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## Wireless Telegraphy in Spain

The King Honours Mr. Marconi.

**M**R. G. MARCONI and Mr. G. C. Isaacs, who visited Spain towards the end of May, were accorded a hearty welcome. An elaborate programme of entertainments had been provided for the guests, who were received with the utmost cordiality in Ministerial, scientific, and commercial circles. His Majesty the King of Spain presided over a brilliant gathering at the Athenæum Club in Madrid on May 19th, when Mr. Marconi delivered a discourse on the history of wireless telegraphy in the presence of leading representatives of the Government, Members of Parliament, the British and Italian Ambassadors in Madrid, and other influential representatives of politics, science, and art. King Alfonso received Mr. Marconi in audience on the following day, and conferred upon him the distinguished honour of the Grand Cross of the Order of Alfonso XII. Among those who entertained the visitors was the Compañía Nacional de Telegrafía Sin Hilos (the Marconi Company of Spain), who gave a banquet, at which there were two hundred guests present, including the Ministers of the Interior, Finance, Justice, and Public Works, Señor Moret (former Prime Minister), and the British and Italian ambassadors. All the newspapers of the capital, and the provincial press, printed glowing eulogies of Mr. Marconi, and devoted a good deal of space to accounts of the receptions given in honour of himself and Mr. Isaacs. The visit has furnished another proof of the keen interest which the commercial development of wireless telegraphy has aroused in the highest circles in Spain, and augurs well for the future of the Marconi system in the Iberian Peninsula.

Spain is already provided with an extensive system of internal and external wireless telegraphy, the central station for which—at Aranjuez—was opened by H.M. King Alfonso

on January 27th. All the stations were erected by Marconi's Wireless Telegraph Company on behalf of the Compañía Nacional de Telegrafía Sin Hilos, and they are situated at Cadiz, Teneriffe, Las Palmas, Barcelona, Vigo, Soller in the Balearic Islands, and Alicante. Before being put into service, the completed stations were subjected to very severe tests by an expert independent commission appointed by the Spanish Government. There is no harm in mentioning now that, before seeing the stations in operation, the members of the Commission were rather sceptical as to the possibility of the wireless service emerging with complete satisfaction from the trials to which it was to be subjected. The performance of the stations in the matter of accuracy, speed, and reliability entirely changed the opinion of the Commissioners, who expressed their great satisfaction with the service rendered by the stations. In actual practice, the Spanish wireless service has amply maintained the golden opinions which it gained during its period of trial. What need is there to recall the inestimable value which the wireless service rendered to the State only a few weeks ago, for is it not still fresh in the public mind—and especially in the grateful recollection of the people of Spain—that when the cables and land lines broke down before a gale, the Marconi stations remained unaffected, and maintained the continuity of the telegraphic service? Little wonder, then, that all sections of the community—politics, science, art, and commerce—should join with their Sovereign and other members of the Royal House in paying homage, when in their midst, to the man who has made all this possible, and who compels admiration for the beneficent results of his marvellous discovery, and for their ready application to the requirements of mankind.

Original from



THE RT. HON. SYDNEY BUXTON, M.P.

**The Right Hon. Sydney Charles Buxton, M.P.**  
**President of the Board of Trade**

"THE word politics, sir," said Mr. Pickwick, "comprises in itself a difficult study of no inconsiderable magnitude." Since the subject of our sketch this month is one who for many years has been deeply immersed in that study, we need offer no apology for citing Mr. Pickwick, especially as his observation is one which no thinking man will dispute. Mr. Sydney Buxton has enjoyed a very lengthy career in the political and parliamentary arena. He first entered the House of Commons as member for Peterborough in 1883, after having unsuccessfully contested the Boston division three years earlier. In 1886 he was elected member for Poplar, and has since represented that East London constituency with honour and distinction. Last year, when he celebrated the twenty-fifth anniversary of his election for Poplar, representatives of all shades of political opinion in the constituency combined to pay homage to their member, and to present him with a suitable token of their goodwill towards him.

Mr. Buxton was educated at Clifton and at Trinity College, Cambridge. From 1876 to 1882 he was a member of the old London School Board, and while on that body he carried out a good deal of social work. He was a member of the Royal Commission on Education from 1886 to 1889, which latter year will always be notable for the distinguished services which Mr. Buxton rendered in bringing about the termination of the famous Dock Strike. From 1892 to 1895 he acted as Under-Secretary for the Colonies in Lord Rosebery's ministry, and in 1904 he was appointed a member of the Income Tax Committee. When the late Sir Henry Campbell-Bannerman formed his ministry in 1905 he appointed Mr. Buxton as Postmaster-General, an office which he continued to hold until 1910, when he was appointed President of the Board of Trade by Mr. Asquith.

As Postmaster-General, Mr. Buxton has had a great deal to do with legislation affecting wireless telegraphy; and, as he himself declared in the House of Commons only a few days ago, the question of wireless was one in which he had taken a very great interest. When at the Post Office he made a purchase for the nation of all the wireless stations throughout the country. It is a singular coincidence that the subject of wireless telegraphy should again claim his attention in his new office. Two years ago a Departmental Committee of the

Post Office, the Admiralty and the Board of Trade was held when the question of enforcing compulsion on ships in regard to wireless was discussed, and the conclusion arrived at was that the matter was premature. Mr. Buxton's attitude is one which is wholly in keeping with his wise statesmanship. He felt that it would have been a mistake in the early days of wireless to have had compulsion. In those days the system was still developing, and ship-owners would have had cause to complain if the Government had insisted upon their adopting a system of wireless without being able to show that they would be able to obtain an efficient and proper service. The position now is very considerably changed, as readers of this journal know. The Government, after very careful consideration and investigation of other so-called systems of wireless telegraphy, have embarked upon a great Imperial scheme of wireless communication which has been made possible by the work of Mr. Marconi.

The labour troubles which have disturbed the industries of this country during the past twelve months have naturally thrown a considerable burden of work upon the department over which Mr. Buxton presides, but whether in the House of Commons or in the committee room, Mr. Buxton has displayed a wonderful grasp of the problems, and has brought to bear upon their solution a clear mind and a conciliatory spirit. His work during the railway crisis last year will not be forgotten for many a long day, while in the more recent miners' strike, he, together with the Prime Minister and the other members of the Cabinet, took a great share in restoring peace. Mr. Buxton, while at the Post Office, was responsible for many important reforms, and he will live long in the grateful recollection of the Anglo-Saxon people for his introduction of penny postage to the United States of America and the Canadian magazine post. Mr. Buxton has written considerably on social and political questions. His "Handbook to Political Questions," which has run into nearly twelve editions, is a masterpiece, and his "Political Manual" runs it very close as a valuable work of reference. "Finance and Politics"; "An Historical Study, 1783-1885"; "Handbook to Death Duties"; "Mr. Gladstone as Chancellor of the Exchequer"; "The Fiscal Question," and other works have also come from his facile pen.

## The International Radio-Telegraphic Convention

**A**S announced in the May issue of *THE MARCONIGRAPH*, the International Radio-telegraphic Convention will open in London on June 4th, and will continue until July 2nd. All countries who have ratified the Berlin Convention will be represented at the gatherings in London, and the associated Marconi companies will be officially represented at the deliberations of the conference. The representatives of Marconi's Wireless Telegraph Co., Ltd., will be Mr. G. Marconi (Chairman), Mr. Godfrey C. Isaacs (Managing Director), and Mr. W. W. Bradfield (Manager). The meetings of the delegates will be private, and the main business will be the work of revising the Convention as it stands at present. The existing Convention deals only with wireless communication between ship and ship and between ship and shore. At the forthcoming conference resolutions are to be proposed urging the need of legislation for the regulation of wireless telegraphic correspondence with fixed points. According to a French report, among other questions to be discussed will be the organisation of a time service and the definition of aerial radiotelegraphic stations. The British Post Office have arranged a series of excursions and entertainments to render the visit of the delegates to this country as enjoyable as possible, and in the programme are included a visit to the new Marconi works at Chelmsford, and to the Marconi station at Poldhu.

The Postmaster-General announced, in the House of Commons on May 21st, that the following gentlemen had been appointed as British representatives at the forthcoming International Radiotelegraphic Convention :

Sir H. Babington Smith, K.C.B., C.S.I.  
Mr. E. W. Farnall.  
Mr. R. J. Mackay.  
Mr. F. W. Home.  
Commander F. G. Loring, R.N.  
Capt. E. F. B. Charlton, Ad.C., R.N.  
Commander W. R. W. Kettlewell, R.N.  
Lieut. John A. Slec, R.N.  
Lieut.-Col. J. M. W. Macdonogh.  
Major R. H. H. Boys, D.S.O.

Australia, Canada, India, New Zealand, and South Africa are sending special representatives. The interests of other British possessions will be looked after by the British delegates.

Canada will be represented by Mr. C. J. Desbarats, deputy minister of the Navy, and by Mr. C. P. Edwards, superintendent of wireless. These gentlemen will be able to report that wireless has made substantial progress in Canada.

France will be represented by several delegates, each of whom is to have a deliberative vote. The first and principal French delegate will represent the Mother Country, while others will represent French Indo-China, French West Africa, French Equatorial Africa, Madagascar, and Tunis. The importance which the French Government attaches to the Colonial interests of France as regards wireless telegraphy is marked by this special representation of French colonies at the conference. The French deputation will consist of M. Frouin, Chief of the Telegraphic Department, president of the deputation; M. Belugou, Chief of the Third Bureau of the Telegraphic Department; M. Poulaine, of the International Telegraph Service; M. Bouchillon, telegraphic engineer; Major Ferrie, of the Army Engineers; M. Lacombrade, Major Cartier, Captain Fossey, Lieutenant Paty du Clam, M. Duchêne, M. Morgot, M. Michel, and Captain Brenot. M. Lacombrade will act as secretary to the deputation.

It is understood that the Russian Government has appointed M. de Etter, Councillor of the Embassy in London, to be the chief delegate of Russia at the Convention. He will be assisted by eight delegates—Prof. Ossadtchü, Assistant Postmaster-General, and Col. Eulez and M. Sergevitch, of the Home Office; Col. Baron Vinecken and Lieut.-Col. Sokoltgow of the War Office, and Lieuts. Schmit, Dmitriew, and Stchnastnü of the Russian Imperial Navy.

Mr. Hugh Law, M.P., asked the Postmaster-General whether he was aware that the fishermen of Tory Island, Co. Donegal, have suffered loss in marketing their fish owing to the breakdown of the cable connecting the island with the mainland, and what steps are being taken to have the cable repaired.

Mr. Herbert Samuel replied: I am inquiring as to the advantages of substituting a wireless installation for the cable which is now broken down, and will inform the hon. member as soon as a decision has been arrived at.

## Questions in Parliament

SIR E. Cornwall asked the Postmaster-General, on April 30th, whether he was prepared to arrange for the public use of the Marconi wireless system between this country and America. Mr. Samuel replied that, on application from the Marconi Company, he had made arrangements to accept from the public, on and from May 1st, at all telegraph offices in the United Kingdom, telegrams addressed to places in Canada and the United States, for transmission by the company's wireless Transatlantic service. The company, he said, notified that the full rate for telegrams sent by their route to New York or Montreal would be 8d. a word, the rate for cablegrams being 1s. a word, and that there would be a similar reduction in the full rates for telegrams for other parts of America. For deferred telegrams in plain language the rate to New York would be 4d. a word, the cablegram rate being 6d., with corresponding reductions for other places.

\* \* \* \*

The Postmaster-General, Mr. Herbert Samuel, informed Sir C. Kinloch-Cooke, in the House of Commons on May 1st, that a conference of representatives of the Governments which have adhered to the International Radio-Telegraphic Convention would be held in London in June. This, he said, would afford an opportunity for discussing the best means of rendering more effective the service of wireless telegraphy for the purpose of saving life at sea. Mr. Samuel added that he was considering the best method of bringing the whole question before the conference.

\* \* \* \*

Mr. Douglas Hall asked, on May 6th, if the Postmaster-General would decline to grant any new licences to establish wireless telegraph ship stations or any extension of existing licences until after the Wreck Commission appointed to inquire into the loss of the "Titanic" had issued its report and recommendations unless a proviso was inserted that at least two competent Marconi operators were carried on each ship so licensed. Mr. Samuel said he was in communication with the Board of Trade on the matter. He fully realised its importance and urgency. Existing ship licences did not expire until December, 1912.

\* \* \* \*

Mr. Samuel informed Mr. Vincent Kennedy, on May 6th, that there were no official regulations covering the hours of duty of Marconi

operators. The conditions of employment were matters of arrangement between the company and the shipowners. No condition was imposed on Marconi's Wireless Telegraph Company necessitating a non-interceptible message service. Such a condition would be impracticable. All wireless telegraph installations on board British ships were capable of being used for inter-communications with other systems, and they are worked in accordance with licences issued by the Post Office. The Radio-Telegraph Convention did not provide for the compulsory interchange of messages between ships for other than distress purposes, and he understood that the Marconi Company declined to inter-communicate, except in cases of distress, with ships fitted with other systems, unless the matter had been arranged by agreement.

\* \* \* \*

Major Archer-Shee wanted to know whether the "Titanic" Court of Inquiry would have power to report, under Section 466 of the Merchant Shipping Act of 1894, on the culpability or otherwise of the Board of Trade itself in neglecting to issue any regulations whatever for the efficient conduct of wireless communication between passenger ships flying the British flag. Mr. Buxton, in reply, said that among the questions submitted to the Court was the question of wireless telegraphy, and the best method of dealing with the question of wireless, as applied to ships, was receiving very careful attention. He pointed out to the hon. member that there were existing rules and regulations which imposed regulations in regard to "wireless" on British ships, especially in regard to messages from ships in distress.

\* \* \* \*

On May 8th, Mr. Norton-Griffiths asked the Postmaster-General whether the legal advisers to the Crown had provided a clause in the contract now being considered with the Marconi Company by which the Government should not be precluded from taking up or controlling any other system of wireless telegraphy that might prove more efficient for long-distance transmission. Mr. Samuel pointed out that the contract with the Marconi Company would meet the contingency referred to by the hon. member. To the inquiry of Mr. Lynch, whether he would take into account experiments which were said to be carried on in other countries, Mr. Samuel replied that if the Government had to wait until wireless telegraphy had been absolutely perfected, the Imperial Wireless Scheme would never be established.



*Outside View of "Marconi House" from the Strand, showing the Main Entrance and Telegraph Office at left.*

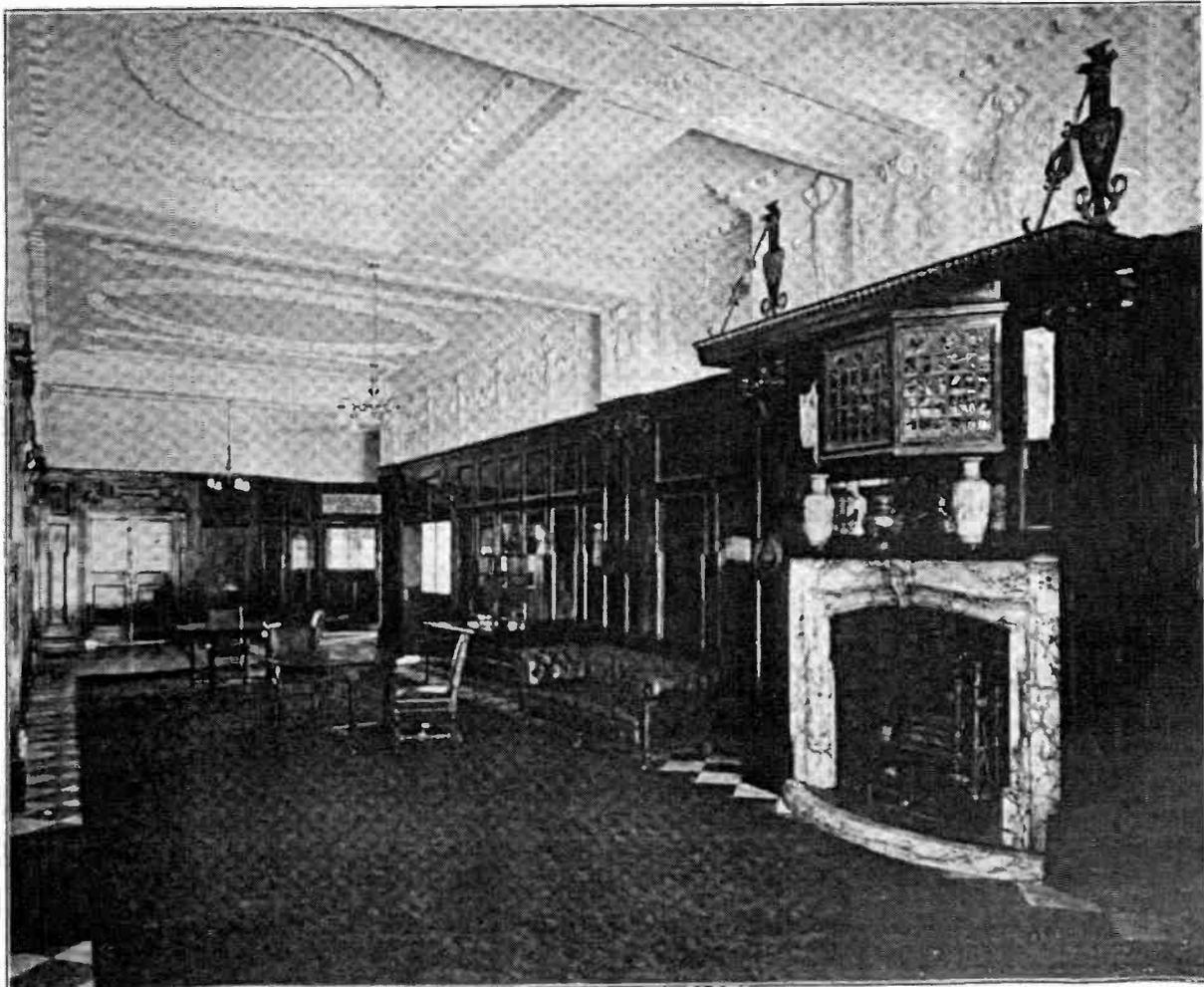
## The New Home of Wireless

### Opening of "Marconi House"

ON May 16th Marconi House was formally opened for business. The conversion of the building to suit the requirements of Marconi's Wireless Telegraph Co., Ltd., was done in exceptionally quick time. The company only came into possession on March 25th, and in well under two months a dismantled restaurant has become a handsome suite of business apartments. The actual area of the site is about 54,500 feet. The premises were formerly used as a restaurant and residential

flats, and an adjoining tavern has been converted into a telegraph office.

