



THE MARCONIGRAPH

WIRELESS-TELEGRAPHY-ILLUSTRATED-MONTH-BY-MONTH
APRIL 1911. PRICE 2



FOREWORD



Seventeen years ago the idea of wireless telegraphy for the transmission of wireless messages through space was regarded as an utter impossibility, yet within a year of that date the "impossible" was achieved, the outcome of which is the present day world-wide system of wireless communication by land and sea.

That the Marconi invention was one of the most difficult problems of science to be solved, is already known to most, if not to all.

The fascination this subject possesses for the world at large has led the Marconi Companies to commence the publication of this Magazine, the aim of which will be to set forth in detail, month by month, all the interesting happenings incidental to the development of the system, and to illustrate the growth of the Marconi Service in the various parts of the world, accompanied wherever possible by actual photographs. The latest developments in connection with the technical side of the system will not be neglected.

In a phrase, the aim of the "Marconigraph" will be to acquaint the lay reader with the latest possibilities in connection with this most marvellous invention.



“ No familiarity with the subject removes the feeling of vague wonder with which one sees a telegraphic instrument, merely connected with a length of 150 feet of copper wire run up the side of a flagstaff, begin to draw its message out of space and print down in dot and dash on the paper tape the intelligence ferried across 30 miles of water by the mysterious ether.”

DR. J. A. FLEMING, F.R.S.



Photo]

[Elliott & Fry, London.

G. MARCONI, ESQ., LL.D., D.SC.

THE MARCONIGRAPH

No. 1.

April, 1911.

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OUR frontispiece is a reproduction of the most recent photograph of Com-mendatore Guglielmo Marconi, the inventor who has given his name to our magazine.

Mr. Marconi, who was born at Bologna, in Italy, in the year 1874, and who is Irish on his mother's side, first began to interest himself in the problem of wireless telegraphy in 1895, and in the following year came to England, taking out the first patent ever granted for a practical system of wireless telegraphy by the use of electric waves. Having once demonstrated the possibilities in store, he set to work to improve this fundamental patent. The work that he did in the next four years, during which he visited nearly every part of Great Britain and many places on the Continent of Europe and America, we need not enter into here, but the time and attention he spent on the subject met its reward in the crowning achievement of the now famous 7,777 patent of 1900 for syntonisation and selectivity. The originality of this remarkable invention, to which all the subsequent development of wireless telegraphy is due, has recently been triumphantly vindicated in the Royal Courts of Justice.

Immediately after this wonderful invention, Mr. Marconi determined to unite Canada and Great Britain by the aid of wireless telegraphy, and in the latter half of 1901, succeeded in receiving signals communicated from Poldhu in Cornwall at St. John's, Newfoundland. The daring of this project was all the greater when we consider that at the time the idea, when proposed, was ridiculed by many eminent men both in lectures and in the Press.

Since this initial success, important developments have rapidly followed each other, and to-day a regular service is maintained between Clifden in Ireland and Glace Bay in Nova Scotia, the messages being distributed thence to all parts of the European and American Continents.

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 he was accorded what is perhaps the highest distinction that can be obtained by any scientist—the Nobel Prize for Physics.





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- NEW YORKThe Marconi Wireless Telegraph Company of America, 27, William Street.
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The Editor will be pleased to receive contributions; and Illustrated Articles will be particularly welcomed. All such as are accepted will be paid for.

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NOTES.

The recent law case against The British Radio-Telegraph and Telephone Company, Ltd., for the infringement of Mr. Marconi's patent, was remarkable in regard to the amount of highly technical detail which the Court had to master before giving their verdict. The judgment delivered by Mr. Justice Parker has had the effect of proving conclusively the indisputable claim of the Marconi system of wireless telegraphy to be based on a master patent.

A brief account of the trial which occupied the court fourteen days is given on pages 9-12.

Very shortly there will be a complete Radio-Telegraphic Service between ships at sea and the Spanish Coast. That country will also be linked together with other countries by means of wireless telegraphy and an accelerated service in the interior of the Peninsula will likewise be available.

The Compania Nacional de Telegrafia sin hilos de España, which has a capital of 6,500,000 pesetas, was recently formed to take over the concession granted to Señor Don Frederico Rohr, representative of the Sociedad Española Oerlikon Huber y Compañia for the construction of a public wireless telegraph service in Spain, and for the use of service on vessels in Spanish seas. The Company's engineers are now busily engaged in erecting stations of considerable range at the following points:—

CADIZ, LAS PALMAS, TENERIFFE, CABO VILANO, MADRID, BARCELONA, CABO GATA and BALEARIC ISLANDS.

As a large number of vessels carrying wireless apparatus are constantly within communication range with these points, an extensive ship to shore service should be established.

A number of radio-telegraphic stations in various parts of the world will be opened to public service in Spain and the Canary Islands.

We propose to deal more fully with this subject in an early issue.

Arrangements were recently made between the Compagnie di Telegraphie Sans Fils of Brussels, who are the licencees of the Marconi patents in Germany, and the various German Companies interested in the Telefunken Company, whereby their interests in wireless telegraphy for the German Mercantile Marine have been transferred to a new company styled "Deutsche Betriebs-Gesellschaft für Drahtlose Telegraphie m.b.H." By this arrangement the competition which hitherto existed between the Marconi Companies and the Telefunken interests, in so far as the German Mercantile Marine was concerned, has come to an end.

The Marconi Wireless Telegraph Company of America consider they have created a new record in the way of a quick delivery of wireless plant on board ship, when they recently equipped three American war vessels within a week of the contract.



It is with deep regret that we have to record the death, on the 6th January last, of Mr. G. L. Bullocke, late Traffic Manager of the Marconi Companies in London. Mr. Bullocke joined the staff more than ten years ago, and his genial disposition made him extremely popular with all whom he came into contact.

