA LINES

of MAIL AND PASSENGER STEAMERS

Mediterranean, Egypt, Red Sea, East and South Africa, Persian Gulf, India, Burmah, Straits, China, Japan, Java, Queensland, Australia.

Under Contract with the Governments of India and Queensland for Conveyance of the Mails.

FLEET

	Gross Tons
Amarapoora(paddle)	192
*Angora (turbine) ..	4,298
*Arankola (T.S.)	4,129
*Aronda(twin-screw)	4,062
Arratoon Apcar	4,510
*Bamora	3,285
*Bandra	3,284
Bangala	3,948
*Bankura	3,159
*Barala	3,148
*Barjora	3,164
*Baroda	3,172
*Barpeta	3,283
*Berbera.....	4,352
Bhadra (tw.n-screw)	599
Bharata	4,054
Booldana (hulk)	2,860
Bulimba	2,510
Canara.....	6 012
*Carpentaria.....	5,766
Catherine Apcar....	2,727
*Chakdara	3,035
*Chakdina	3,033
*Chakla	3,200
*Chakrata	5,682
*Chanda	6,168
*Chantala	4,949
*Chilka (twin-screw)	3,952
Chindwara	5,192
*Chinkoa	5,222
*Chupra	6,173
*Chyebassa	6,249
*Coconada (T.S.)....	3,958
Colaba	6,019
Cooeyanna	3,922
*Culna.....	6,142
Dilwara	5,378

	Gross Tons
Dumra	1,695
*Dunera	5,389
Dwarka	1,695
*Edavana (T.S.)	5,284
*Egra (twin-screw)	5,108
*Ekma (twin-screw)	5,108
*Elephanta (T.S.) ..	5,292
*Ellenga (twin-screw)	5,196
*Ellora (twin-screw)	5,201
*Erinpura (T.S.)....	5,128
*Eucyalus	3,570
Fazilka.....	4,152
Fultala.....	4,154
*Golconda	5,874
Gracchus.....	3,750
Gregory Apcar.....	4,604
Hindu	770
Hymettus	4,606
Islanda.....	5,237
*Ismaila	5,265
Itaura	5,197
*Itinda.....	5,251
Itola	5 257
*Itonus (twin-screw)	3,340
Itria	5,318
Janus.....	4,824
*Japan	6,013
Kapurthala	1,180
Kasara.....	1,195
Katoria	1,127
Kistna	1,182
*Lama (turbine)	2,198
*Lhasa (turbine)....	2,184
Lightning	3,315
*Linga (turbine)	2,185
*Lunka (turbine)....	2,193

	Gross Tons
*Madras (T.S.).....	6,956
*Malda (twin-screw)	7,884
*Manora(twin-screw)	7,875
*Mashobra (T.S.) ..	8,174
*Matiana.....	5,281
*Merkara (T.S.)	8,288
*Mombassa	4,662
*Mongara (T.S.)	8,205
*Morvada(T.S.)	8,193
Muttra.....	4,644
*Neuralia (T.S.)	9,082
*Nevasa(twin-screw)	9,070
*Nirvana.....	6,020
Obra	5,462
Okara	5,291
Okhla	5,288
Onda.....	5,247
Oolobaria	5,295
Orissa	5,436
*Ormara	4,741
*Orna	4,980
*Ozarda	4,971
Palamcotta	3 413
Palitana	2,998
Pentakota	3,418
Pundua	3,305
Purnea.....	3,306
Queda	7,703
Querimba	7,696
Quiloa	7,697
Ramapoora (paddle)	910
Rasmara (paddle) ..	892
*Rewa (turbine)	7,299
Sangola	5,184
Santhia	5,192
Sealda	5,382

	Gross Tons
*Shirala	5,306
*Sir Harvey Adamson (twin-screw)..	1,030
Sofala	5,381
Surada.....	5,324
*Takada(twin-screw)	6,949
*Tara (twin-screw)..	6,322
*Taroba (twin-screw)	6,309
*Teesta (twin-screw)	6,296
*Thongwa (T.S.)....	6,298
Torilla	5,205
Uganda	5,431
*Ujina	5,310
Ula.....	5,310
*Umaria	5,317
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Upada	5,257
Urlana	5,253
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Virawa.....	3,360
*Vita (twin-screw ..	4,691
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Zaida	2,027
Zira	2,030
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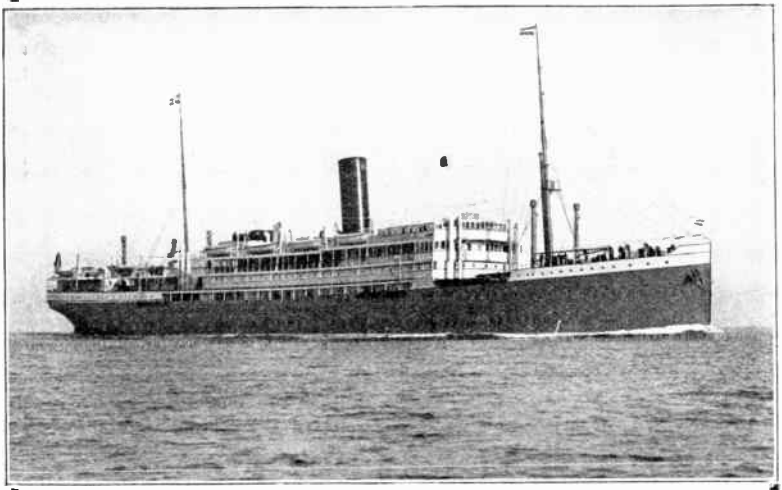

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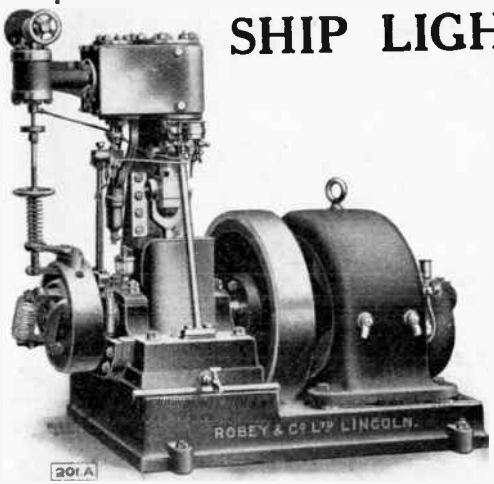

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