The premises now occupied by the company as their headquarters in London are in the Strand, and are bounded on the north by Aldwych. Forty-eight years ago the site near which Marconi House now stands commenced to be famous. It occurred to some syndicate that the main thoroughfare in London was in need of enlivenment, and the "Strand Musick Hall" was the immediate result. The new



*The Main Waiting Hall.*

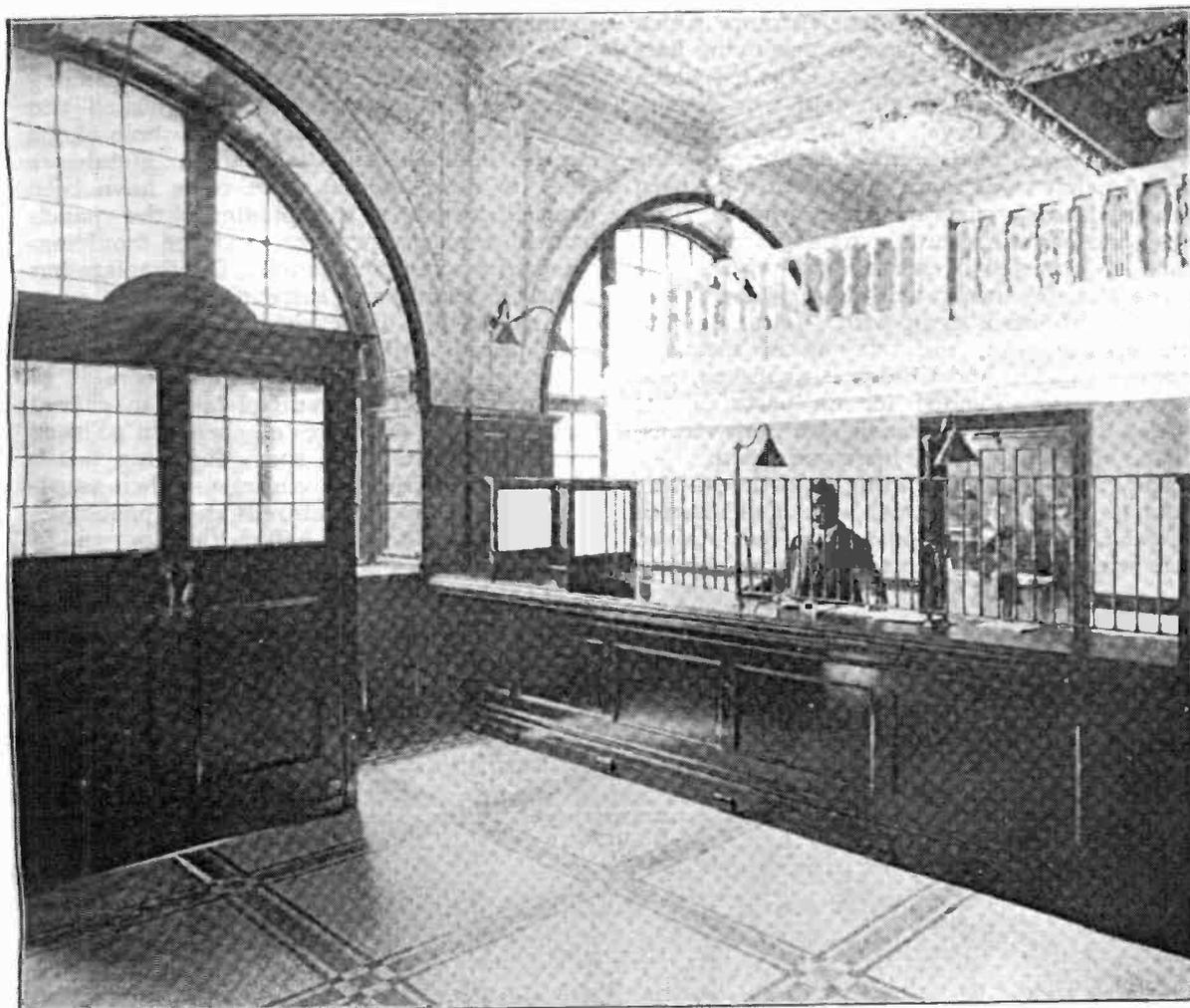
building nominally followed the style of Continental Gothic, and was declared by some to be a building of considerable beauty and tasteful construction. It opened with promenade concerts and a band of thirty-six performers. Signor Tito Mattei, pianist to the King of Italy, was one of the principals, and vocalists of international reputation were engaged to sing. The place, however, did not prosper, and it closed its doors on November 30th, 1866. Two years later it re-opened under new management, and before it closed in July, 1903, the once extolled playhouse had grown gradually out of date. Yet there was a sense of compactness and charm about the old Gaiety, which, like Aladdin's lamp, was finally changed for a new one. Of the company which performed in those days, Mr. Richard Barker, Mr. Joseph Eldred and Miss Nellie Farren are now dead. Other tender memories are Kate Vaughan and Fred Leslie.

In 1903 the New Gaiety Restaurant and

Hotel took the place of the old theatre, and this in turn has made way for the headquarters of one of the most important commercial undertakings of the century. The architectural features of the building have been retained. In exterior treatment the imposing massive proportions of the Florentine period of the Italian Renaissance were adopted, upon the suggestion of Mr. Norman Shaw, R.A. The bold masses thickly fenestrated and surmounted by the interesting carved frieze cannot fail to attract the attention of passers-by as being one of those restrained, yet dignified, efforts of a great artist in architecture. The artistic atmosphere of the whole design strikes one immediately on entering the main waiting hall near the entrance. This is panelled in the most beautiful fashion with Honduras mahogany, the fireplace being a great feature of the design. The frieze is a deep plaster cast setting, and the ceiling is richly ornamented. On the left-hand side of the hall is a small counter at which



*The Transfer Department (on the Ground Floor).*



*Public Telegraph Office (Strand Entrance).*

marconigrams can be received for transmission to all parts of the world. Next to that is a public telephone for the use of visitors waiting to keep appointments. The main lift is capable of carrying twelve passengers, excluding the lift attendant. On the right hand of the waiting room is a telephone exchange containing three switchboards, one fitted with 100 lines for the inter-communication system of telephones, and the other two being Post Office wires, each having five extra points and fifty extensions, making a total of ten extra lines and one hundred extensions. Past the telephone exchange is another set of large doors, which communicate with the Aldwych side of the building. These doors are used by the staff. On the same floor is a large room, 60 feet by 40 feet, which is used as the Transfer Department. This room is fitted with a Honduras mahogany counter, equipped with three solid bronze grilles, in which are received the share certificates,

vouchers, etc. All the desks in this office have been specially made by the Shannon Company. These are 6 feet long. The office is decorated in white, with a fine balcony running all round it, on which are employed about twenty dictaphone typists. From this balcony is an electric lift, communicating with each floor in the building, for the conveyance of dictaphone records. The whole of the electric light fittings in this room are of solid bronze, penny metal. In all, the staff employed in this room will be about twenty, so that, compared with the floor space, it will be seen that each man is provided with ample space. The postal room is situated at the end of this floor, and opens on to the street through a set of doors at which the mails are delivered. This room is also used as the central exchange for the Lamson pneumatic tube system, which is installed throughout the offices. Another large room has been reserved on the Aldwych front (which was originally known as the Dutch Bar) for

*Original from*

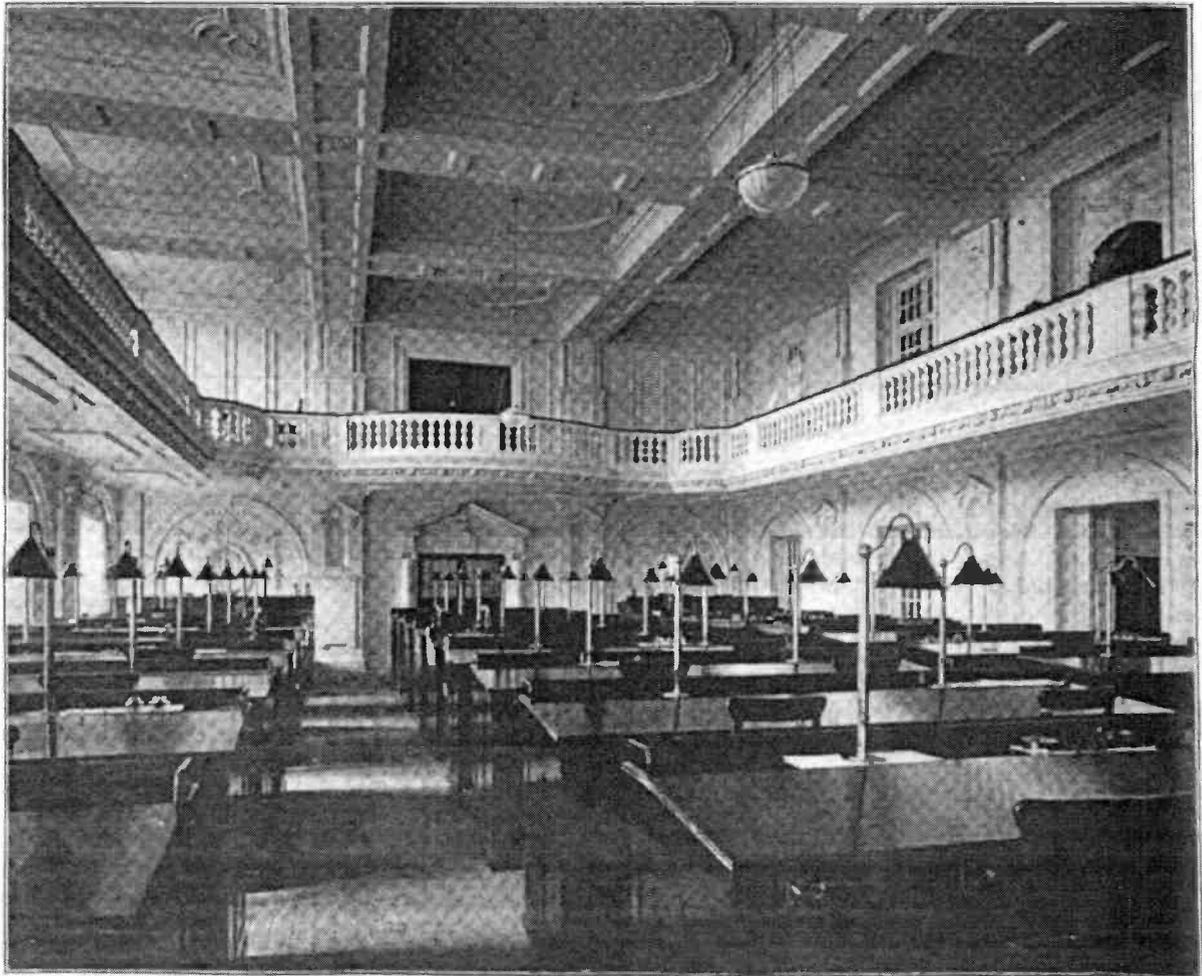
extension of the Traffic Department. On the Aldwych side there is another entrance which was originally used by persons occupying flats on the upper floors. Here is a large lift which is used by members of the staff who occupy offices on the Aldwych side of the building.

To the right of the main entrance off the Strand what was once a tavern has been converted into a telegraph office, which is open night and day to receive marconigrams. This office is connected by means of a private wire to the Marconi station at Clifden, where Transatlantic business is dealt with. As a result of this private wire, the relaying of messages between London and Clifden is abolished, and marconigrams intended for all parts of the United States and Canada are now transmitted at a considerably increased speed.

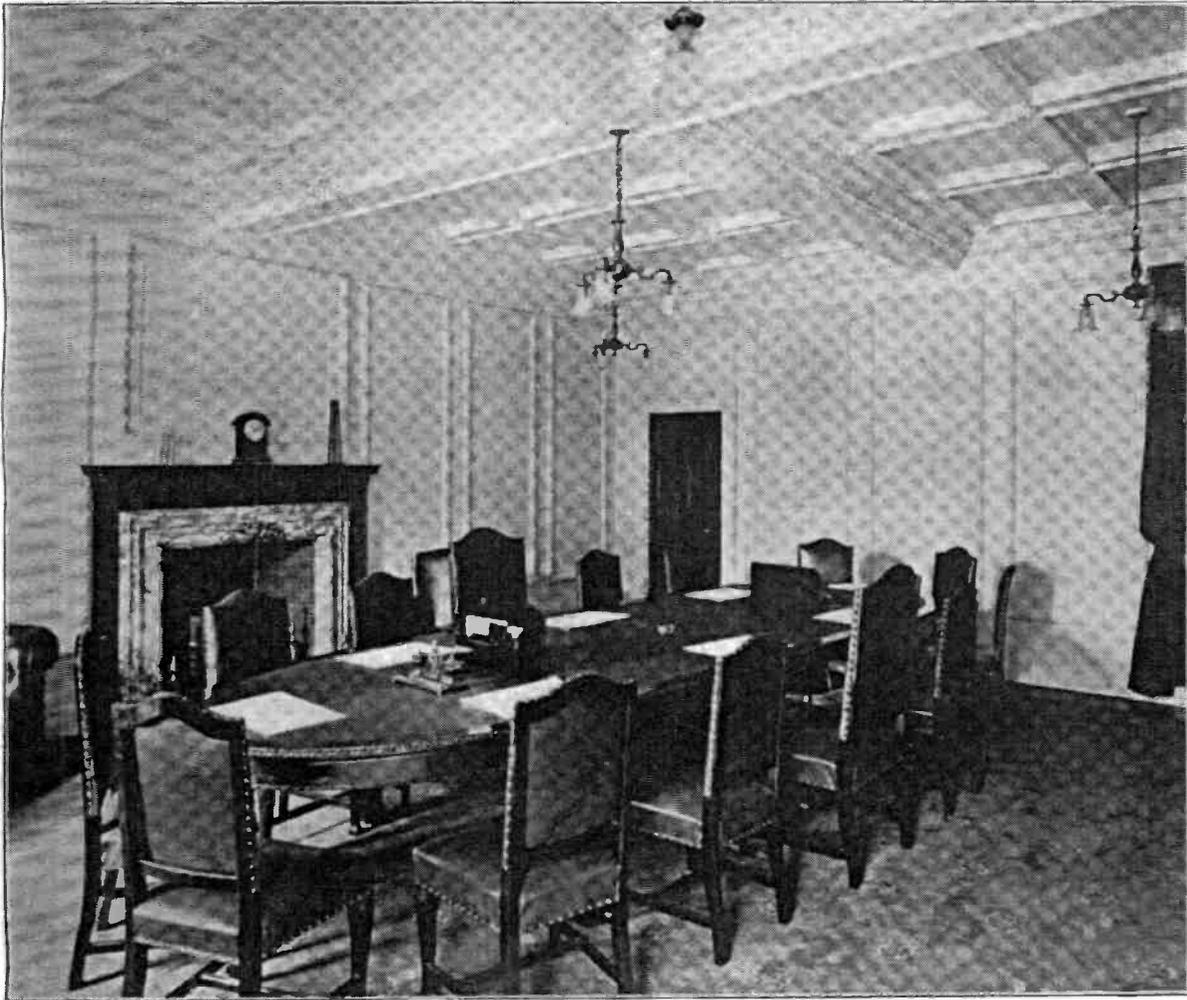
The grand staircase leading from the waiting room to all floors is 10 feet wide, and inserted on each landing are some very fine stained glass windows. The motto under the window

on the first landing is, "I'll put a girde round about the earth in forty minutes."

On the first floor is a large room overlooking the Strand, which is used by the managing director. This room has been furnished and decorated in the Adam style, the whole of the electric light fittings and other metalwork being in solid bronze. The walls have been panelled with rich mouldings, the panels painted a pale sage green, and the mouldings coloured a scrambled white. The fireplace has a marble hearth and surround, and the grate and cheeks are of polished steel with bronze enrichments. Adjoining this room is the manager's office, which has been decorated in similar style. The mantelpiece is in carved mahogany, and the grate and cheeks in polished steel and bronze. The room adjoining this is used by the private secretaries and their assistants. In this room is also situated a pneumatic tube station. The large hall on this floor will be used as another waiting room.