Mr. W. R. Cross, formerly in charge a Liverpool, has been appointed to succeed Mr. Bullocke as Traffic Manager, and Mr. F. E. D. Pereira is at present in charge at Liverpool.

Captain Adrian Simpson, late of H.M. Indian Army, has been appointed to the head office staff of Marconi's Wireless Telegraph Co., Ltd., in London.

Mr. Alfred Eddington, formerly assistant in the Test-Room at the Company's works at Chelmsford, was appointed assistant works' manager on 25th March last.



NEW POSTAL ARRANGEMENTS FOR MARCONIGRAMS.

Marconigrams may now be received at any postal telegraph office for transmission to ships at sea when such vessels have passed beyond, or have not yet entered into, the radius of operation of the Postmaster-General's coast stations.

Such telegrams should be addressed in the form, "Jones, steamship 'Mauretania,' Poldhu," and will be charged for at the inclusive rate of 3s. per word. The Marconi station at Poldhu has a range of about 1,500 miles, and should the ship to which the message is addressed have passed beyond this range, the telegram will be forwarded

(without extra charge) by telegraph to the Marconi Company's long-distance station at Cape Cod.

A list of the ships to which this service extends will be found marked with an asterisk in the Post Office Guide.



MARCONI FIELD STATION APPARATUS.

Very successful tests have been carried out with the latest pattern of the Cavalry Field Station.

The tests were carried out between Broomfield, Chelmsford, and a position 4 miles on the other side of Ipswich, a distance of over 40 miles, and good readable signals were obtained on all three wave lengths.

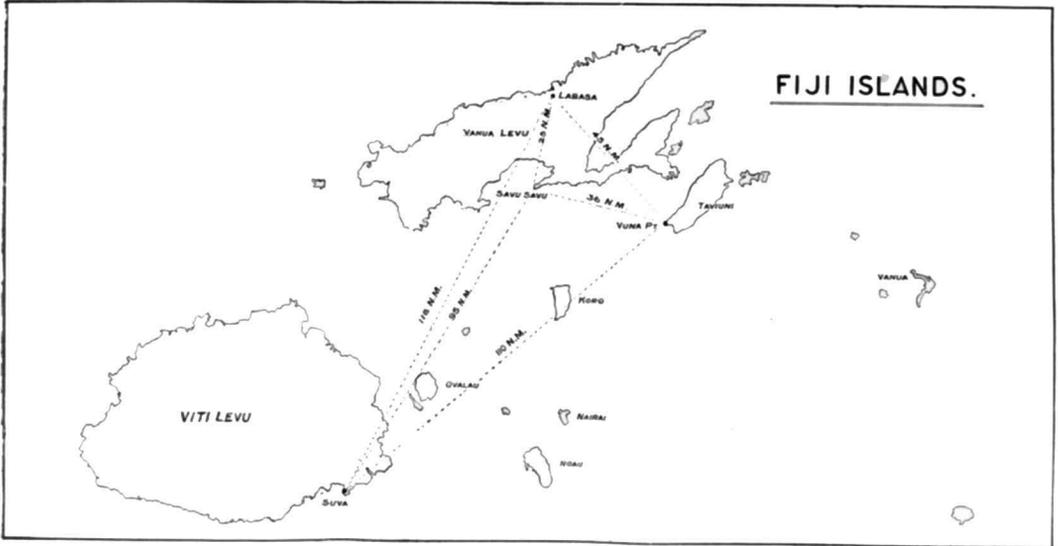
The new 1½ K.W. portable military stations are entering on their final stage of testing and promise to give excellent results.



WIRELESS ON AEROPLANES : Experiments in America.

Perhaps the most interesting matter in connection with wireless telegraphy which took place in America during the past month was the experiments made wherein wireless messages were received by a passenger on an aeroplane. From Palm Beach on March 6th last, Aviator J. A. D. McCurdy, accompanied by the Marconi engineer, Percy G. B. Morriss, who is at present in charge of the Marconi Station at the Hotel Breakers at Palm Beach, ascended in his aeroplane to a height of over 1,800 feet, circled around for some time, and through a very simple receiving set installed in the aeroplane, Morriss was able to receive distinctly signals from the stations at Key West and Havana, and perfectly read a message which was being transmitted by a passing fruit vessel to Key West Station. For some reason signals were not received from the Palm Beach Station: whether it was too directly below the aeroplane, or whether there were no signals transmitted, is unknown, as full particulars have not come to hand, but the matter will probably be referred to in our next issue with data from operator Morriss.

WIRELESS TELEGRAPHY IN FIJI.



Several years ago Marconi apparatus was utilized to connect Tasmania with the mainland, and the results were eminently satisfactory throughout the period of the demonstration which was conducted at the Company's expense. Ever since then tenders have been called for from time to time, but, in this year of grace, no commercial wireless telegraph station exists either in Australia or in New Zealand with their enormous coast lines. The enterprise of the great shipping lines, such as the P. and O., the Orient, the White Star and the Blue Funnel, in having their vessels fitted with the Marconi System is thus, for the present, dependent for its reward upon the presence of ships lying in Australian ports fitted with wireless telegraph apparatus and serving as coast stations.

It is therefore refreshing to be able to chronicle the fact that the little colony of Fiji has decided to adopt the uses of wireless telegraphy.

Suva, the capital, Vuna Point, Savu-Savu and Lambasa are the places where the first installations will be made.

The Suva Station will be the most im-

portant, and while the equipment at present being installed is of no greater power than 5 K.W., care has been taken in choosing the site and in laying out the installation in such manner, that the additional plant necessary for communication to be effected with the mainland of Australia may be conveniently and economically installed.

Savu-Savu and Vuna are being fitted with $1\frac{1}{2}$ K.W. sets, but Lambasa will have a 5 K.W. installation similar to that at Suva, for although the air-line distance between the two last mentioned stations is no greater than 117 nautical miles, a certain amount of land intervenes, rising near Lambasa to upwards of 3,000 feet, while a certain reserve of power was considered desirable in apprehension of frequent atmospheric disturbances. It is expected that both the Suva and Lambasa Stations will have a working range with ships of 350 miles during the day, and from two to three times that distance at night. For all stations a uniform arrangement of masts has been adopted, consisting of a central steel tubular mast ("Gray" type) 160 feet in height and four light tubular steel

telegraph poles, each sixty feet high. The five K.W. Stations are furnished with a 10 H.P. Gardner engine direct coupled to a continuous current dynamo, available for charging a battery of accumulators or for running the motor-generator-disc.

It is intended that the battery shall be used as the general rule to energise the transmitting plant.

The 1½ K.W. Stations are of the Company's standard type of ship set energized by an oil engine and furnished with a storage battery. Similar installations are in use, among other places, at Aden, Berbera, and at the new station at Cocos (Keeling Islands) which is about as far to westward of the Australian continent as Suva is to the eastward.

The Suva, Vuna Point and Savu-Savu Stations are to be completed on or before April 30th, but the Lambasa Station will probably not be opened much before August 31st.

Mr. John J. Leary is the Company's engineer in charge of the work, and he is assisted by Messrs. Keith, Strickland and Nicholls.



CAPE TOWN— SLANGKOP STATION.

The latest reports from the Company's engineer, Mr. Kos, state that the masts on the Slangkop station should be completed by about the 29th March, and it is therefore probable that as soon as the station is handed over to the Union Government it will be opened to public maritime service during the month of April.

The station will be of 5 K.W., and is designed for a working range of 400 nautical miles for sea, and for a maximum range considerably exceeding this figure. The power for operating the station is obtained from a battery of accumulators consisting of 60 cells and having a capacity of 240 ampere hours, the accumulators in their turn being charged by means of a D.C. dynamo directly coupled to a 10 H.P. Gardner engine. Should it be required at any time for special purposes to obtain more power, the station has been arranged in such a manner that this can be effected by

running the D.C. dynamo and accumulators in parallel.

The transmitting apparatus is designed to tune to waves of 300 and 600 metres as well as to any waves between 600 and 1,200 metres, whilst the receiving apparatus can be tuned to any wave from 100 to 2,500 metres.

The aerial system will consist of a four part multiple wire umbrella aerial supported by 5 masts of which the centre is 230 feet over ground; the parts of the aerial being independently supported in pairs between the main mast and the adjacent extension masts.

As ships carrying the standard 1½ K.W. Marconi sets have frequently been in communication with the Durban station whilst lying at anchor in Cape Town harbour, it is only reasonable to anticipate that as soon as the Slangkop station has been opened, Cape Town and Durban will then be in direct communication, at any rate by night.



COCOS STATION.

March 2nd witnessed the opening of the station which has been established on Cocos (Keeling) Islands, midway between Colombo and Fremantle.

The vessels of the Orient and P. & O. Companies pass within easy working distance of the station, which is of the usual 1½ K.W. type and has a wireless telegraph range of 200 miles and upwards.

Cocos is on the Eastern Extension Australia and China Telegraph Company's system, and the station, which was erected under the supervision of Mr. Rackstraw, will be operated by the Cable Company's staff. In due course, similar arrangements will be made at Hong Kong, Singapore, Malta and Gibraltar.



OTHER NEW MARCONI COAST STATIONS.

The following coast stations were recently erected and opened for public service:—

In Italy: Cagliari, Palermo, Naples, Isola Chiesa (Maddalena), owned by the Italian Government. In Arabia and Somaliland at Aden and Berbera respectively, which belong

to the Colonial Office ; and at Durban for the South African Government.

The Marconi Wireless Telegraph Company of America are responsible for four new stations in the United States at Cape May (New Jersey), Palm Beach and Fernandina (Florida), and Virginia Beach (Virginia) ; and the Marconi Wireless Telegraph Company of Canada, Limited, for a new Canadian Station at Pictou. Another new Marconi Station at Grindstone (Magdalen Island) is owned by the Canadian Government.

STATIONS CLOSED.

The station at Isola Chiesa (Maddalena) was opened in lieu of the Asinara station which was recently closed by the Italian Government.

* * * *

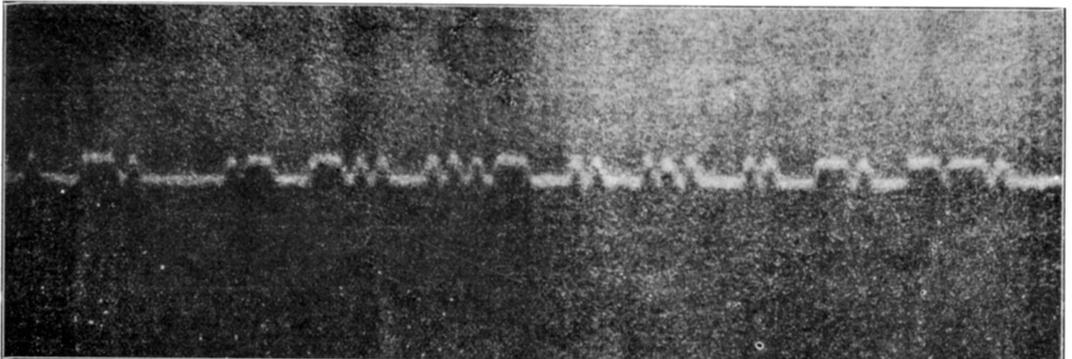
Proving the utility of Wireless.—Wireless telegraphy was again to the fore when, owing to a breakdown of the cable between Stornoway and the mainland, communications were carried on from February 27th by means of wireless between the Lochboisdale and Tobermory wireless telegraph stations.

MARCONI ATHLETIC CLUB (LONDON).