*Accountant's Office with Gallery used by Draughtsmen.*



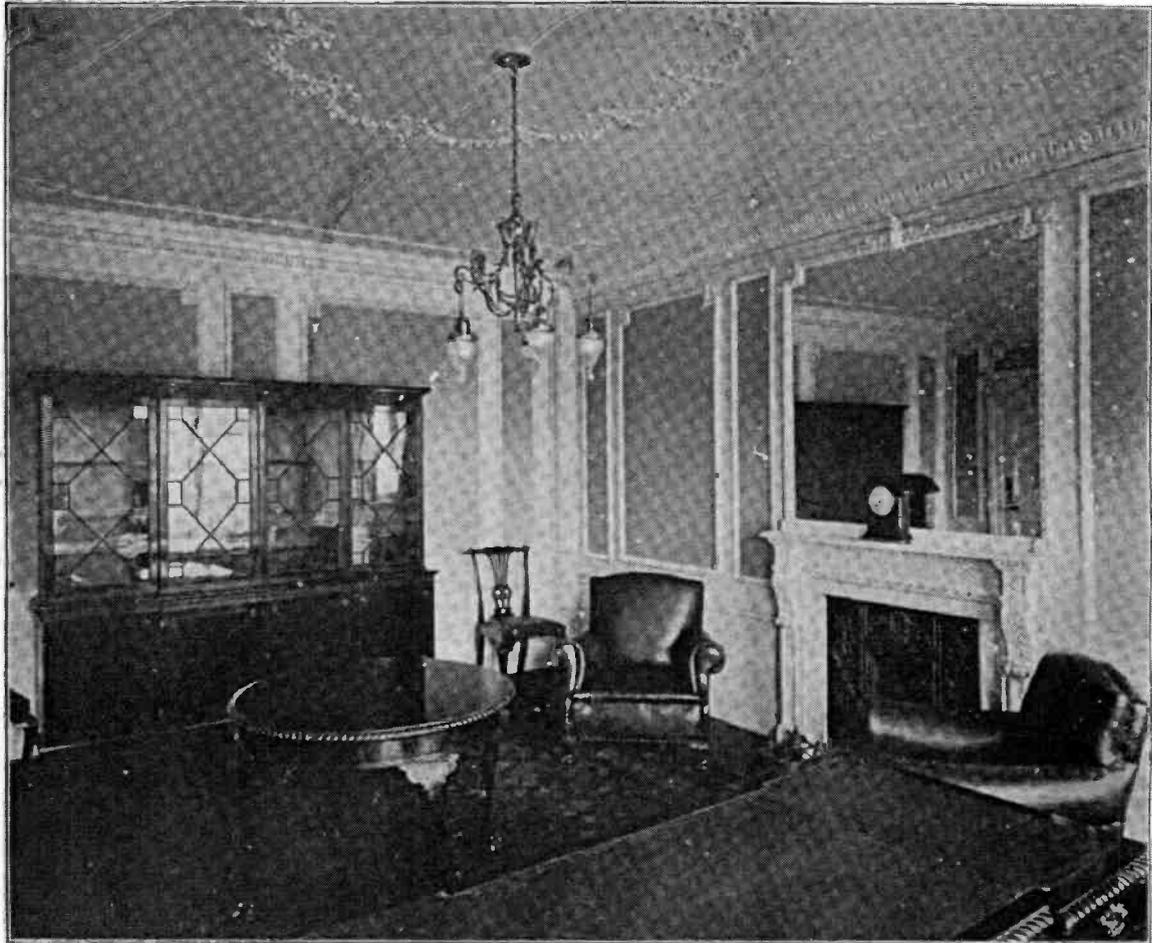
*The Board Room.*

Another flight of stairs leads to the second floor. On the right are the rooms occupied by the secretary, the assistant secretary, and their typists, and the Board Room.

The latter has been tastefully and skilfully decorated, an entirely new ceiling having been put in. This suite of rooms was originally the lower portion of the Masonic Temple, which had plaster columns and a domed roof. These have been cut out, and a new floor inserted. It is on the under side of this new floor that the Board-Room ceiling has been fixed. The electric light fittings here are also in solid bronze of a special design. To the left of the landing is the Accountant's Department, which is of similar dimensions to the Transfer Department—namely, 60 feet by 40 feet. This was formerly used as a ballroom, and was provided with a spring floor. To adapt the floor to its present requirements the springs have been wedged up and secured. A subsidiary stair-

case leads to another balcony, which is used by draughtsmen. The ceiling is domed, and highly enriched with fine plaster work. Thirty-two new desks, each 10 feet long, have been provided, giving accommodation for sixty-four clerks. At the back of this office are the store-rooms, lined with adjustable bookshelves, on which papers can be stored, and a large lift is installed, by means of which all books are conveyed to the strong room. Divided from this room by means of Honduras mahogany screens are the offices of the accountant, the assistant-accountant, the cashiers, and their typists.

On the third floor are the offices of the technical staff, consisting of the chief engineer, the assistant engineer, other engineers, and technical clerks. These rooms overlook the Strand, and are partitioned off by means of Honduras mahogany screens, and are situated on the new floor which has been inserted—this



*Mr. Marconi's Room.*

was formerly the upper portion of the Masonic Temple.

A very light room on the right-hand side of the large waiting room is used by the chief draughtsman and drawing-office staff.

On the fourth floor the offices facing the Strand are occupied by Mr. Marconi, Mr. Marconi's private secretary, and the Patent Department. The other rooms on this floor have been allotted to the Field Station Department, THE MARCONIGRAPH, the Publicity Department, and the Stationery Department, while the rooms overlooking the Aldwych side have been apportioned to first-class engineers, foreign agents, auditors, etc.

The fifth floor is occupied by the traffic manager and his staff. These offices lead up to the Ship Fitting Department, the chart room, operators' and inspectors' waiting rooms, etc.

A portion of the sixth floor has been reserved for the use of the housekeeper.

On the seventh floor there will be a large

workshop and a room in which drawing-office tracings will be printed, also a dark room for photographic work, a drawing office, four large show rooms where working sets can be demonstrated, and all types of storage. An aerial system will eventually be placed on the roof for demonstration purposes. Other rooms on this floor are being equipped as a training school for operators.

The heating apparatus employed in the building consists of two boilers, each 11 feet by 6 feet diameter, which are used for heating and driving pumps. The heating system is a low-pressure one of 5 lb. per square inch. Three pumps are used for pumping surface water and return condensation water to boilers. Originally the boilers were fed directly off the mains, and in the course of reconstruction four bushel baskets of sand were removed. Under the system now adopted the same water is used over and over again, thus obviating the consequent collection of sand. The sewage pumps are merely used for waste and surface

water which collects in the cesspools. The electrical mains enter in one of the vaults under the Strand, the current feeding these mains being supplied by the Charing Cross Electric Light Company. The current comes in at 200 volts D.C., and at this voltage it supplies the whole of the lighting throughout the building. The wiring is in parallel, and in addition there is a separate circuit, known as "police lighting," which allows the main lighting to be shut off, and to leave a scattered circuit about the place, giving the necessary amount of light for a night watchman. The main fuses are 150 amps, and the remainder of the lighting is on distribution boards running from small fuses averaging from 5 to 10 amps. Two electric signs ("Marconi House") are run off the basement lighting. The lifts and sewage pumps are operated by electric motors. The inter-communication telephones, of which there are nearly 100 extensions, have been supplied by Messrs. W. G. Hodgson & Co., who have also carried out the installation of electric bells and fire alarms. Twenty-four fire hydrants are distributed about the building, and a large gong is placed at each hydrant. A day and night fireman will be in attendance. The architects were Messrs. Dunn & Watson, of Lincoln's Inn Fields; and the surveyors, Messrs. T. M. Deacon, Son & Addiscott, of 32 Craven Street, Charing Cross, London. The builders were Messrs. Trollope & Colls, who have carried out the whole of the alterations and made all the joinery and mahogany screens, including the accountants' desks, within record time. The Shannon Co., Ltd., supplied the desks for the Traffic Department. The lifts are by Messrs. Waygood & Company, and have been thoroughly overhauled and improved. Messrs. F. Geere Howard, of Berners Street, have carried out the electric lighting work, and the signs are by the Electrical Name & Numerical Sign Co., Ltd. The furnishing was carried out by Messrs. Hampton & Sons, Ltd., and Maple & Co. Magneta clocks have been installed in each room.

About nine miles of wire was used in connection with the telephone extensions, and four miles for the bells and indicators. The fire alarms required about two miles of wire; 4½ tons of white lead were used in the building, and 120 gallons of Rippolin. The number of men employed on the job averaged 450. About ten weeks ago the company were in negotiation with the London County Council for the acquisition of the premises, so that the work of adapting the premises to their present needs has been carried out in a wonderfully short time. Another point to be remembered is that the removal from the old premises took place without any interruption in the work of the staff.

## Safety at Sea

### A German Conference

A CONFERENCE of shipowners was held in Berlin on May 6th in order to discuss means for ensuring safety at sea. The Minister of the Interior, Herr Delbruck, who presided, made a short introductory speech, in which he said that the object was not so much to take final decisions as to refer, after discussion, some or all of the five subjects in question to a special committee which would work out the suggestions for international discussion. Each of the five subjects was then discussed upon the basis of the reports drawn up at the preliminary conference between the Seeberufsgenossenschaft (Marine Association) and the principal German shipping lines or on the basis of the regulations of the Seeberufsgenossenschaft, or of the Maritime Code. The first two subjects—security against sinking of damaged steamers and the provision of boats—were referred to special committees, which will prepare suggestions dealing respectively—first, with the question of watertight compartments, pumping, and kindred subjects; secondly, with the size of boats, their portability, capacity, and so on.

Regarding the third subject—wireless telegraphy—a number of recommendations were made in the report from the preliminary conference:

First, that the receiving apparatus on board ship should be watched day and night, so that any message from a ship in distress might be taken by all ships within her radius.

Secondly, that all steamers should be ready to receive signals from ships requiring help, even when they are engaged in communication with the land.

Thirdly, that of all telegraphic communications by sea wireless signals of distress should have precedence.

Fourthly, that means should be considered to secure the continued generation of electric power to the apparatus even when the main battery should be under water or out of order.

Lastly, that as far as possible spare instruments should be carried as substitutes for wireless appliances which might be damaged or destroyed.

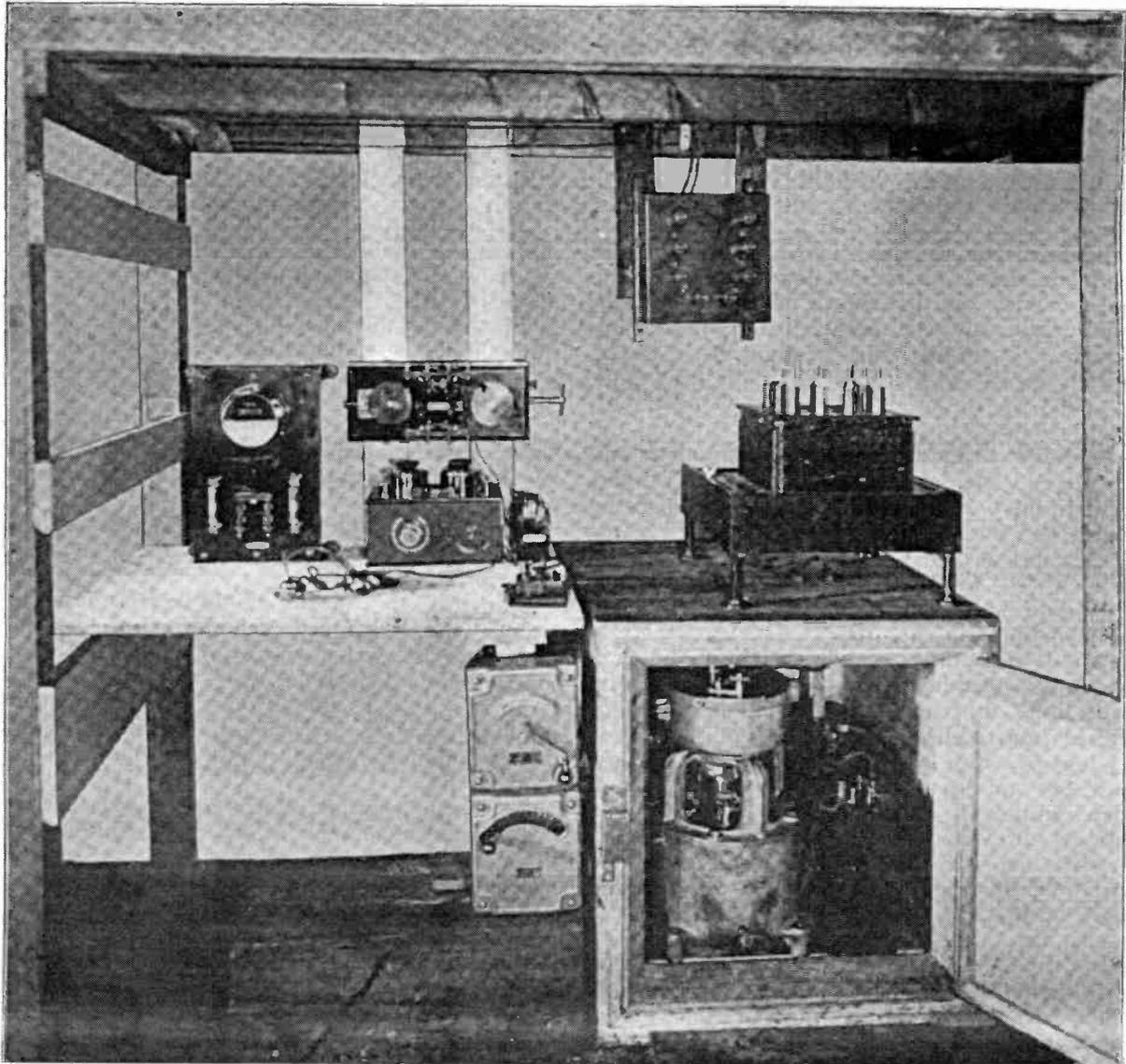
A special committee was appointed to consider these recommendations. The subjects of "ice reporting" and steamer routes were both referred to this wireless telegraphy committee, which will be assisted in these subjects by nautical experts. It is observed that before the committees submit their reports the official English inquiry on the "Titanic" disaster will probably have been completed and provide fresh material for discussion.

## New Apparatus for Cargo Vessels

½-k.w. Marconi Set

**T**HE manifold advantages of wireless telegraphy in connection with shipping have already been demonstrated in a variety of ways; in some cases wireless telegraphy has been instrumental in saving numbers of lives, and in others of large amounts of valuable property. It has already been applied to all general purposes in connection with the larger classes of steamships. The labour upheaval which took place in this country

some months ago, and in which shipping was so largely concerned, pointed to another useful purpose to which wireless telegraphy might be applied [if all classes and sizes of vessels were fitted with the apparatus. No doubt there have been many cases during shipping strike troubles at our large ports when considerable time and expense might have been saved to shipowners and merchants by the diverting of vessels from one port to another,



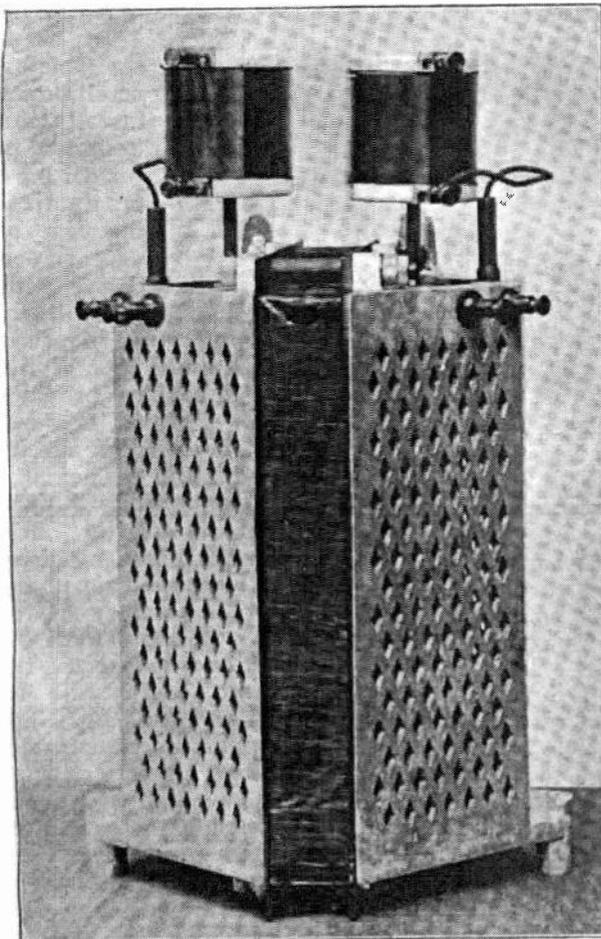
had it been possible to communicate with the vessels in time. This would apply more particularly to the cargo liner and the tramp steamer. Take as an instance the situation in Liverpool last August. Owing to the labour troubles at that port there was no possibility of vessels getting discharged for some time. Those which were carrying perishable cargo might have had a chance of being discharged in some other port, so that there would certainly

the owners are enabled to communicate with the commander by means of wireless telegraphy.

These are only two striking instances of the great commercial advantages of equipping cargo boats with wireless telegraphy. With regard to humanitarian considerations, it is scarcely necessary to emphasize these in view of recent happenings, but it might be as well to recall certain instances where either life or property, or both, lost at sea might have been saved had the vessels which met with disaster been equipped with wireless apparatus.

In the case of the "Loodiana," this ship was overdue for a considerable period, and absolutely no knowledge of her whereabouts was obtainable. Had the vessel been fitted with wireless, there is no doubt that some communication would have been received, thereby informing the world at large what had happened to her. Not so long ago the new ship "Abhona" left the builders' hands at Glasgow a fine ship fitted with every up-to-date appliance—excepting wireless. The vessel never passed Gibraltar, and it is presumed that she foundered somewhere in the Bay of Biscay, certainly within range of some of the numerous wireless telegraph land or ship stations in the locality. There is also the case of the "Parisiana," which was burnt at sea. It is said that if that vessel had been able to summon assistance during the early part of the conflagration, more men would have been available for extinguishing the fire, and the survivors who landed in boats on either St. Paul's or Amsterdam Islands would have been spared the terrible sufferings they had to endure for many a long day before they were succoured.