Formed in 1905, with Mr. Marconi as president, the "Marconi Cricket Club" has had a very flourishing career. Owing to the enormous increase in the business of the Marconi Company, which has necessitated considerable enlargement of the staff, the present year was thought to be a most opportune time for a more ambitious club to be instituted, and in consequence, the "Marconi Athletic Club" was recently formed, to include, cricket, tennis and football sections, and opened for membership to all members of the Marconi staff. A capital ground, the "Ravensbank Athletic Ground," at Lower Sydenham, has been acquired ; Mr. Marconi has again honoured the club by his presidency, and Mr. Bradfield the captaincy, and with a good list of fixtures arranged, there is every promise of a most successful season.

It is hoped that some time during the cricket season a sports gathering may be held, and with the enthusiastic support of the whole of the staff, the club should prove a tremendous success.

TRANSATLANTIC TELEGRAPHY.



A remarkable photographic record of Wireless Signals received at Clifden, Ireland, from Glace Bay, Canada, a distance of 2,200 miles.

MARCONI AND MARCONI'S WIRELESS
TELEGRAPH Co., Ltd.,
versus
THE BRITISH RADIO-TELEGRAPH AND
TELEPHONE Co., Ltd.,
Before
Mr. JUSTICE PARKER,

for Infringement of Patent No. 7.777 of 1900.

A brief account of the trial in December 1910 and January 1911, and an abridgement of the judgment delivered 21st February, 1911.

This action was brought by Mr. Marconi and Marconi's Wireless Telegraph Company Limited to restrain the British Radio-Telegraph and Telephone Company Limited from infringing the Plaintiffs' Patent No. 7.777 of 1900 and two other patents, but at the commencement of the proceedings it was agreed between the parties to confine the present case to the principal patent as the apparatus covered by the other patents could not be usefully employed without that of the principal patent.

The case was heard before Mr. Justice Parker in the Chancery Division of the High Court of Justice in London, on the 12th, 13th, 14th, 15th, 16th, 20th and 21st of December, 1910, and on the 11th, 12th, 13th, 17th, 18th, 19th, and 20th of January, 1911, and Judgment for the Plaintiffs was delivered on the 21st February, 1911.

The Plaintiffs claimed that the Defendants had manufactured and sold, and were offering for sale, apparatus infringing their Patent No. 7.777 of 1900, and asked for an injunction, damages, delivery up of infringing apparatus, and costs.

The Defendants contended that they had not infringed the patent and that the patent was not valid, and in support of their contention cited numerous documents and called no less than seven witnesses.

In support of their contention of non-infringement the Defendants argued that a two-coil transformer was an essential feature of the invention, that they were using a one-coil or auto-transformer, and that an auto-transformer was not a known equivalent of a transformer at the date of

the patent. Further they argued that if the auto-transformer they were using was an infringement they might instead use a single coil with an equal number of turns in each circuit which would not even be an auto-transformer and, therefore, could not infringe.

In support of their contention of invalidity the Defendants relied upon the following patents:—

No.	Granted to
8,575 of 1891	Nikola Tesla.
20,981 „ 1896	„ „
11,575 „ 1897	Oliver Lodge.
18,644 „ 1897	„ „
29,505 „ 1897	„ „
525 „ 1898	Silvanus Thompson.
1,862 „ 1899	Ferdinand Braun.
22,020 „ 1899	„ „

and upon numerous papers and articles by Tesla, Oudin, Lodge, Evershed, Fleming, Brown, Fessenden and Blondin, published in the "Journal of the Institution of Electrical Engineers," "L'Electricien," "The Electrician," "Proceedings of the National Electric Light Association," "Comptes Rendus," "Electrical World," "Electrical Review," and "Eclairage Electrique." The Defendants argued that all these specifications and publications anticipated the patent, and if they did not anticipate it that they deprived it of subject matter.

As the case developed the Defendants further contended that the patent did not give sufficient directions how the invention was to be carried into effect, and yet at a

later stage they endeavoured to read all the necessary information into Braun's Patent No. 1,862 of 1899.

Judgment

(Considerably abridged.)

Before going into the question of the infringement and validity of Patent No. 7,777 of 1900, it will be convenient to say a few words about wireless telegraphy generally, and the problems which its practical application has involved, as only in this way can a proper conclusion be arrived at.

Wireless telegraphy in the sense here used operates by disturbances in the ether produced by the sudden discharge of a condenser, and in this respect is entirely different to magnetic induction telegraphy. Moreover, the effect produced on the receiver falls off in the latter case, as the cube of the distance from the transmitter, and in the former case only as the square of the distance, from which it follows that the utilisation of these disturbances for conveying signals must be far more efficient than the utilisation of lines of magnetic force.

Henry first noticed that the discharge from a condenser was oscillatory. Kelvin and Helmholtz established the relation between the frequency of the discharge and the resistance, capacity and inductance of the circuit. Clerk Maxwell showed that the oscillatory discharge of a condenser must give rise to a disturbance in the ether travelling with the velocity of light. Hertz supplied the experimental verification of Clerk Maxwell's theory and produced the well-known Hertz radiator and resonator, the latter having a minute spark gap. Branly and Lodge produced the coherer, which, substituted for the minute spark gap of Hertz's resonator, made a much more sensitive receiver. In 1892 Crookes first suggested the utilisation of Hertz's waves for wireless telegraphy, and in 1894, the year after Hertz's death, Lodge gave his famous lecture on "The Work of Hertz." In this lecture Lodge gave a very clear and complete account of the knowledge of Hertzian waves at that date, he pointed out the necessity for a persistent train of waves in order to obtain selectivity, and stated that conspicuous energy of radiation and per-

sistent oscillation were incompatible—a statement which is true to-day when we remember that he was referring to a single circuit.

In 1896 Marconi applied for his Patent No. 12,039, of 1896, which was the first patent ever granted for a system of ether wave telegraphy. It embodied, among a large number of minor improvements, the utilisation of an elevated aerial and an earth, but had a number of drawbacks. Not only was there the drawback, pointed out by Lodge, that being a good radiator the aerial could not be a good oscillator, but it also suffered from the limitation of capacity and potential of the aerial and therefore of the energy which could be utilised.