The wreck of the "Kurdistan" and the loss of all hands on board, with the exception of two, within a few miles of the Scilly Islands, is still fresh in the memory. From the evidence given at the Board of Trade inquiry it is certainly clear that had timely help been available the ship might have been saved; at any rate, the entire crew would have been rescued, and the survivors would not have had to endure their long and terrible experiences in an open boat had it been possible to summon aid by means of wireless telegraphy. The case of the "St. Leonards" affords another striking instance where wireless telegraphy would have meant the saving of the vessel, but unfortunately, being a cargo steamer, she was not so equipped. This ship lost her propeller in the Atlantic and signalled a French steamer, which was unable to tow her as she carried mails. There were many other ships in the immediate vicinity of the "St. Leonards" which would have been willing and able to tow her to port, but it was impossible to get into



Transformer,  $\frac{1}{2}$  k.w. with Choke Coils mounted on top.

be a great advantage and saving of money if those vessels could have been communicated with by wireless on their approaching the Channel, and instructions given to the captains to proceed to another port. Let us also consider the case of a vessel carrying a cargo of wheat. The cargo may change hands several times between the departure of the vessel from the United States and its arrival at the port of destination in this country. It eventually might be better for the vessel to put in, say, at Cardiff instead of at Hull, or *vice versa*; but an alteration in the course is only possible if

communication with other vessels in the neighbourhood. The "St. Leonards" drifted for a period of twenty days, during the latter part of which she was within 100 miles of the Azores, when she had to be abandoned.

These are only a few examples showing how cargo vessels which have come to grief on the

designing such a set has engaged the attention of Marconi's Wireless Telegraph Co., Ltd., who have just evolved a  $\frac{1}{4}$ -kw. set, which is specially adapted to the requirements of cargo vessels, and in view of the likelihood of the Governments of the world insisting upon the vessels sailing under their flags or entering their ports being equipped with wireless telegraphy it is important to note that a suitable set is now obtainable.

The apparatus referred to is known as the

**M a r c o n i**  
 $\frac{1}{4}$ -kw. cargo  
set. This is a  
small power  
installation  
designed to  
produce  
transmitt-  
ing waves of  
250 and 600

meters, or any intermediate wave with a simple change-over from one to any other. The working transmitting range depends upon the height, length and shape of the aerial. The receiving apparatus provides for tuned reception of all waves between 250 and 1,600 meters. The working receiving range is also dependent on the aerial.

The transmitting plant consists of a rotary converter with its starter, field regulator, and guard lamps driven by direct current from the ship's mains and supplying alternating current to the primary of the potential transformer. In series with the primary of this transformer is inserted the low frequency air core, adjustable inductance and the manipulating key. The secondary coil of the potential transformer is connected through two air core choking coils with the primary high frequency circuit. The primary coil of the oscillation transformer is connected in series with the transmitting condenser and disc discharger, one end of the primary coil being connected to one terminal of the condenser and the other to one of the electrodes of the disc discharger. The secondary of the oscillation transformer is connected at one end to an aerial, through an adjustable inductance, and an insulated lead in, passing through the roof or side of the operating cabin. The other end of the secondary connects to the top plate of an arrester earth spark-gap, the bottom plate of the

spark-gap being connected to the earth bolts which are fastened to the plates of the iron shell of the ship. The receiving apparatus is connected across the arrester earth spark-gap, an arrangement which enables the receiving operator at a corresponding station to "break in" on the transmission in the event of



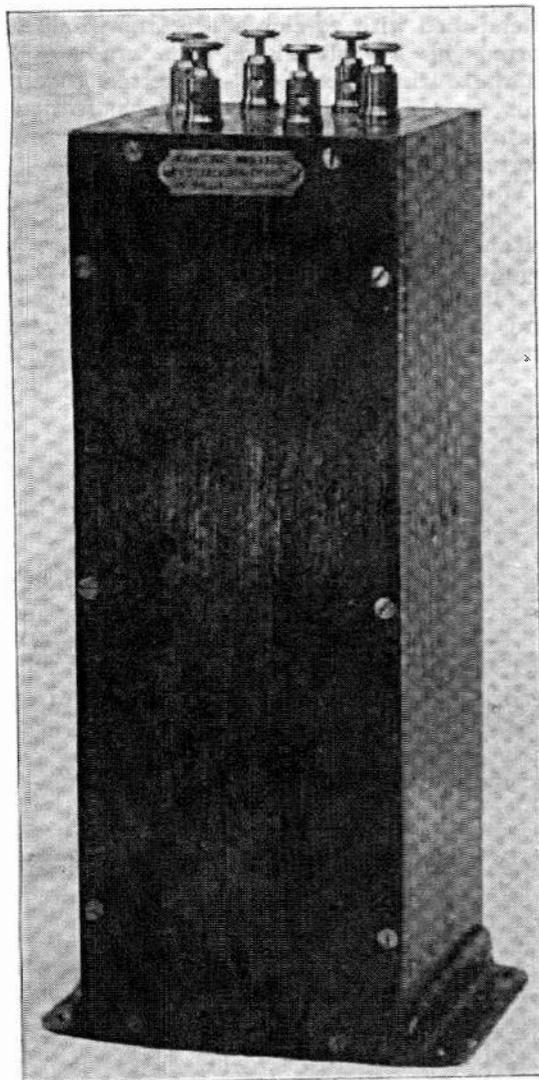
$\frac{1}{4}$  k.w. Converter with Disc Discharger.

open sea might have been saved had they been equipped with apparatus for wireless telegraphy.

The excuse for not equipping cargo boats earlier, has been the absence of a sufficiently small, compact, and efficient set which would be suitable in cases where the standard ship equipments are too large. The problem of

erroneous reception, and thus avoid waste of time.

The rotary converter gives an alternating current output of  $\frac{1}{2}$  k.w. It is of the vertical



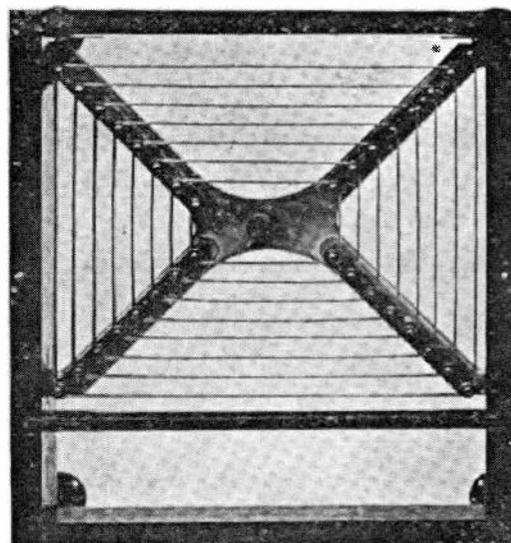
*Low Frequency Inductance.*

type, and occupies a minimum of floor space. The armature is of a special design, and differs from the ordinary converter by giving at the slip rings a constant alternating current voltage independent of the direct current input voltage. The machine is designed to suit the direct supply available on the ship. It has eight poles, and runs at 2,250 revolutions per minute, thus giving a spark frequency of 300 per second.

The discharger box is made of aluminium, and is fitted on top of the converter, and contains an eight-stud disc, which is carried on

the armature shaft by an insulating bush. The top of the box is made of ebonite, and carries the two electrodes. These electrodes are designed to be independently adjusted, and both electrodes can be moved so as to regulate the time of the spark discharge in relation to the alternator. A scale of 180 degrees is fixed on top of the box discharger. The phase displacement is shown by an index mark on the ebonite disc carrying the electrodes. When this index mark is at  $0^\circ$  on the scale, the discharge will take place at the moment of maximum volts on the alternator; at  $10^\circ$  lag, the discharge will take place  $10^\circ$  after the alternator has reached its maximum voltage; and so on. A small fan is fitted on the shaft at the bottom of the box discharger, and this carries away the gases formed by the discharge. The switchboard consists of a black enamelled slate mounted on a cast-iron frame and fitted with an ammeter of the spring controlled type, a double-pull switch, and two single-pull fuses, and is inserted between the alternating current side of the converter and the primary of the potential transformer.

The low frequency primary inductance consists of several layers of No. 14 D.C.C. copper wire wound on an ebonite tube. Tappings are made at various points, and connections made to the terminals mounted on the top of the box. The function of the low frequency



*Primary of Transmitting Jigger showing bare Strip Winding.*

primary inductance is to regulate the power and assist in tuning the circuit.

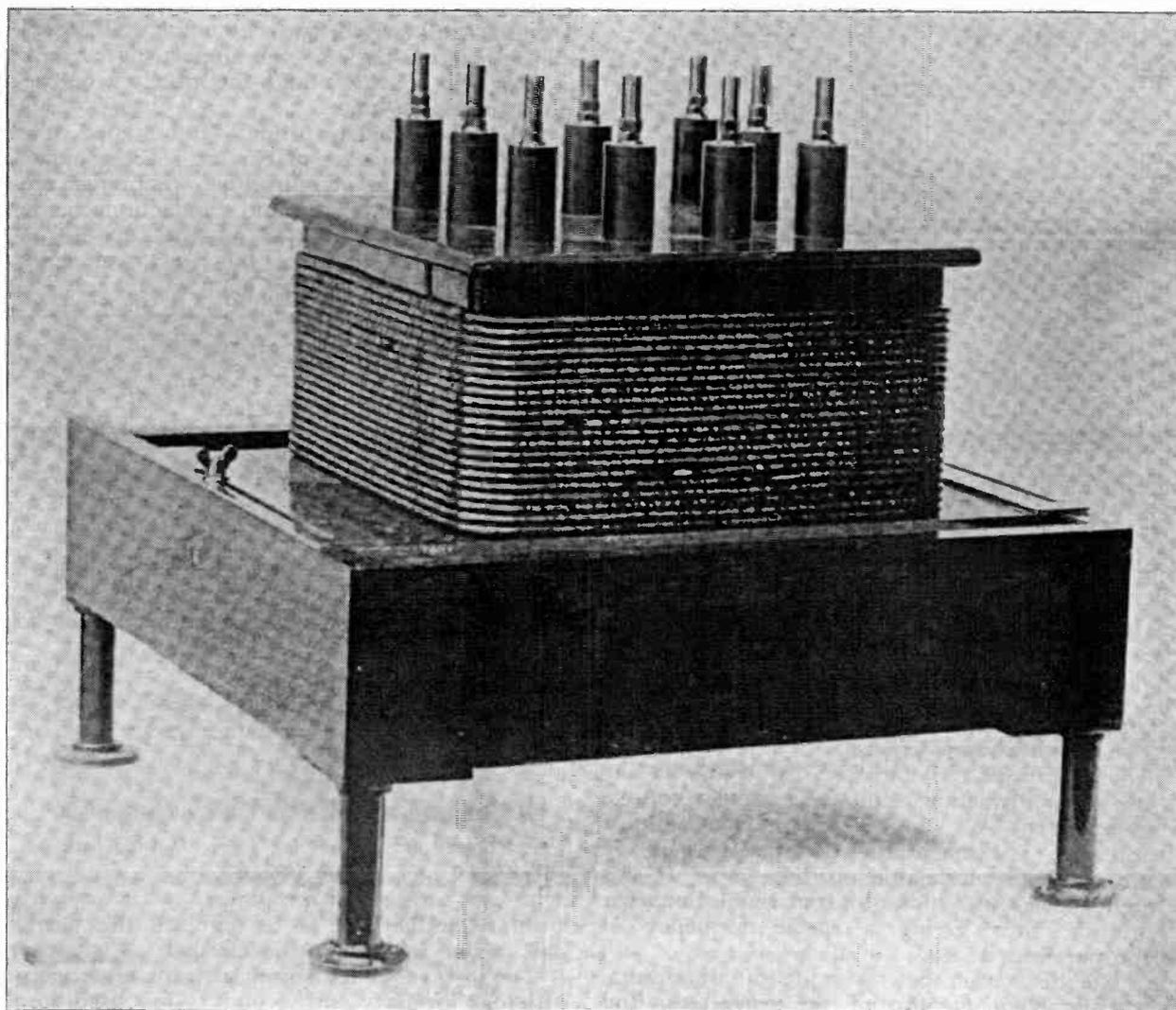
The low frequency potential transformer consists of a primary and secondary mounted on a closed laminated iron core, the complete trans-

former being enclosed in an aluminium frame. Being of the vertical type, it requires a very small amount of floor space. The ratio is about 95 to 1. The high frequency and air-core chokes consist of a number of turns of enamelled wire wound on porcelain bobbins and mounted on top of the potential transformer. They are inserted in the high tension circuit to prevent any rush of high frequency current into the transformer secondary.

The variable coupling oscillation transformer is of the air-core type, a sheet of ebonite  $\frac{1}{8}$  inch thick separating the primary coil from the secondary. The primary consists of about seven turns of copper strip mounted on ebonite; the secondary consists of twenty turns of stranded copper wire wound on a wooden former about 12 inches square. This secondary coil slides over the primary coil, and by this

means a coupling between the wave-generating and the wave-radiating circuit is varied. Connection to the primary is made by means of easily detachable spring clips, which provide a ready method of altering the wave-length. The transmitting condenser consists of 34 glass plates interspaced with 17 zinc sheets, the whole supported in a galvanised iron cradle. The alternate zinc sheets are connected together, thus forming two sections. Each section is connected to an insulated terminal on top of the teak, lead-lined container.

The two protecting lamps supplied are of the single straight filament carbon type suitable for the voltage of the converter, and mounted between spring clips on a board. One lamp is connected as a shunt to the armature, and the other to the field of the converter. These lamps protect the converter from the



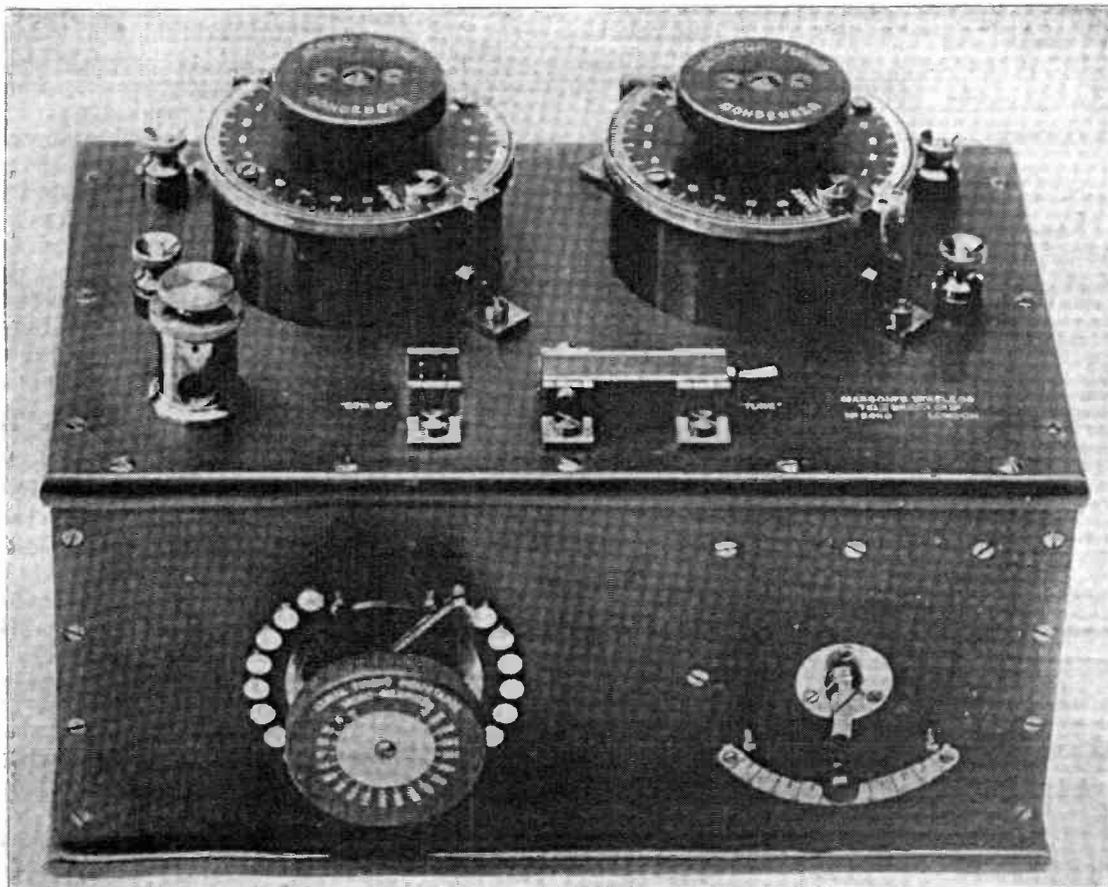
*Transmitting Jigger complete.*

injurious effects of any high frequency currents which may be generated in the primary circuit by providing an alternative non-inductive path for them across the machine. The manipulating key is designed for fast sending, and is fitted with a side lever, which provides a ready method at the hand of the operator for breaking the primary circuit in an emergency. There are three terminals, which have their connections marked on them. In addition, there are two other terminals, which connect to the telephone terminals of the magnetic detector. These are mounted on the end of two insulated spring clips carrying contacts. The contacts touch when the key is depressed, and so short-circuit the telephone and prevent it responding to impulses from the transmitting plant. The receiving circuit is always connected to the aerial, so that when the key is up signals can at once be received, and the operator interrupted in the middle of the message if necessary. The front and back upper contacts of the key and the upper telephone short-circuiting contact are adjustable. The transmitting gear, with the exception of the oscillating transformer, the starter, the regulator, and

manipulating key, are enclosed in a sound-proof cabinet. The complete transmitting apparatus is mounted on a wooden base, which slides into the cabinet and provides an easy and efficient means for inspection and repairs.