In 1897 Lodge applied for his Patent No. 11,575 of 1897, in which he employed an inductance with a large capacity aerial in order to prolong the train of waves and improve selectivity. He thus made a compromise, sacrificing the radiating in order to improve the oscillating properties of his aerial. In other respects his system resembled Marconi's. His aerial was vertical and not horizontal, and he says it may be earthed if desired, and he, too, uses a coherer of metal filings with a mechanical decohering arrangement.

Later, in the same year, Lodge applied for another Patent, No. 29,505 of 1897, and the following year Sylvanus Thompson applied for Patent No. 525 of 1898. Both these patents relate to inductive telegraphy, and neither of them throws any light on the difficulties incident to utilising the principle of resonance in a system of telegraphy by ether waves.

Marconi also applied for Patents Nos. 12,326 of 1898, 6,892 of 1899, and 25,186 of 1899, all of which refer to the use of a transformer in the receiver for the purpose of increasing the voltage applied to the coherer.

It is true that Braun's Patent No. 1,862 of 1899 preceded Marconi's Patent No. 7,777 of 1900, but as there is no evidence that it was put into practice I have now mentioned all that is necessary for the interpretation of the latter specification.

Marconi commences his specification with the statement that the object of his invention is to increase the efficiency and to secure selectivity. He obviously refers to the

difficulty pointed out by Lodge, namely, that you cannot have your circuit doing two incompatible things, however desirable, at the same time, and he says in effect: Take two circuits and let one do one of the things and the other do the other. For this purpose he employs a closed oscillating circuit coupled to an open radiating or absorbing circuit and adjusts all four circuits to have the same time period.

The interpretation I have put on the patent seems to me after careful consideration the true and indeed the only possible interpretation, but before leaving the subject I must mention the matter of coupling upon which considerable stress was laid at the trial. It was contended that loose coupling was essential to success, that no direction as to coupling is given, and that in one out of the nine examples given the coupling is not very loose. In my opinion the direction to couple loosely is impliedly if not expressly given in the specification.

It is not disputed that the invention does get over the difficulties it was designed to meet. It produced a persistent train of waves, increased the available energy, doubled at once the distance of communication, and secured selectivity. The utility of the invention cannot be doubted.

I propose next to consider whether the invention was anticipated by Braun's Patent No. 1,862 of 1899. Braun's Patent involves many difficulties and he was evidently unacquainted with what Marconi and Lodge had already done. The essential feature of Braun's invention is the utilisation of lower frequencies than he thought were being used, and it is clear that the specification does not contain even the remotest suggestion of the problem which Marconi's Patent of 1900 was intended to solve, much less any suggestion bearing on its solution.

That I am right in this conclusion will be further evident when I consider the objection founded on want of subject matter. In considering this plea it is important to remember that two circuits in the receiver was no novelty. Lodge had two circuits in his 1897 patent. He was an engineer of first-rate ability endeavouring to get over the difficulty he had himself explained. He had two circuits at his receiving end, and in a way, at his transmitting end also, and yet he failed to see that if he utilised

the principle of resonance as between those two circuits the problem would be solved. Marconi had two circuits in his 1898 patent and did not tune them. In the transformers of Tesla and Oudin rough tuning was done to overcome the disadvantage of comparatively loose coupling, but this was only with the object of raising the voltage and is a very different thing from deliberately loose coupling and tuning two circuits together with the object of producing a long train of waves and securing the full benefit of resonance between the receiver and transmitter. In the literature quoted there is no trace of the idea underlying Marconi's invention and not a single suggestion from which a competent engineer could arrive at this idea. I hold, therefore, that the plea of want of subject matter entirely fails.

The only other plea of invalidity is based on the prior grant of Braun's Patent No. 22,020 of 1899. This patent is similar to the previous one with the addition of an earthed aerial. He says nothing of tuning, and the specification contains a passage which in my opinion is inconsistent with the two circuits being intended to be tuned together. I cannot see how it can be said that this patent contains a grant of the invention described in Marconi's 1900 Patent.

Having come to the conclusion that Marconi's 1900 Patent is a good and valid patent, I must now consider the question of infringement. The Defendants' transmitter contains two circuits, one a closed circuit which is a good conserver of energy and a persistent oscillator, and the other an open circuit which is a good radiator. These circuits are intended to be tuned together and contain adjustable devices for that purpose. They are also linked together in such a way that the oscillations in the closed circuit will gradually build up and maintain in the open circuit like oscillations, thus radiating a long train of waves. Similarly, the receiver contains two tunable circuits linked together. It appears, therefore, that the Defendants' apparatus contains all the essential features protected by Marconi's 1900 Patent.

It is contended that an auto-transformer such as the Defendants are using was not a known equivalent of a transformer at the date of the patent and further that they might use an inductive shunt which would not be a transformer at all. I cannot con-

ceive, however, that an electrical engineer in, say 1899, would have had any doubt that what could be done by a two-coil air core transformer could also be done by an air core auto-transformer, and this even if arranged one to one, although an inductive shunt had never been used as a transformer before. In my opinion, however, the use of a two-coil instrument is not an essential feature of Marconi's invention at all, and it is a matter of indifference whether a transformer or an auto-transformer be used.

Being of opinion that every claiming clause of Marconi's Patent of 1900 is a claim

for an entirely novel combination producing an entirely new and useful result, and that the use of a two-coil transformer is no essential part of his invention, I hold that the Defendants, who in my opinion have taken all the essential parts of the invention, are infringers, notwithstanding that they have substituted an auto-transformer for a transformer in the combination claimed, and notwithstanding that the use of an auto-transformer with an air core for any such purpose as that for which Marconi has used the transformer may have been new.

The action, therefore, in my opinion, succeeds.

The Plaintiffs were granted a certificate of validity of their patent and an injunction, costs and damages against the Defendants.

WIRELESS APPARATUS FOR THE NEWFOUNDLAND SEALING FLEET.

Marconi Wireless Apparatus was this year for the first time used by several of the steamers of the Newfoundland Sealing Fleet

that the ice conditions were most unfavourable.

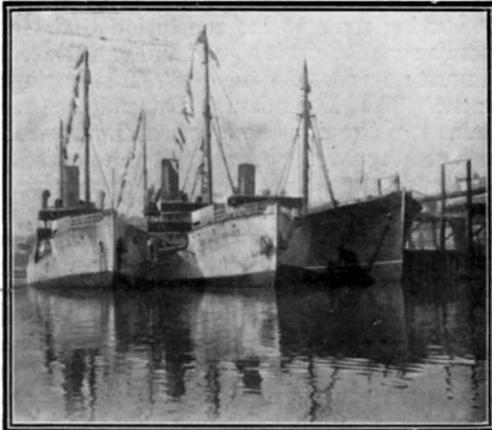
The annual seal hunt, one of the main industries of Newfoundland, is a thing of which very little is heard in the outside world. The open season lasts from March 12th to May 1st each year.

Until the year 1863 it was carried on entirely by small schooners of not more than a hundred tons register.

The first steam ice-hunter came to the country in 1863, from Glasgow, to Messrs. Walter Grieve & Co., of St. John's. Built of stout British oak throughout, the "Bloodhound," as she was called, carried sails in addition to her steam power, and was barque rigged.

More ships of the "Bloodhound" type followed each year until the sailing vessel was almost precluded. Up to the year 1904 all steamers carried sails, but from that time they have been slowly discarded. All yards have been done away with, and now only one or two of the oldest steamers carry staysails.

In 1906 a new departure was made. Messrs. Harvey & Co., of St. John's, had a steel steamer built for the seal fishery. Her nett tonnage was 829, length 250 feet, and breadth 38 feet. She had a specially constructed bow which enabled her to ride up



SS. "Adventure." "Bonaventure." "Bellaventure." Three of the vessels which were equipped with Marconi Apparatus previous to this year's voyage.

which left St. John's for the East Coast and the Gulf of St. Lawrence on March 14th.

The first wireless message was received on Friday night, March 17th, which indicated

on the ice, thereby getting her weight to help in cutting a passage instead of butting dead against it as a straight stem ship would do.

She was christened the "Adventure," and was commanded by Captain Harry Daw, who comes of an old stock of successful seal hunters and has followed the trade from boyhood.

The "Adventure" left St. John's on her maiden voyage on March 10th, 1906, and returned on April 1st with thirty thousand seals valued at fifty thousand dollars (£10,000).

In 1909 four new steel ships were built for the same purpose. Two for Messrs. Harvey & Co., the "Bonaventure" and "Bellaventure." The "Beothic" for Messrs. Job Brothers, and the "Florizel" for Messrs. Bowring Brothers. All were the same type of ship as the "Adventure," but the first three were a trifle smaller, while the "Florizel" was larger.

The "Florizel" was commanded by Capt. Abraham Kean, "Bellaventure" by Capt. Job Knee, "Bonaventure" by Capt. Parsons, and "Beothic" by Capt. George Barbour—all tried men and lifelong seal hunters.

The "Florizel" returned first that year with 30,488 seals, while the others followed shortly with valuable loads.

The total catch amounted to two hundred and sixty-nine thousand seals, valued at 458,020 dollars (about £91,604), but the "hunt" proved to be a very disastrous one for the ships.

Two were crushed in rafting ice and went down. The crews of these ill-fated ships, the "Virginia Lake" and the "Vanguard," were picked up by other ships. The "Bloodhound" and the "Neptune" were towed into port with main shafts broken, and many other ships suffered smaller injuries, having rudders broken and propeller blades torn off.

The "Florizel" was the first ship of the fleet to use Marconi Telegraphy. She was the only one fitted with an equipment in 1909. Her progress was reported to the owners, *via* the Marconi Company's station at Cape Race.



View from Aloft, looking from the Barrel.

The May number of "The Marconigraph" will contain an account of the voyage made in 1910 by Ernest T. Fisk, Marconi Officer on board the SS. "Florizel." The article will be illustrated by actual photographs taken by Mr. Fisk.

THE " WIRELESS " HERO.

The damages awarded to Mr. Jack Binns in his action against an American Cinematograph Company have been reduced by Justice Greenbaum of the New York Supreme Court, from £2,500 to £500.

MARCONI NEWS MESSAGES.

A contract has just been concluded with the Royal Mail Line for the transmission of news messages to the following six boats:—"Asturias," "Avon," "Araguaya," "Amazon," "Aragon," "Danube."

THE MARCONI COMPANIES' PROGRESS IN THE MERCANTILE MARINE.

That the Marconi International Marine Communication Company have, during the past few months, fitted over 100 vessels of the Mercantile Marine is significant of the absolute indispensability of wireless installations on board ship.

The total number of boats installed with the Marconi System now amounts to over 450, most of which conduct a public telegraph service for the Shipping Companies and their passengers.

In addition to this number, the Company has received orders from many large Shipping Companies for the installation of wireless apparatus on vessels now being built, and on vessels which are shortly due in port. The Company have also been favoured with instructions from various Government officials for the equipment of naval ships.

The Eastern Telegraph Company and its associated Companies, which early discovered the utility of wireless telegraphy in connection with the laying of cables, also continue to extend the application of the Marconi System to their cable steamers.

The following twenty steamships of the Union Castle Line, with a service to and from Cape Colony and East Africa, were recently equipped with Marconi apparatus:—

SS. "Edinburgh Castle," "Armadale Castle," "Walmer Castle," "Saxon," "Briton," "Kildonan Castle," "Kinfauns Castle," "Dover Castle," "Durham Castle," "Dunluce Castle," "Garth Castle," "Granully Castle," "Galeka," "German," "Galician," "Gaika," "Gascon," "Goorkha," "Guelph," "Goth." The Company has also received instructions for the equipment with their modern apparatus of three new boats now building.