In order to maintain communication with the Mawson expedition to the Antarctic regions, arrangements are being made for the erection of an intermediate wireless station on Macquarie Island, 600 miles south of Hobart.

In accordance with the proposals of M. Millerand, Minister of War, the Army Committee of the French Chamber has drawn up a scheme for the organisation of a military telegraphy service. A regiment of 12 companies, each company consisting of 112 men, is to be stationed in Paris, with the addition of 220 engineers for wireless telegraphy. In North Africa provision is made for two companies of ordinary telegraphists and one of wireless,



*Multiple Tuner for 1/2 k.w. Set.*



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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.

## CONTENTS

	PAGE
Wireless Telegraphy in Spain ... ..	61
Portrait and Biography—	
The Rt. Hon. Sydney Buxton, M.P. ... ..	62, 69
The International Radio-Telegraphic Convention ... ..	70
Questions in Parliament ... ..	71
The New Home of Wireless ... ..	73-79
Safety at Sea ... ..	79
New Apparatus for Cargo Vessels ... ..	80-85
The Share Market ... ..	85
An Appeal ... ..	86
Honouring the Memory of Mr. Phillips ... ..	87
Company Meetings ... ..	87, 88
Mr. Marconi on Future Developments ... ..	89, 90
Clearing the Air ... ..	90
Maritime Wireless Telegraphy ... ..	93
The New Marconi Works at Chelmsford ... ..	94, 95
Wireless for Aeroplanes ... ..	96, 99
Aid by Wireless ... ..	99
The "Titanic" Inquiry ... ..	100-106
Obituary ... ..	109
The Athletic Clubs ... ..	109
Personal ... ..	109
Movements of Operators and Engineers ... ..	110

**BINDING CASES** for "The Marconigraph," Vol. I., are now on sale, price 1/6 each post free. Applications with remittance to be made to The Publisher, Marconi House, Strand, London, W.C.

**PORTRAIT OF MR. PHILLIPS.** The Publisher begs to announce that he has arranged to supply portraits of the heroic Marconi Officer who lost his life as a result of the "Titanic" disaster at the following prices: Cabinet size, 1/9 each; Enlargements, 10 in. by 8 in., 13/-; 12 in. by 10 in., 14/-; 15 in. by 12 in., 17/6 post free. The portrait is by Miss J. Stedman of Farncombe, and is the same as that from which the illustration in the May number of THE MARCONIGRAPH was made.

### The Share Market

Since our last issue attention in the Industrial section has again been chiefly given to the shares of the various Marconi Companies. Some severe fluctuations have taken place during the last month, brought about by over-speculation in various Industrial shares, in which the shares of the Marconi issues suffered severely. The ordinary shares fell at one time as low as 5 on the severe liquidation of weak accounts and the failure of several brokers, which caused more stock to be thrown on a very sensitive market. The result of this severe liquidation combined with the continued public demand from the small investors has left the market in a much healthier position. Some of the large blocks of American shares which were purchased at their introduction on the London market were realised by weak holders and have passed into the hands of investors, who will no doubt at no distant period be pleased at the bargains they have secured. The prices on May 25th were: Ordinary, 5½; Preference, 5½; New, 3½; Canadian, 24½; Spanish, 1½; American, 1½.

### An Appeal

ON the two occasions when we have appealed to telegraph operators and engineers to contribute towards a fund for the benefit of those dependent upon one of their colleagues cut off from life at an early age, the response has been gratifying in the extreme. It is our sad duty to make a further call upon the generosity of those employed in the service on behalf of a most deserving case. As announced in our obituary columns, Mr. R. O'Driscoll, who was the operator in charge of the high-power Transatlantic station at Clifden, passed away at the comparatively early age of 35, leaving behind him a widow and three young children totally unprovided for. His end came with tragic suddenness, for before entering the Galway Hospital the deceased appeared to enjoy the best of health. Perhaps his genial and generous character helped to conceal even from those nearest to him the approach of his fatal illness; at all events, his death was totally unexpected. In appealing for help for those who have suddenly been bereft of their breadwinner, we feel that we can rely upon a generous response from our thousands of readers of all classes scattered over the whole of the globe. Contributions should be sent to the Editor, THE MARCONIGRAPH, Marconi House, Strand, London, W.C., and all amounts received will be acknowledged in these columns in due course.

## Honouring the Memory of Mr. Phillips

NUMEROUS expressions of sympathy have been received by the parents and relatives of the late Mr. Phillips, the heroic Marconi operator on board the "Titanic." The following are extracts from some of the letters and telegrams which have reached us:

"The Electro-Technical section of the Imperial Russian Technical Society begs to transmit to the family of Mr. Phillips, the heroic wireless operator, their heartiest sympathy and their deepest admiration for his brave deed.—(Signed) N. ПОПОВ." "

The London section of the Postal Telegraph Clerks Association passed the following resolution:

"That the London Branch of the Postal Telegraph Clerks Association expresses its admiration of the splendid conduct displayed by the wireless operators engaged upon the ill-fated 'Titanic,' and also expresses deep sympathy with the relatives and friends of the late Mr. Phillips."

The Union of German Wireless Telegraph Operators sent the following to the Marconi Company:

"The Union of German Wireless Operators begs to bring its sincerest condolence on result of the death of Mr. Phillips in fulfilment of his duty, and request your company to inform us whether Mr. Phillips was married or single."

The Danish Telegraph Union of Copenhagen sent the following:

"The Committee of the Danish Telegraph Union beg to express their sincerest condolences with the relatives of the late Mr. Phillips, the first Marconi officer on board the 'Titanic,' and they wish to express their admiration for the heroism displayed by Mr. Phillips, and their delight and pride to number such a man among their colleagues.—(Signed) F. C. MOLLER."

Señor Sagasta, the Director-General of Posts and Telegraphs of Spain, has, in the name of the whole of the telegraph staff of the country, addressed to the International Bureau at Berne an offer to co-operate with other countries in steps to be taken "to perpetuate the memory of the operator Phillips who met a noble death in the fulfilment of his duty." Our contemporary, the *Telegrafista Español*, of Madrid, heartily applauds the action of Señor Sagasta, and announces that the Spanish telegraphists have decided to honour the memory of their valorous fellow-operator by placing an enlarged portrait of Mr. Phillips in the instrument room of the central Post Office in Madrid.

## Company Meetings

### Spanish and General Wireless Trust

THE statutory meeting of the Spanish and General Wireless Trust, Ltd., was held on May 9th at the Whitehall Rooms, Hôtel Métropole, Mr. Godfrey Charles Isaacs, the managing director, presiding.

The report of the directors showed that the total number of shares allotted was 249,007, of which 247,000 shares had been allotted as fully paid up in consideration of 12,350 Bearer shares of 500 pesetas each in La Compañía Nacional de Telegrafía sin Hilos, and the remaining 2,007 shares had been allotted for cash and were fully paid up. The receipts and payments of the company on capital account to April 25th, 1912, were as follows: Receipts—£1 per share paid on 2,007 shares of £1 each, £2,007; transfer fees and other receipts, £90 8s; total, £2,097 8s. Payments—Preliminary expenses, £918; sundry expenses, £37 2s. 9d.; cash in hand, £1 8s. 7d.; cash at bankers, £1,140 16s. 8d.

The Chairman said: Gentlemen,—This is a statutory meeting held in compliance with section 65 of the Companies Consolidation Act of 1908, the object of which is to furnish you with full particulars of the financial position of the company, and the report of the directors which has been sent to you complies fully with the requirements of that Act.

From that report shareholders will have learned that of the 249,007 shares allotted 247,000 have been allotted in payment of 12,350 Bearer shares of 500 pesetas each in La Compañía Nacional de Telegrafía sin Hilos. That is the extent of the company's business transactions to date. I make this statement because there have been a number of unauthorised rumours and reports as to other important business which the company was transacting, and I would ask shareholders to pay no heed whatsoever to any rumours or unauthorised statements, but that they should rely confidently upon the company always giving them at the earliest possible moment official intimation of anything which may be of importance to them, whether it be favourable or unfavourable, and if it be not in the form of a circular it will be by an authorised statement in the Press. This applies not only to this company, but to all those companies with which the name of Marconi is associated. I have nothing more to add now in respect of this company's business, except that there is a probability in the near future of the directors considering the increase of the company's capital with a view to their holding shares in certain other of the companies in which the parent Marconi Company has large interests.

The shareholders, however, would like to

know something of the business of the *Compañia Nacional de Telegrafia sin Hilos*, in which this company has so large a shareholding. The *Compañia Nacional de Telegrafia sin Hilos* was formed in Spain under Spanish laws in December, 1910. Its object was to secure the Marconi rights for Spain and Spanish colonies, and to erect a number of high-power and ship stations under a concession which it had secured from the Spanish Government. A contract was entered into between *La Compañia Nacional de Telegrafia sin Hilos* and the Marconi Wireless Telegraph Company for the erection of these stations. The first of them were erected in Tenerife and Las Palmas, in the Canary Islands, Cadiz, Vigo, Barcelona, and Soller, on the Island of Majorca. The last was completed at Aranjuez (Madrid), and its opening was inaugurated by the King of Spain.

All these stations are now at work communicating between the shore and ships at sea, and are ready for the conduct of an international telegraph service. A considerable business is being done between Spain and the Canary Islands; the cable system having broken down, the wireless telegraph stations are conducting the whole service. So soon as the war in Tripoli will be at an end arrangements will be made to open up the service between Spain and Italy, and ere long it is contemplated that the necessary arrangements will be completed for a service to be conducted between England, Spain, and the Canary Islands. This will also, of course, involve a service from the Canary Islands and Spain to the United States of America and Canada through England. This telegraph business will require a little while to develop and assume its full importance. There are additional stations to be erected, but inasmuch as negotiations with the Spanish Government are now pending as to the location of the stations, I am not able to say more upon that subject. With the general development, however, of Marconi stations in all parts of the world, so will the traffic of the Spanish stations increase, and the importance generally of the business of the *Compañia Nacional de Telegrafia sin Hilos* will be the better understood and, I think, appreciated. It is, in my opinion, destined to play a very important part in the network of stations which will be owned or controlled by the Marconi companies, or in which the Marconi companies will be interested.

#### The French Company's Successful Year

The annual meeting of the *Compagnie Française Maritime and Coloniale de Telegraphie sans Fil* (the French Marconi Company) was held in Paris on May 11th. The capital of the company is 100,000 frs. The receipts during the year amounted to 140,864.70 frs., from which was deducted the sum of 125,422.54 frs., representing gross expenditure,

leaving a net balance of 15,442.16 frs. The total cash resources of the company at the end of 1911 amounted to 42,380.15 frs., which represented a decrease compared with the preceding year, due to the fact that last year eighteen new wireless telegraph stations were established out of the company's resources, and that the equipment of the works in which the apparatus is made was increased and brought thoroughly up to date. The apparatus at some of the company's stations was also improved during the year, and the directors have determined to continue their policy of modifying the equipment of stations wherever this may be found necessary.

It is pointed out in the report that an important agreement was concluded between the French authorities and the company on April 14th, 1911, the result of which has proved entirely satisfactory, and has consolidated the good relations between authorities and the company. As a result of an official visit to the works of the company by representatives from public departments, the company were invited to take part in the adjudications of the different departments for the provision of wireless apparatus. Another important event which took place during the past year was the installation of two stations at the Aviation Exhibition, held at the Grand Palais. This exhibition enabled the company to demonstrate the superiority of their apparatus, and resulted in some important orders from the State. Statistics furnished in the report denote a gratifying increase in the traffic handled by the company; huge increases are shown in the number of messages handed in on board ship, in the messages received at the company's offices for transmission to ships at sea, and in the number of marconigrams sent via Clifden to North America, the latter representing an increase of more than 500 per cent. The allocation of the profits of the past year was as follows: 5 per cent. to reserve and a dividend of 5 frs. per share (free from taxation), the sum of 9,670.06 frs. being carried forward. The retiring directors, MM. Musnier and dal Piaz, were re-elected.

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Among the features of the Boys' Naval Brigade's Review, held recently, was a display of wireless telegraphy.

When the King paid a visit to the Fleet an elaborate naval aviation programme had been arranged. In view of the condition of the weather, the Admiral Commanding the Fleet ordered that no flying was to be attempted. This order was communicated to the aviators by means of a wireless message received from H.M.S. "Neptune" at the temporary wireless station on the Lodmore aviation ground.

## Mr. Marconi on Future Developments

**M**R. MARCONI arrived at Plymouth on May 6th from America, and was immediately besieged by Press representatives with requests for an interview. The interval between Mr. Marconi's departure for and arrival from America has been an epoch-making one, and it is but natural to expect that there would be a great desire to obtain Mr. Marconi's views upon the important events

York, where he gave most important evidence before the "Titanic" Commission.

Mr. Marconi is full of confidence as to the outcome of his big schemes for encircling the globe with a great system of wireless. "Wireless," he said to-day, "is progressing all the time, and extending its reign in all directions. We are proposing to erect very soon big stations for communicating direct



*Gold Tablet, modelled by the celebrated Sculptor, Prince Paul Troubetzkoy. Presented to Mr. Marconi by prominent Citizens in New York.*

that have taken place. The following is a report of the interview which appeared in the *London Evening Standard* :—

Within the next twelve months it will be possible to send a wireless telegram direct from London to New York without the assistance of the Post Office land lines, as at present. In a little longer period a wireless message can be flashed round the globe through all-British wireless stations.

These and other interesting facts concerning the future developments of wireless telegraphy were mentioned to one of our representatives to-day by Mr. Marconi, the world-famous inventor of radio-telegraphy, who reached London this morning from New

York, where he gave most important evidence before the "Titanic" Commission.

Mr. Marconi is full of confidence as to the outcome of his big schemes for encircling the globe with a great system of wireless. "Wireless," he said to-day, "is progressing all the time, and extending its reign in all directions. We are proposing to erect very soon big stations for communicating direct

between England and America, or, rather, between the vicinity of London and the vicinity of New York.

"I hope this service will be in operation within twelve months, although we have not yet fixed on the location of the stations. The messages will go through within a very few minutes, practically instantaneously; time is at present occupied in transmitting the messages to Clifden, and repeating them on the other side from Glace Bay to New York. By our arrangement with the Western Union on the other side the messages will be delivered as quickly as any cablegram.

sent messages over greater distances, as, for example, from Ireland to Buenos Ayres, a distance of nearly 7,000 miles."

Mr. Marconi went on to discuss the world wireless scheme, all the stations for which will be on British territory. "I shall soon have a great deal to do with this scheme in designing the stations," he said. "The exact number to be erected depends on the intentions of the Government, and has not yet been decided. But when this decision has been reached, we shall begin the simultaneous construction of all the stations, and they ought to be completed within twelve months."

"The Government will have the direction of all these stations, and will pay us £60,000 per station, exclusive of the cost of buildings and foundations."

The conversation naturally turned to the lessons to be derived from the "Titanic" disaster. "It shows," said Mr. Marconi, "the great benefit of wireless telegraphy, and also that it is desirable to have two operators on all ships carrying the system. Further, it proves that some regulation of wireless telegraphy in America is imperatively necessary."

"No false news or false messages of any kind emanated from any Marconi station. That was established by the official inquiry and by the inquiries we ourselves made. So far as the Marconi Company is concerned there was no keeping back of news, as has been alleged. We would not attempt to do anything of the kind; neither should we have the power to do so."

"Much has been written," said Mr. Marconi, "regarding the tapping of messages. No tapping is possible when you are communicating between shore stations; but nearly all ships are 'tuned' alike, and necessarily so. Under the Berlin Convention every ship speaks purposely in practically the same 'tune,' so that any call at sea is received by any ship within the range of the sender."

"Otherwise vessels would never be able to receive signals of distress. The intention is not that there should be secrecy at sea, but, on the contrary, there is a law which provides that every ship should speak in a certain 'tune.'"

"I do not think," added Mr. Marconi, "that anything has the more demonstrated the necessity for wireless being compulsory on all ships than has this disaster. There cannot be the slightest doubt that there are twenty times as many tramp steamers as liners crossing the Atlantic, and we know that there was one steamer in close proximity to

the 'Titanic' when she struck. Had this steamer had wireless, the story of the 'Titanic' disaster would have been very different."

Mr. Marconi indicated that he was further perfecting wireless apparatus, notably in the direction of discovering the bearings of ships in fog. This would facilitate the finding of any ship in difficulties.

Before leaving New York a committee of prominent New Yorkers presented Mr. Marconi with a gold tablet engraved with his portrait, in commemoration of the part which wireless telegraphy played in the disaster. The modelling on the tablet is the work of Prince Paul Troubetzkoy.

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## Clearing the Air

It has been incorrectly reported that the Boston Circuit Court of Appeals is preventing the sale of the United Wireless Company to the Marconi Company owing to the latter company's infringement suit against the former company's property. The fact is that the Boston Court has merely decided that the trustees in bankruptcy should defer for the present the actual transfer of the title, but this will not affect the sale to the Marconi Company nor interfere with the ordinary conduct of business by that company.

Proceedings have been instituted by the Marconi Company against a firm of members of the London Stock Exchange for libel in respect of statements contained in a recent weekly report.