They have also been favoured with instructions to equip sixteen vessels of the Booth Line, running between Liverpool and the Amazon, *via* Portugal and Madeira, of which the "Anselm," "Ambrose," "Francis," "Hilary," "Hubert," "Lanfranc," "Stephen," and "Augustine" are

already fitted, and the remainder are expected to be fitted shortly. Three vessels of the new "Blue Funnel" Line, controlled by Messrs. Alfred Holt & Company, running between Liverpool and Australia, have also been equipped.

Of the large companies having vessels running to the East, the P. & O. have had the following twelve boats fitted:—SS. "Mooltan," "Persia," "Soudan," "Dongola," "Plassy," "Caledonia," "Himalaya," "Delhi," "Assaye," "Vectis," "Devanha," "Delta," and orders have been received to fit the "Maloja" and "Medina."

The SS. "Osterly," "Orontes," "Orsova," "Otway," "Orvieta" and "Omrah" of the Orient Line, and the SS. "Gloucestershire" of the Bibby Line, are also recent additions to the Marconi service.

The White Star Company's sailing ship "Mersey," for the training of cadets, together with four of the Company's steamships, SS. "Medic," "Afric," "Persic" and "Runic," having a service between England and Australia *via* the Cape, were recently fitted. The "Olympic" and "Titanic" will also be included.

Messrs. George Thompson and Company, the owners of the Aberdeen Line, had their vessels "Miltiades," "Marathon," "Moravian," "Themistocles" and "Demosthenes" equipped with standard ship sets and special emergency apparatus. These boats also carry on a service between London and Australia, *via* the Cape.

The SS. "Oropesa," "Orcoma," "Orita," "Oronsa," "Oriana," "Ortega," "Oravia" and "Orissa," owned by the Pacific Steam Navigation Company, with a service to and from Brazil, River Plate, Falkland Islands, Valparaiso, Callao and all West Coast Ports, have been fitted.

The following is a list of other vessels which have recently been installed with Marconi apparatus, or which are to be fitted shortly:—

ANCHOR LINE, SS. "Perugia," "Italia," "Calabria" and "Cameronia."

ROYAL MAIL STEAM PACKET COMPANY, SS. "Danube."

DOMINION ATLANTIC RAILWAY COMPANY, SS. "Boston," "Prince George" and "Prince Arthur."

BRITISH INDIA S.N. COMPANY, SS. "Rohilla" and "Rewa."

CANADIAN PACIFIC RAILWAY, "Monteagle," "Princess Adelaide," "Princess Mary."

CUNARD STEAMSHIP COMPANY, SS. "Francia."

CITY OF DUBLIN STEAM PACKET COMPANY, SS. "Connaught," "Leinster," "Ulster" and "Munster."

JOHN T. RENNIE, SONS & COMPANY, SS. "Intaba."

IQUITOS STEAMSHIP COMPANY, SS. "Huayna," "Atahualpa" and "Manco."

ALLAN LINE, SS. "Scotian."

ATLANTIC TRANSPORT COMPANY, SS. "Mesaba," "Manitou," "Menominee," "Marquette."

BOWRING LINE, SS. "Stephano."

CANADIAN NORTHERN S.S. COMPANY, SS. "Royal Edward" and "Royal George."

CAIRN LINE, SS. "Cairnrona" and "Gerona."

DONALDSON LINE, SS. "Saturnia" and "Tritonia."

HUDDART, PARKER & COMPANY, SS. "Zealandia."

LEYLAND & COMPANY, SS. "Canadian" and "Bohemian."

J. FARQUHAR & COMPANY, SS. "Seal."

SPANISH TRANSATLANTIC COMPANY, SS. "P. Satrustegui" and "P. Alfonso XII."

URANIUM STEAMSHIP COMPANY, SS. "Volturno," "Uranium" and "Campanello."

LAMPORT & HOLT, SS. 3 ships building.

OCEANIC STEAM NAVIGATION COMPANY, SS. "Ionic," "Corinthic" and "Athenic."

SHAW, SAVILL & ALBION LINE, SS. "Arawa" and "Tainui."

ELDER, DEMPSTER & COMPANY, SS. "Elmina" and nine other boats.

YEOWARD BROTHERS, SS. "Andorhina."

ADELAIDE STEAMSHIP COMPANY OF AUSTRALIA, SS. "Grantala" and "Koombana."

HOWARD SMITH & COMPANY, OF MELBOURNE, SS. "Bombala," "Cooma" and "Peregrine."

MCLWRAITH & MCEACHIARN, OF AUSTRALIA, SS. "Karoola."

COMPANIA PERUANA DE VAPORES Y DIQUE DEL CALLAO, SS. "Urobamba," "Pachitea" and "Mantaro."

CABLE SHIPS.

The cable steamers "Electra," "John Pender" and "Norseman," belonging to the Eastern Telegraph Company and its Associated Companies were equipped some time ago. The SS. "Patrol," "Recorder" and "Magnet" are being fitted at Singapore, and the Company has now received instructions to equip the "Sherard Osborn" and prepare for shipment sets to be installed on board the CS. "Sentinel" on the West Coast Station, and on board the CS. "Cormorant," stationed at Monte Video.

The T.C. and M's CS. "Colonia," "Cambria" and "Telconia," the CS. "Buccaneer" of the India Rubber, Gutta Percha and Telegraph Works Company, and the CS. "Mackay Bennett" of the Commercial Cable Company, all carry standard 1½ K.W. sets, which have been used on many occasions with the greatest advantage in facilitating and expediting repairs.

NAVAL SHIPS

The Company has been favoured with instructions from the Portuguese Government to equip two of their Fleet, the "Admastor" and "Sao Rafael," with wireless sets.