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At a recent meeting of the Battersea Polytechnic Engineering Society, Mr. A. Smith read a paper on wireless telegraphy. Mr. Ashton took the chair. The following account of this lecture appears in the interesting magazine of the Polytechnic:—"Mr. Smith dealt with the development of the Marconi system of wireless telegraphy. He explained in detail the action of the discharge of condensers and the propagation of waves undischarged, and illustrated his explanation by slides showing the propagation from a Hertz oscillator, and by some interesting mechanical analogies. He next dealt with the first simple transmitting apparatus used by Mr. Marconi, afterwards with the famous patent, whereby the inductive coupling of aerial and condenser circuit makes commercial communication possible for very long distances. Mr. Smith concluded his lecture by an expression of thanks to Marconi's Wireless Telegraph Co., who had lent him a magnificent set of slides."

## Maritime Wireless Telegraphy

**A** MATTER of the utmost importance to the shipping interests is the transfer of the ship and shore stations formerly owned or worked by the United Wireless Company to Marconi's Wireless Telegraph Company of America in accordance with the judgment of the United States Court. It is well within the recollection of our readers that the Marconi Company succeeded in their action against the United Wireless Company for infringement of their American Patent, corresponding to the well-known English Patent No. 7777 of 1900, and the defending company not only acknowledged the validity and scope of the patent and admitted their infringement, but submitted to judgment and a permanent injunction in favour of the Marconi Company. The result of this is that 500 ship stations and about 70 land stations which had been erected and worked by the United Wireless Company passed into the hands of the Marconi Company. It is not difficult to conceive the great advantage of this arrangement, whereby the points for inter-communication between ship and ship have been so considerably increased and many additional land stations thrown open for traffic with vessels off the American coasts. To give anything like a list of the ships fitted with wireless which have come into the hands of the Marconi Company would occupy too much space, but some indication of the magnitude and importance of the arrangement may be gauged by the mere mention of the important lines affected by the arrangement.

The classes of vessels which are now added to the Marconi organisation comprise passenger, cargo, collier, barges and other craft, and the vessels are owned by such well-known and important shipping companies as the Mallory Line, the Quebec Steamship Company, the Red D Line, the New York and Porto Rico Steamship Company, the Savannah Line, the Panama Railroad Company, the Old Dominion Line, the Standard Oil Company, the Merchants & Miners Transportation Company, the Royal Mail Steam Packet Company, the United Fruit Company, the Wilson Line, the Nelson Line, Lamport Holt & Company, the Lloyd-Brazileiro Steamship Company, the Clyde Line, the Ward Line, the Bank Line (Messrs. Andrew Weir & Co., Ltd.), the Pacific Mail Steamship Company, the Grand Trunk

Pacific Coast Steamship Company, the Canadian Pacific Steamship Company, and the Pacific Coast Steamship Company. From the names of the shipping companies which we have extracted from the list, it will be seen that the vessels are owned by most of the leading lines plying between New York and Boston and other ports on the Atlantic and Pacific coasts of America. A good many of the ships are employed in the Great Lake service.

Marconi's Wireless Telegraph Co. have concluded an agreement with the Argentine Navigation Co. (Nicholas Mihanovich & Co., of Buenos Ayres) for the installation of Marconi Standard 1½ k.w. apparatus on board twenty river vessels. The apparatus is of the same type as that supplied to the same company's s.s. "Rawson," which has proved so satisfactory in operation that it has been the forerunner of the large contract just concluded. The fitting of these boats will be completed in time to enable them to comply with the Uruguayan decree, which makes it compulsory for all vessels conveying passengers between Uruguay and foreign ports to have wireless telegraphic installations on board. The vessels will be fitted in Monte Video by the Marconi engineers. The work is in charge of Mr. C. S. Persichetti, who is being assisted by Mr. P. H. Johnson.

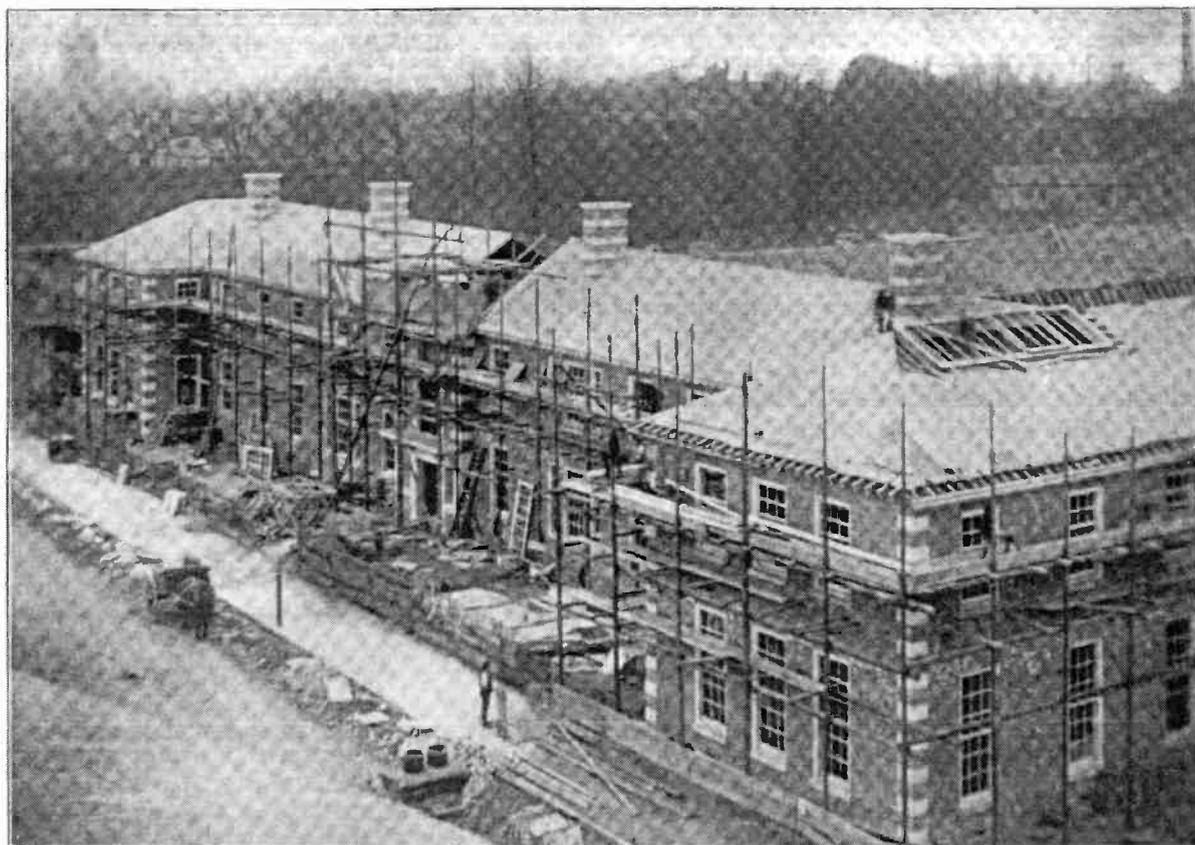
The Marconi Wireless Telegraph Company, of Canada have received instructions to equip two vessels, one for the Kingston Shipbuilding Company, of Kingston, Ont., and another for the Collingwood Shipbuilding Company, of Collingwood, Ont. Both steamers are being built for the Marine Department, and are small steamers that are to be employed in the service of supplying the various lights and other aids to navigation around the Canadian coast. The names of the vessels are the s.s. "Estavan" and the s.s. "Dollard."

The Federal Grand Jury (Norfolk, Virginia) has indicted the captains of five British steamers for alleged violation of the Congressional Act, requiring vessels carrying crews and passengers in excess of fifty to be equipped with a wireless installation.

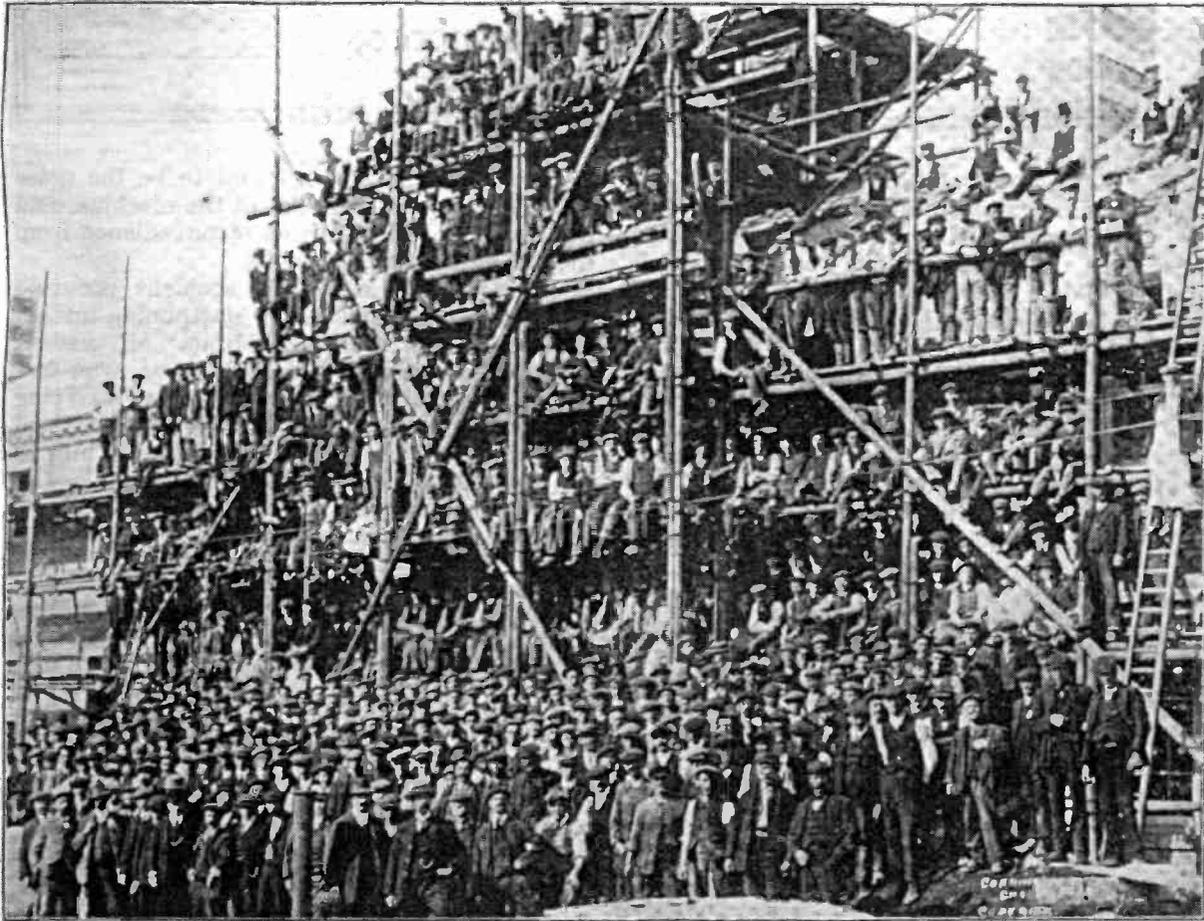
## The New Marconi Works at Chelmsford

THE visitor to Chelmsford cannot fail to have noticed the remarkable progress within a very short time of the erection of the new works for Marconi's Wireless Telegraph Company, Ltd. The buildings are now practically completed, whilst the piping for heating, lighting, and drainage is almost in position. The site faces the Great Eastern Railway Company's main line to Colchester, and a connection therewith is taken across New Street to a double siding which runs along one side of the works for the entire length, a roadway being provided between the two rail tracks. Fronting the street is a two-storied block, comprising several offices, a show-room, a large drawing office, and rooms for other purposes, a special feature being the number of reception rooms found necessary for the firm's numerous visitors. This building is of brick with stone facings and a handsome

main entrance ornamented with stone carvings, the dimensions being 200 ft. long by 40 ft. in width. Artificial heating is by low-pressure hot-water radiators. Between the office block and the works building is an instrument test-room of fireproof construction, with a flat concrete roof. The main buildings measure 466 feet in length by 150 ft. in width, and the roof is in 530 ft. spans, having the unglazed portion covered by green slates over felt and matchboarding. The whole of the works are raised to the level of a railway wagon standing in the sidings, and two rail-loading docks, with the necessary turntables, are provided in the packing department, the siding equipment being completed by two electric capstans and a weighbridge. Next to the sidings are the power test-room and packing department, and the carpenter's shop. Adjoining these are the finished and raw material



*View of the Chelmsford Works in course of Construction.*



*View of the Men at Work on the New Building.*

*[Photo by Cornhill.]*

stores, and a shop for riggers and tinsmiths. The raw material stores communicates with the machine shop, a condenser and winding shop, and the carpenter's shop, through serving windows, while the finished parts store has the power test-room on one side, and the assembling and machine shops on the other. This department is served by a 5-ton three-motor overhead travelling crane, for which the runways extend over the loading docks and the packing department. On the other side of the room is an assembling shop 90 ft. square, a machine shop 178 ft. by 90 ft., a condenser and winding shop 112 ft. by 90 ft. All the departments are capable of future extensions. A power-house, 73 ft. by 33 ft., is erected on the sidings, together with a circular brick stack 130 ft. in height by 4 ft.  $4\frac{1}{2}$  in. diameter inside at the top. A cooling pond for condensing has been dug out next the power-house. Two masts, each 450 ft. in height, with aerials between them, are being erected—one at the works, the other on a separate ground at the requisite distance away.

The masts are built up of pressed steel plates having four external flanged vertical joints to the round and angle rings for connecting the sections horizontally, the diameter being 3 ft., and the plates  $\frac{1}{4}$  in. thick throughout. There are five sets of insulated stays connected with four steel anchors, the latter being set in 100-ton concrete blocks on a 220 ft. radius, while the central foundation block weighs 120 tons. The works have been erected by Messrs. Cubitt & Co., Ltd., to the designs of the architects, Messrs. Dunn & Watson, and were built in record time, over 500 men being continuously engaged on the work. The ground was picked out on February 10th, and bricklaying only began on the 26th of that month, yet the buildings, floors, and piping are practically complete. The work so far has involved the laying of  $2\frac{1}{2}$  million bricks, the erection of 400 tons of steel work, and the carting of 9,000 loads of earth. Within a few days all the machinery and equipment will be in full working order.

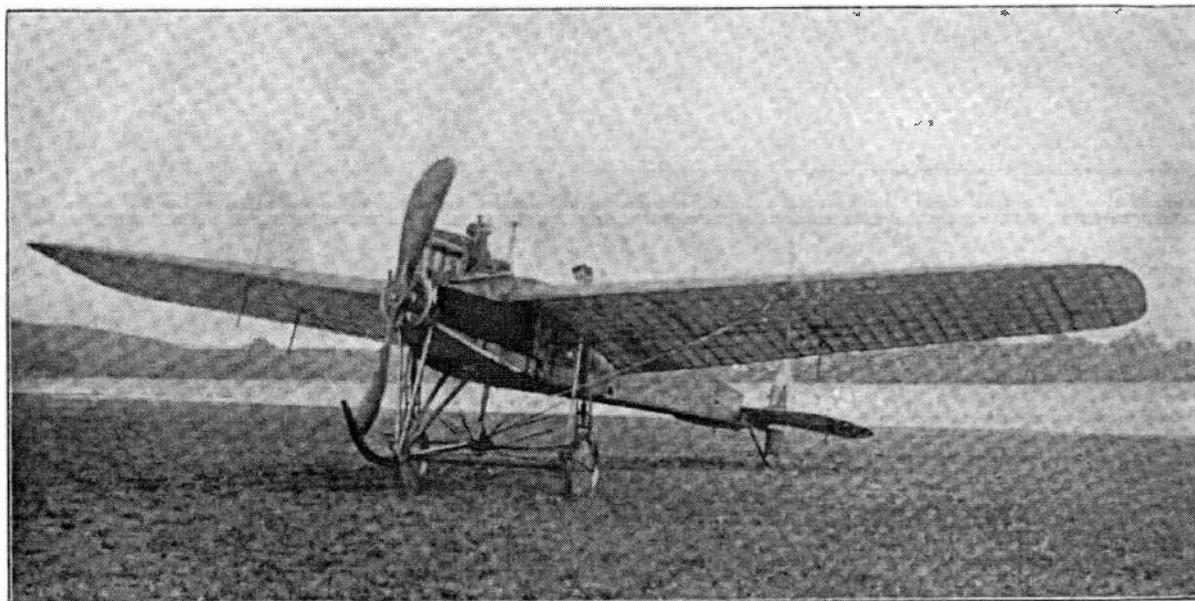
## Wireless for Aeroplanes

### New Marconi Apparatus

**W**E have already described some experiments conducted with Marconi wireless apparatus on a Flanders monoplane. Since then the apparatus has been transferred from the Royal aircraft factory at Farnborough to Brooklands Aviation Ground, near Weybridge, with a view of carrying out further experiments. Important advances have been made since the earlier experiments were described, and it is now possible to use an aerial wire contained on the machine instead of a trailing wire as formerly. This advantage is an important one, especially from the pilot's point of view, as it enables the aeroplane to fly as

The chief difficulty was found to be the noise of the engine and propeller of the machine, and the operator suffered some inconvenience from the strong propeller draught.

On May 13th a serious accident occurred which will have the effect of postponing further experiments for some little time. Mr. Fisher, the pilot of the Flanders monoplane, who had been flying for the wireless tests, was carrying a passenger, and whilst turning on his third circuit had a bad sideslip which caused him to fall a considerable distance to the ground. The machine was travelling very fast at the time, and the impact was so strong that the machine



*Flanders Monoplane on which experiments with Wireless were carried out.*

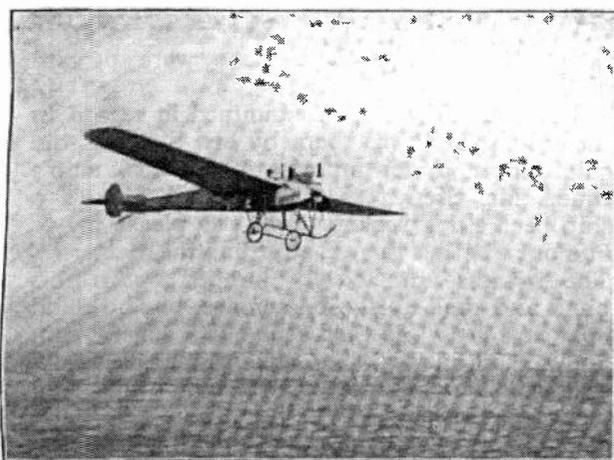
near as flying conditions allow it to other machines, and also obviates any trouble which might arise from a trailing wire in the event of a landing being made in a confined space.

The early experiments were devoted almost entirely to the question of transmitting messages from the aeroplane to the ground, and, as previously reported, this has been carried on up to five miles with a small set. Lately, however, the question of receiving messages in the aeroplane sent from a station on the ground has been receiving attention, and a few days ago the first tests were successfully carried out.

was wrecked and Mr. Fisher and his passenger both lost their lives. On the previous day Mr. A. W. Mathieu, the wireless operator, had flown on this monoplane with Mr. Fisher, and had received signals from the Flanders shed continuously during a flight of several miles whilst flying over Weybridge and the country round, and at the time of the accident he was waiting for the machine to alight so that he could take the place of the ill-fated passenger. None of the wireless apparatus was on the machine at the time of the accident. It is hoped that in the next two or three weeks the Flanders Company will have one of their new army type

aeroplanes ready on which to finish the wireless experiments which have been twice delayed by accidents, and which have shown the practicability of designing commercial wireless sets capable of being fitted to any type of aeroplane.

The illustration in figure 1 shows the Howard Flanders monoplane on the ground at Brooklands with Mr. Robert Kemp in the pilot seat. The photograph was taken at the time when the first experiments were carried out at Brooklands. Figure 2 shows the machine in the air with the same pilot.



*Flanders Monoplane Flying.*

We are now able to give some particulars of the Marconi aeroplane set, which has been made adaptable as far as possible to any type of aeroplane. This set has been made up into several separately contained units, with the idea of having as wide a margin as possible for the distribution of weight, which is a consideration of great importance for every type of air craft. The apparatus is very strongly constructed, and has stood very severe treatment without in any way suffering from it. The source of supply can be either primary or secondary batteries, and if the latter type is adopted, a special unspillable accumulator case is supplied, from which there is no fear of acid splashing out and damaging the machine in the event of a rough landing or a fall. The only high tension wire on the machine is run in a very well insulated tube through the fusilage of the machine, which makes the pilot and passengers absolutely immune from any chance of a shock whilst the apparatus is working. The trailing wire aerial is fitted with a safety plug, which is adjusted to stand only as much strain as it would be subjected to when the machine is flying, and which frees itself immediately in the event of the wire having any

extra strain put upon it, such as would occur if it came into contact with trees or anything during a flight. It has been found convenient for the bulk of the apparatus to be fitted underneath the pilot and passenger seats, and it has therefore been designed with a view of placing it upside down or in any other position most suitable to the type of machine on which it is to work.

The only part of the apparatus which need be exposed is the manipulating key and the small control switch, and these can be placed in any position most suitable to the pilot or passenger who is to carry out the work of observing and reporting.

The receiving station is very compact, and is fitted with a portable mast, which can be erected in a very few minutes.

The wave length of the set is comparatively short, and consequently the receiving apparatus is not in any way troubled by interference with other stations, and very little adjustment is required in tuning.

Beyond its uses from a military point of view, a machine thus equipped enables the pilot to keep in constant communication with the aerodrome or headquarters during a flight, which in cross-country and long-distance flights would be of great importance.

## Aid by Wireless

There is a happier side to the story of starvation on St. Kilda. Mr. Winston Churchill happened to be in town on Saturday, the 28th May, when the news arrived, and, realising the gravity of the situation, he acted promptly on the information. Proceeding at once to the Admiralty, the First Lord sent a wireless message to the Commander-in-Chief of the Home Fleet, who is cruising around the West of Scotland just now, instructing the immediate despatch of a cruiser to supply the starving islanders with provisions.

The result of this promptitude was seen in the following official statement issued from the Admiralty:

The Secretary of the Admiralty begs to state that H.M.S. "Achilles" was yesterday ordered to visit St. Kilda, and arrived at the island early this (Sunday) morning.

The Admiralty statement does not mention in what way Mr. Churchill's instructions reached the "Achilles," but in all probability it was received by the Commander-in-Chief at Lam-lash on the island of Arran in the Forth of Clyde, and by him transmitted to one of the cruisers further down the Firth in the neighbourhood of Culov Craig. About two years ago the Admiralty had to render help in similar circumstances.

## The "Titanic" Inquiry

THE sittings of the Court of Inquiry appointed by the Government to investigate and report upon the loss of the "Titanic" are now being held, with Lord Mersey as President. They opened on May 2nd, and the Attorney-General (Sir Rufus Isaacs, K.C., M.P.), who is leading counsel for the Board of Trade, read to the Court at its first sitting a list of the questions which it was proposed to submit. One of the questions to be submitted was:

What installations for receiving and transmitting messages by wireless telegraphy were on board the "Titanic"? How many operators were employed in working such installations? Were the installations in good and effective working order, and were the number of operators sufficient to enable messages to be received and transmitted continuously by day and night?

There is no need to deal here with the general evidence and the intricate mass of detail which is being unravelled at almost every step. It will suffice to confine ourselves to the evidence bearing upon the working of the wireless, which has been compiled for this journal from reports in *The Times* and other newspapers, The Marconi Company are in no way responsible for any of the statements made.

Here, as we have been reminded again and again, for hours together were ships ploughing the ocean hundreds or thousands of miles from land, and, for that matter, hundreds of miles from each other, advising one another, as if in the most customary, every-day way, of the presence of ice in the North Atlantic—passing the word, so to speak, from mouth to mouth.

Mr. Cyril Evans, examined by the Solicitor-General on May 15th, stated that he was the sole Marconi operator in the "Californian." At 5.35 p.m. New York time, or 7.30 ship's time, he received a message from the steamship "Antillian" that an hour before she had seen three large icebergs to the southward. A little later he heard from the "Titanic" and offered her the report about the ice, and she replied, "All right, I heard the same thing from the 'Antillian.'" At 9.5 New York time, or 11 o'clock ship's time, the captain directed him to tell the "Titanic" that the "Californian" was stopped and surrounded by ice. He sent the message to the "Titanic" and got the reply, "Keep out." That was because the

"Titanic" was at that moment in communication with Cape Race, and his message had caused an interruption. The "Titanic," however, must have heard what he had said about the ice, because his signals were much stronger and louder than the Cape Race signals. He next heard the "Titanic" say to Cape Race, "Sorry, please repeat." The messages from the "Titanic" to Cape Race were private messages from the passengers.

The witness was then examined in regard to the visit paid to his room by Mr. Stewart, the chief officer, at ten minutes to 6 o'clock ship's time. Mr. Stewart said to him, "There's a ship been firing rockets; will you please try to find out whether there is anything the matter?" The witness immediately jumped out of his bunk and took up the telephones, but he could hear nothing. He then sent out a general call, and got an answer from the "Mount Temple" saying, "Do you know the 'Titanic' struck an iceberg and is sunk?" The "Frankfurt" also sent him the same message. At this time Mr. Stewart was in the room. When he heard the messages from the "Mount Temple" and the "Frankfurt" he wrote down the position on a piece of paper and gave it to the captain. Then he asked the Allan liner "Virginian," which was coming from Cape Race, for an official message, and she gave it as follows: "'Titanic' struck berg, wants assistance, urgent, passengers in boats, ship sinking. Position 41.46 N., 50.14 W. Gamble, Commander."

In cross-examination witness said he judged by the strength of the "Titanic's" signals that she was not more than 100 miles away from the "Californian" in the afternoon. They had instructions to communicate with all ships in cases of distress.

Captain Henry Moore, master of the Canadian Pacific Railway steamer "Mount Temple," 6,661 tons, was the next witness. He described the receiving of the "Titanic's" "C.Q.D." message on the morning of April 15th, and how he immediately put the ship round and steered east.

Mr. John Durrant, Marconi operator of the "Mount Temple," was the next witness. In reply to the Solicitor-General, he stated that the range of his wireless installation was 150 miles by day and 200 miles by night. On the evening of Saturday, April 13th—the day before the foundering of the "Titanic"—he got an official message from the captain of the

"Corinthian" to the captain of the "Mount Temple" that ice had been seen. This was the only message he received in regard to ice before the wreck.

The witness then proceeded to give from his log-book the various calls he heard sent out by the "Titanic" and the replies to them by ships which they reached.

The first thing he heard of the "Titanic" was at 11 minutes past 12 o'clock (ship's time) on Sunday night, when he got the message "C.Q.D." from the "Titanic," giving her position, and adding, "Come at once. Struck berg. Advise captain." He told his captain at once. After the lapse of ten minutes he had the entry, "'Titanic' still calling C.Q.D.," that she was asked by the "Carpathia" what was wrong, and replied, "Struck iceberg. Come to our position," which was given. At 12.26 a.m. he made the entry—" 'Titanic' still calling C.Q.D." At this time the "Mount Temple" had altered her course, and was speeding to the assistance of the "Titanic." This had been done about 15 minutes after getting the first signal. At 12.34 he heard the "Frankfurt" answering the "Titanic," and the "Titanic" giving her position to the "Frankfurt." The "Titanic" asked, "Are you coming to our assistance?" The "Frankfurt" said, "What is the matter with you?" and the "Titanic" answered, "Have struck an iceberg. Sinking. Come to our help. Tell captain." The "Frankfurt" then said, "O.K. Will tell bridge at once," and the "Titanic" replied, "O.K. Yes. Quick." At 12.42 he heard the "Titanic" calling "S.O.S."

At a quarter to 1 o'clock he heard the "Titanic" sending out both calls. She then got into touch with the "Caronia," and next with the "Virginian."

The SOLICITOR-GENERAL: If you had broken in and talked to the "Titanic" you would have interrupted her messages to other ships?— Yes, I never said a word after I got her position. The first rule in wireless telegraphy is "Never interfere."

The witness, continuing the narrative from his log-book, said the "Titanic" called the "Olympic" at 12.43 a.m. The "Olympic" replied at 1.6 a.m., and got the message, "Get your boats ready. Going down fast by the head." At 1.11 the "Frankfurt" sent a message to the "Titanic," "Our captain will go for you." At 1.13 he heard the "Titanic" working the "Baltic."

The witness said the "Titanic" answered the "Olympic," "We are putting the women off in the boats." At 1.29 the "Titanic" sent out a general call, "C.Q.D. Engine-room flooded." The "Titanic" also informed the "Olympic" that the sea was clear and calm. At 1.31 he heard the "Frankfurt" say to the

"Titanic," "Are there any boats round you already?" and to this the "Titanic" made no reply. At 1.33 he heard the "Olympic" send a message to the "Titanic," asking whether the "Titanic" was steering south to meet the "Olympic," and the reply of the "Titanic" was simply the code word for "Received." That was the last message that he heard from the "Titanic." The messages from the "Titanic" did not get fainter towards the end. When the messages ceased, he thought the flooding of the engine-room had put the wireless out of condition. Most ships, including his own, carried storage batteries for use when power could not be obtained from the dynamos, and the wireless apparatus could be changed from the dynamos to the storage batteries in a minute; but the range of a wireless using storage batteries would be less than that of a wireless using dynamos.

At 1.41 a.m. he heard the "Frankfurt" and the Russian ship, the "Birma," calling the "Titanic," and there was no reply. At 1.56 the "Olympic," the "Frankfurt," and the "Baltic" called, and again there was no answer from the "Titanic." At 2.11 the "Birma" informed the "Frankfurt" that she was 70 miles from the "Titanic." At 2.36 he made the entry, "All quiet now. The 'Titanic' has not spoken since 1.33." At 3.11 he heard the "Carpathia" say, "If you are there, we are firing rockets." At 3.26 the "Carpathia" again called the "Titanic." At 3.44 the "Birma" told the "Frankfurt" that he thought he heard the "Titanic," and calling her, said, "Steaming full speed to you. Shall arrive 6 in the morning. Hope you are safe. We are only 50 miles away." At 3.46 he heard the "Carpathia" calling again. At 4.46 he made the entry, "All quiet. We are stopped away. Pack ice." At 5.11 the "Californian" called, "C.Q." and he answered, telling her that the "Titanic" had struck an iceberg and sunk, and he gave her the position. At 5.26 he heard the "Californian" speaking to the "Frankfurt," and the "Frankfurt" replied to the same effect. His last entry was, "8 a.m. Heard from 'Carpathia' that she had rescued 20 boatloads."

Witness denied that he heard any message to the effect that the "Titanic" was steaming to Halifax, or that all passengers had been rescued.

Captain James Barr, of the "Caronia," was on May 17th examined in relation to a warning as to ice which he sent to the "Titanic" at 9 o'clock on the morning of Sunday, April 14th. The marconigram he sent was in the following terms: "West-bound steamers report bergs, growlers and field ice in 42 N. and 49 to 51 W." At 9.45 he received the following reply: "Thanks for message and information. Have had variable weather throughout.—SMITH."

On May 22nd Mr. G. E. Turnbull, the deputy-manager of the Marconi International Marine Communication Company, was called to prove from the records of "La Touraine," the "Caronia," the "Amerika," the "Baltic," the "Californian" and the "Mesaba" the warning messages which were said to have been sent to the "Titanic."

He explained that the records of wireless messages sent or received by a ship with the Marconi installation were sent to the offices of the company at the end of the voyage. The *procès verbal*, or diary of messages, kept in the Marconi office in the "Caronia" showed that on April 14th Captain Barr sent a warning message as to ice to the "Titanic" at 1.26 p.m. It was acknowledged in the following terms:

"Thanks for information. We have had variable weather throughout.—SMITH."

The wireless message from the German steamer "Amerika" on April 14th reporting that she had passed two large icebergs was intended for the Hydrographic Office at Washington. It happened that at the moment the "Amerika" sent out the message she was not within the range of communication with Cape Race, but she was within the range of communication with the "Titanic," which, in turn, was within the range of communication with Cape Race; and, therefore, the "Amerika" asked the "Titanic" to forward the message to Cape Race. Mr. Turnbull said that he had sent two telegrams to the wireless station at Cape Race asking them to state whether they had received on April 14th a message from the "Amerika" via the "Titanic," and to say whether they got the message direct from the "Titanic" or through another ship. The answer he received was as follows: "Received direct from 'Titanic,' April 14th, steamship 'Amerika,' via 'Titanic.' 'Amerika' passed two large icebergs in 41.27 N., 50.8 W., on April 14th."

The PRESIDENT: That, at present, satisfies me that this message had reached the Marconi operator in the "Titanic," was read by him, and transmitted by him to America. But there it stops.

Witness added that the receipt of the message from the "Amerika" by the "Titanic" involved its being written down by the operator on board the "Titanic."

The SOLICITOR-GENERAL: Will you tell me what is the practice of your operators in the case of a message of this sort passing through the "Titanic"? Do they treat it as a message which concerns the ship from which it is retransmitted?—In ordinary practice it would be treated as a private message, but the operator, seeing from the contents of it how important it was as regards the navigation of the ship, would, without any doubt whatever,

communicate its contents to the commander or officers.

The PRESIDENT: You mean by that that you think he ought to do so?—It is the general practice.

Have you ever been in one of these steamers in the Marconi room?—I have. I made a trip to America in 1904.

Can you recall any case where you received a private message which you thought would be of interest to the captain of the ship you were upon, and which you disclosed to the captain of that ship?—No; I cannot recall any particular instance.

Mr. Turnbull then produced the *procès verbal* of the "Baltic," which showed that the following message was sent at 11.52 a.m. on April 14th to Captain Smith of the "Titanic":

"Have had moderate, variable winds and clear, fine weather since leaving. Greek steamer reports passing icebergs and large quantity field ice in latitude 41.51 N., longitude 49.52 W. Last night we spoke German steamer 'Deutschland,' Stettin to Philadelphia, not under control, short of coal, latitude 40.42 N., longitude 55.11 W. Wishes to be reported at New York and other steamers. Wish you and 'Titanic' all success.—COMMANDER."

The reply of the captain of the "Titanic" to this message was, the witness said, received at 12.55 p.m., and was in these terms:

"Thanks for your message and good wishes. Had fine weather since leaving.—SMITH."

The witness added that the time given in both messages was New York time, and ship's time would be about two hours later.

SIR ROBERT FINLAY (who appeared for the White Star Line): This is the first we have heard of this message.

The PRESIDENT: Do you dispute receiving it?

SIR ROBERT FINLAY: I do not know anything about it. I have not heard of it until this moment.

The Solicitor-General then put in an affidavit made by the captain of the "Baltic" in relation to another message sent to the "Titanic." This was to the effect that on April 14th reports were received by wireless telegraphy from numbers of steamships of having passed ice and bergs in positions varying from 49.9 W. to 50.20 W. on the outward southern track. These ice reports were, in the ordinary course, sent out by the operator to all other ships with wireless apparatus, including the "Titanic." They were sent shortly before noon, New York time. The operator received an acknowledgment from the "Titanic" about 1 p.m., New York time, on the same day.

Mr. Turnbull said that in the *procès verbal* of the "Baltic" there was no record of any message but the message he had mentioned having been sent by the "Baltic" to the "Titanic."