Instructions have also been received for the "Vasco da Gama" to be fitted.

Orders were also placed by the Australian Commonwealth for the "Parramatta," "Yarra" and "Warrego," by the Argentine Government for the "Chaco" and "Pampa," and by the Canadian Government for the "Rainbow" and "Niobe."

TRAINING SHIPS.

Besides the White Star Line's Training Ship "Mersey," wireless sets have been installed on the training ships "Conway" and "Indefatigable," stationed on the Mersey, and the "Worcester" lying off Greenhithe. The "Arethusa," which is also lying off Greenhithe, is now being fitted.

SEALING VESSELS.

Previous to setting out upon this season's sealing expeditions, the SS. "Adventure," "Bellaventure," "Bonaventure" and "Newfoundland," belonging to Messrs. A. Harvey & Company, were equipped with Marconi Apparatus.

PRIVATE YACHTS.

The SY. "Valhalla," owned by the Duke of Bedford, has been fitted at Cowes. The SY. "Sapphire," owned by Mr. Gould Brokaw, of New York, was similarly equipped.

COMPULSORY WIRELESS TELEGRAPHY ON BOARD SHIP.

That Governments and the public generally now recognise that wireless telegraphy is vital to the safety of ocean-going vessels is clear from the action which has, during the past few months, been taken by several of them to make installations of wireless telegraphy compulsory on ocean-going passenger vessels. The requisite powers were taken by the New Zealand Government by means of a clause in the New Zealand Shipping and Seamen Amendment Act of 1909, which reads:—

“ The Government may, from time to time, by order in Council, make regulations requiring ships registered in New Zealand and carrying passengers to be provided with apparatus for transmitting messages by means of wireless telegraphy, and may by such regulations prescribe fines not exceeding fifty pounds for any breach thereof by the owner or master of a ship.”

In Italy also powers have been taken by the Government to compel vessels carrying emigrants and calling at Italian ports to carry Marconi Wireless Apparatus.

An Act passed by the Senate and House of Representatives of the United States of America provides that “ from and after the first day of July, 1911, it shall be unlawful for any ocean-going steamer of the United States, or of any foreign country, carrying passengers and carrying fifty or more persons, including passengers and crew, 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, in charge of a person skilled in the use of such apparatus, which apparatus shall be capable of transmitting and receiving messages over a distance of at least one hundred miles, night or day. Provided, that the provisions of this Act shall not apply to steamers plying only between ports less than two hundred miles apart.”

Bills of a similar nature are now under consideration in Canada and the Argentine.

An order was promulgated by the Austrian Government on 8th November, 1910, decreeing that Austrian merchant vessels keeping up a passenger service from Austrian ports beyond Gibraltar or Aden, should on regular voyages be fitted with radio-telegraph stations.

These stations have to conform with regard to their installation, their working (or service) and their operating staff with the Regulation of the Ministry of Commerce of the 7th January, 1910, Reichsgesetzblatt, No. 11, and under normal conditions they have to guarantee an exchange of messages on a distance of at least 100 nautical miles, and above all, they are to serve for communication, without any discrimination as to system, with coast and ship stations in matters of the captain's orders regarding rescue work or safety precautions.

This regulation comes into force one year after its proclamation.



THREE THOUSAND LIVES SAVED BY WIRELESS.

That wireless telegraphy has become an important adjunct of the life-saving service is demonstrated by the following announcement which recently appeared in the “ Telegraph and Telephone Age.” A rough calculation has been made recently as to the success and value of the assistance rendered by wireless telegraphy to ships at sea in the saving of life, and it is estimated that 3,000 persons owe their continued existence at the present time to the help rendered by wireless telegraphy.



The Marconi Company of America has received instructions to install Marconi apparatus on the SS. “ British Sun,” a tank steamer carrying oil across the Atlantic and between Galveston and Philadelphia, owned by the British Sun Company.

The Transmission of Telegrams to Ships at Sea.

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Telegrams for transmission to ships at sea are accepted at all Postal Telegraph Offices in the United Kingdom and at the Head Office of the Marconi International Marine Communication Company, Limited, Watergate House, York Buildings, Adelphi, London, W.C. The charge for transmission to ships at sea, via any ordinary British coast station is 10½d. per word, without minimum, except to German and Dutch vessels, when the charge is calculated at 6½d. per word, without minimum, plus 4d. per word with a minimum of 3s. 4d. The charge for transmission via the Marconi High Power Stations at Poldhu (Cornwall) or Cape Cod (Massachusetts, U.S.A.) is 3s. per word without minimum.

Arrangements have also been made for the acceptance of wireless messages at any Postal Telegraph Office in the United Kingdom for transmission via various coast stations abroad.

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A pamphlet containing further particulars will be sent post free on application to the head office,

*Marconi's Wireless Telegraph Company, Limited,
Watergate House, York Buildings, Adelphi, London, W.C.*

or from any of the following addresses:—

BRUSSELS La Cie de Telegraphie sans Fil, 19, Rue du Champ de Mars.

PARIS La Cie Française Maritime et Coloniale de Telegraphie sans Fil, 35, Boulevard des Capucines.

BUENOS AYRES La Cia Marconi de Telegrafia sin Hilos del Rio de la Plata, 132, San Martin.

MADRID Compañia Nacional de Telegrafia sin Hilos, Calle de Alcalá, 43.

MONTREAL The Marconi Wireless Telegraph Co. of Canada, Ltd., 86, Notre Dame Street.

NEW YORK The Marconi Wireless Telegraph Company of America, 27, William Street.

ROME Marquis L. Solari, Piazza S. Silvestro, 74.

The Marconi Companies

have made arrangements for

: *The Installation of* :
MODEL WORKING
: : *STATIONS* : :

AT THE FORTHCOMING

CORONATION EXHIBITION,

: Great White City, :
Shepherd's Bush, W.

AND AT THE

Industrial & Work Exhibition,
: : : *TURIN.* : : :