*Mr. J. Darrant, of the "Mount Temple."*



*Mr. Gilbert W. Balfour,  
Marconi Operator on board the "Baltic,"  
who was on the same vessel when she went  
to the rescue of the "Republic."*



*Mr. Cyril Evans, of the  
"Californian."*



*Mr. H. T. Coitam, of the "Carpathia."*

The Solicitor-General pointed out that the report of the evidence given at the American inquiry showed that the captain of the "Baltic" stated that he received more ice messages than one.

The President said he did not doubt that. But that these messages were sent out to the "Titanic," in the sense of having been received by the "Titanic," did not seem to be accurate.

The Solicitor-General said, as regarded the "Californian," they had already evidence from the operator Evans, of that ship, regarding the warning of three large bergs—a warning despatched at 7.30 p.m. on Sunday, ship's time. Evans was sending to the "Antillian," and was told by the "Titanic" operator that he had overheard it.

The PRESIDENT: There is nothing in writing, as far as I know, to show that this "Californian" message was received by Captain Smith?

SIR R. FINLAY: No.

The Solicitor-General next mentioned the warning sent by the "Mesaba" (Atlantic Transport Line), which, he said, was the "critical message."

SIR R. FINLAY: This we say we did not receive.

The PRESIDENT: Yes; but the "Californian" overheard it.

The witness produced the record of the "Mesaba's" message. There was first a "Time Rush" message, dated 7.50 New York time, stating that an ice report had been sent to the "Titanic." Mr. Turnbull explained that a "Time Rush" message was a preliminary telegram to inform a ship of the telegrams ready to be despatched for it. He then read the message, dated 7.50 p.m., and sent by S. H. Adams, the "Mesaba's" operator, to the "Titanic":

"Ice report.—In latitude 42 N. to 41.25 N., longitude 49 W. to 50.30 W., saw much heavy pack ice and great number of large icebergs, also field ice. Weather good, clear." At the bottom of the same form there appeared this entry by the "Mesaba's" operator: "Reply received, thanks. Sent this to about ten other ships as well; names in P.V. (*procès verbal*)." The reply, Mr. Turnbull explained, would be sent by the "Titanic's" operator, not by the captain.

Mr. H. Bride was then called and examined by the Attorney-General. He said that in June, 1911, he obtained his certificate of proficiency in radial telegraphy from the Postmaster-General, and later on he was appointed by the Marconi Company to serve as assistant wireless operator in the "Titanic." He joined the "Titanic" at Belfast in the beginning of April. On the trial trip of the ship from Belfast to Southampton, Phillips, the senior

operator, and he tested the wireless apparatus with several stations on the mainland and found it in good working order. The arrangement as to the watches they had made was that Phillips was to go on duty from 8 o'clock at night till two in the morning, and the witness from 2 o'clock in the morning until eight. During the day they took turns to suit one another's convenience. But a continuous and constant watch was kept, and one or other of them was always in the Marconi room, which was close to the bridge.

Will you tell us as far as you are able what was the first message you recollect with regard to ice?—The first message I recollect on April 14th was from the "Californian."

That was the first you recollect?—And the last.

Had you any messages before the 14th?—No, sir.

What was the message you recollect receiving on the 14th? Do you recollect the time?—The time was between 5 and 5.30 in the afternoon, ship's time. It stated that the "Californian" was passing close to a large iceberg. She gave the latitude and longitude.

Was that a message intended for you or which you overheard?—It was a message which was intended for me in the first place and which I overheard afterwards.

Do you always write the messages down which you receive?—Yes, sir.

Is that an invariable practice?—Invariable.

Do you also write the messages which you send?—They are generally written for us.

And put before you for transmission?—Yes, sir.

The witness added that to the best of his recollection the message from the "Californian" which he overheard was intended for the "Baltic," and was acknowledged by the "Baltic." At the time he overheard this message he was aware that the "Californian" had the same message for the "Titanic."

The Attorney-General read an extract from the evidence given by Bride in America to the effect that the message from the "Californian" which he had overheard was that they had seen three large bergs five miles to the southward of them; and that it was sent to the "Antillian."

The witness said he might have had it in his mind when he reached New York that the message was sent to the "Antillian." He was very busy on the Sunday, and had had many communications.

The ATTORNEY-GENERAL: What did you do when you got this message from the "Californian"?—I delivered it to the officer on the bridge.

Do you remember who the officer on the bridge was?—No; I was not acquainted with the officers.

Can you tell us how long it was after you got the message that you delivered it to the bridge?—Two minutes.

Did it strike you as an important message?—That sort of message is looked upon as important.

The President asked whether there was any doubt that this message did come to the knowledge of the officers on the bridge.

SIR ROBERT FINLAY: I think there is no doubt at all. The point is—when?

The ATTORNEY-GENERAL: This witness says two minutes after it was received. (To the witness): From the time you received that message until the "Titanic" sank, as far as you are concerned, there was no other ice reported?—No, sir.

Did you have any conversation at all with Mr. Phillips about ice messages?—No, sir.

The witness said he was relieved by Phillips between 6 and 7 o'clock—to the best of his recollection—in order that he might go down to dinner.

The witness said, in reply to the Attorney-General, that when he did come up from dinner he had a conversation with Phillips in the Marconi room. Phillips established communication with Cape Race between 8.30 and 9 o'clock.

The PRESIDENT asked how did he know that Phillips established communication with Cape Race at that time?

The witness said that he had "turned in," and as his sleeping place adjoined the instrument room he could read by sound the messages that Phillips was sending to Cape Race.

The PRESIDENT remarked that the witness's memory appeared to be so extraordinarily accurate as to time that, while he did not say the witness was not telling the truth, he wondered whether he could really remember details so distinctly.

The witness said he remembered these things because they constituted his work.

Replying to the Attorney-General, he said he particularly remembered communication being established with Cape Race. It was very important that they should get into communication with Cape Race because there was a large accumulation of messages awaiting despatch.

The PRESIDENT said that would explain how the witness remembered so well.

The witness proceeded to say that he relieved Phillips at 12 o'clock midnight—two hours before he was regularly due—because Phillips had had a busy time the night before. That was after the collision. Phillips then told him that he had cleared off the traffic to Cape Race, but Phillips did not say when he had actually completed the work. It was not until then that the witness heard that there had been a collision. He was asleep at the time of the impact

Phillips told him he thought the ship had struck something from the feel of the shock that followed. They were not then sending or receiving messages. The captain came into the Marconi room shortly afterwards and said he wanted assistance from other vessels. Mr. Phillips was told to be quick about it, so he set about sending "C.Q.D." immediately. Answers were received from the "Frankfurt" and the "Carpathia." The "Frankfurt" wired, "O.K. (all right), stand by" (*i.e.*, wait for further reply). The "Frankfurt" gave no position. The "Carpathia" transmitted her position, said she had turned, and was coming along as fast as possible. The "Olympic" sent several messages right up to the time when they finally left the cabin, but he believed they were not delivered, because they presumed that Captain Smith was busy. The effect of one of the messages was to tell Captain Smith to have his lifeboats ready. He went to report to the captain, who was on the boat deck superintending the lowering of the lifeboats. Later, the captain came into the Marconi room and told them the ship would not last very long, and that the engine-room was flooded. Mr. Phillips thought that the "Frankfurt" was the nearer of the two vessels, as the strength of the "Frankfurt's" signals was greater than that of the "Carpathia's." He informed the "Baltic" that they had had a collision and were sinking fast. Mr. Phillips had then gone outside to look round, and when he came back he said that the fore well-deck was awash, and that they were putting the women and the children in the boats and clearing off. Then the captain came in and told them to shift for themselves, because the ship was sinking.

Were you at that time called up?—Yes, Mr. Phillips took the telephones up when the captain had gone away and started to work again. He could read what Phillips was sending, but not what he was receiving, and he judged that the "Carpathia" and the "Frankfurt" had both called up together; the "Frankfurt" had persisted in calling them, and was interfering with Mr. Phillips's reading of the "Carpathia's" message. Mr. Phillips expressed his opinion of the "Frankfurt," and told the operator of that vessel "to keep out of it and stand by." Mr. Phillips then told the "Carpathia" that they were abandoning the ship. Mr. Phillips tried to call once or twice more, but the power (which they got from the engine-room) was failing, and they failed to get any replies.

Then he and Phillips lined up on top of the Marconi cabin in the officers' quarters. They were trying to fix up a collapsible boat, and he helped to get it down from the top deck to 'A deck. He got into it, but as the vessel sank it was floated off upside down. He was swept off

the boat deck. When he last saw Mr. Phillips he was standing on the deck-house. The witness said he swam away from the collapsible boat, but he joined it three-quarters of an hour later.

Mr. Lightoller, one of the ship's officers, was then recalled, and said, in answer to Sir R. Finlay, that he never heard anything whatever of the message which was said to have been sent from the "Mesaba," and which should have reached them before 10 p.m. He also had heard nothing of the message supposed to have been sent from the "Amerika."

What is the custom with regard to messages which are communicated by the Marconi operators to the captain?—It is customary for the messages to be sent direct to the bridge. If addressed to Captain Smith they are delivered to him personally when he is in the quarters or on the bridge. If Captain Smith is not immediately available, either in his room or on the bridge, they were then delivered to the senior officer of the watch. Captain Smith's instructions were to open all telegrams and act on your own discretion.

And are you positive that you never heard anything?—Absolutely positive.

The witness said that he saw the captain on the bridge on the night of the disaster from 8.55 to 9.20.

A message such as that from the "Mesaba" would be one that would be communicated to him?—I have no doubt that it would be immediately communicated to him if it referred to pack ice.

In answer to the Solicitor-General, Mr. Lightoller said he had a distinct recollection of Captain Smith's bringing a message to him on the bridge at about 12.45 p.m. on Sunday. There were perhaps other messages, but he could not recollect with any distinctness having seen them.

Mr. Lightoller was examined with reference to the calculation he made on the day of the casualty that they would be up to the ice region by 9.30 p.m., whereas Mr. Moody had calculated that they would not reach it until 11 p.m. He said he had come to the conclusion that Mr. Moody in forming that estimate did not take the same wireless telegram that Captain Smith had shown to him (Mr. Lightoller).

The SOLICITOR-GENERAL: If you take the "Baltic's" marconigram you would, according to that, be up to the ice about 11 o'clock. Did you know that?—No, I did not.

You know the "Caronia" mentioned that you would get to the ice on the 49th meridian. And your impression at the time was, not that Mr. Moody had made a mistake in his calculation, but that he had used another marconigram?—Exactly.

The "Baltic's" message would reach the

"Titanic" about 1 p.m. Do you observe that if you told Mr. Moody at 6 p.m. about the ice message, the "Baltic" message would be a later message in point of time than the "Caronia's"?—I see. But my instructions to Mr. Moody would direct him to look for the easternmost ice.

Mr. Lightoller added that he heard nothing of the "Californian's" message at all.

The PRESIDENT: The "Caronia's" telegram would indicate that the ice was to the north of the track?—I believe so.

Is it possible that Mr. Moody may have calculated the position of the ice as given by the "Baltic"?—It is possible, but it is most probable that he would pay greatest attention to the longitude, regardless of the latitude.

But if he did, calculating from the "Baltic's" telegram, he would ascertain the time at which the ice would be reached as 11 o'clock?—Quite so.

And the "Baltic's" information was to the effect that the ice was just on the track?—Yes, a little to the north.

The Solicitor-General asked the witness where, supposing there was a message about ice which could not be given personally to the captain, such a message would be placed.

The witness said it would be brought to the senior officer of the watch on the bridge. He added that his explanation of the chit of paper on the chart-room table, with the word "ice" on it, was that an officer had noted from some telegram an ice position and had scribbled it on paper, and had merely left the paper lying there, instead of crumpling it up, after pricking off the position on the chart.

The PRESIDENT: Can you tell me what other ice messages besides the "Caronia's" you heard of?

The witness: None that I remember.

Mr. Boxhall, Mr. Pitman and Mr. Lowe were recalled and questioned upon the number of messages received relating to ice.

Mr. Boxhall said he remembered writing out the chart, which gave the position of the ice reported by the "Caronia." He never heard anything of a message from the "Mesaba" until the night they reached New York. He then heard that some one who had been talking to the captain of the "Mesaba" was told that the ship had warned them. So far as he knew there was no message received by any officer on the bridge during his watch from 8 o'clock to 12 o'clock. Captain Smith was frequently on the bridge during the watch.

The SOLICITOR-GENERAL: Did you know of more than one ice message?

The witness: I recall messages from the "Caronia" and "La Touraine," and there was another shortly after.

The inquiry stands adjourned.

## Obituary

We regret to announce the death, at the early age of 35, of Mr. R. O'Driscoll, the chief operator at the Marconi wireless station, Clifden.



The deceased had been in the Galway County Hospital for three weeks suffering from kidney disease and heart trouble, and from the first little hope was held out of his recovery. Mr. O'Driscoll was a Cork man, and had a most successful career in the South of Ireland as telegraphist. He was for ten years at

the Clifden station, and was held in high esteem by all who knew him. He leaves a widow and young family to mourn his loss. As announced elsewhere, we have decided to open a fund for the benefit of those who have been left behind totally unprovided for.

## The Athletic Clubs

LONDON.

The members of the Marconi Athletic Club foregathered in large numbers at the George Hotel, London, on April 27th, when a successful smoking concert was held. The event served to mark an important epoch in the club's history, and if the enthusiasm which prevailed at the concert is sustained throughout the season in other departments of the club's activities we may look forward to an uninterrupted period of prosperity. Every member of the staff of the Marconi companies has it in his power to help towards the consummation of this modest hope by becoming a subscriber to the athletic club, and taking whatever part he is capable of in its actual operations; and we cannot believe that any will be found who will hold themselves aloof from the club and so mar the efforts of the committee. An excellent playing field has been acquired at Acton Town, which is within one minutes' walk from the station (District Railway) of that name, and a commodious pavilion is being erected on the ground, which, by the time these lines appear in print, will have been formally opened. Cricket matches are being arranged for the present season, and the first important fixture on the home ground will be held early in June. Those who do not play cricket will be able to join the tennis section of the club, whilst a swimming section is also being formed. It will thus be seen that ample opportunities are provided for the season which opened so auspiciously with a successful concert on April 27th.

Mr. Andrew Gray, chief engineer of the Marconi Wireless Telegraph Company, presided over the smoking concert, and he was supported by a large number of the staff and many friends of the company and well wishers of the club. A welcome interlude in the proceedings of the evening was the receipt of a marconigram from Mr. W. W. Bradfield, who had earlier in the day sailed for the United States. Mr. Bradfield's thoughtful action on this occasion was another of the many evidences which he has displayed of his keen interest in the welfare of the club, and it was highly gratifying to all present. The musical contributions were furnished entirely by members of the staff in London, and in the long and

varied list of items it would be invidious to single out any for special mention where all performers shone so conspicuously. There is undoubtedly much musical talent among the staff, and it might be necessary for the club to form a musical section for the cultivation of that art amongst its members.

The Marconi Cricket Club played their first match of the season on May 18th with St. Barnabas, Woodford, on the ground of the latter, and after a close game succeeded in beating the home side by five runs, the final scores being: Marconi Club, 38; St. Barnabas, 33. The bowling of Toon for the visitors was the chief feature of the match, his analysis being 7 wickets for 11 runs, S. Wheeler being top scorer with 11 runs. Although the scoring was low, the play was, on the whole, of a good standard, and, needless to say, caused a great deal of enthusiasm amongst the members on winning their opening fixture.

CHELMSFORD.

The annual meeting of the Marconi Athletic and Cycling Club, Chelmsford, was held on April 20th—Mr. C. Mitchell, president, in the chair. Mr. Chas. Robarts, the hon. secretary, presented a most satisfactory first report. The membership was 190, and the club finished the year with a credit balance of £13. A rifle section has been formed, and next winter a good football team will be put in the field. Thanks were accorded the directors of the company and the president for their kind assistance. The report and accounts were adopted, and the officers were re-elected as follows: President, Mr. Chas. Mitchell; Treasurer, Mr. F. W. Herring; Hon. Secretary, Mr. G. C. Robarts. The following were elected to serve on the Committee: Messrs. G. Royffe, P. Dumenil, H. Cornwall, E. Tarling, J. Baker, A. Martin, F. Woodhouse, F. Roland, W. Vernon, J. Aylett, J. Leggett and F. Rucker.

## Personal

The Institution of Electrical Engineers have recently awarded to Dr. J. A. Fleming and his assistant, Mr. G. B. Dyke, jointly the Institution premium (the highest prize which it is in their power to give) for their paper on "The Power Factor and Conductivity of Dielectrics for Alternating Electric Currents of Telephonic Frequency and at Various Temperatures," which was read before the Institution on March 25th last.

Dr. Fleming was travelling on the ill-fated Calais express which was derailed shortly after leaving Paris recently, and he is to be heartily congratulated upon his providential escape without injury.

On March 28th last Berbera said "Good-bye" to Mr. S. T. Dockray, the retiring superintendent of telegraphs and engineer of the wireless stations, Berbera and Aden. The Civil Mess, of which Mr. Dockray was a member, entertained him to dinner. With the exception of H.M. Commissioner, who was unavoidably absent, all the permanent officials were present to show their respect and appreciation for Mr. Dockray. After the usual toasts, the president of the Mess, Mr. J. H. Thomson, proposed the health of the guest, and Mr. Dockray returned thanks in a witty speech. The small British colony in Somaliland will miss Mr. Dockray in every way. His cheery presence and superabundance of energy acted as a tonic to his brother officers who have spent so many years in such an enervating climate as one has to put up with in Somaliland. He was foremost in every sport, and best at most. In work as in play he was ever to the front. Full of energy, his best endeavours were put forward in connection with his work, and all he did was inspiring to others. During the evening Mr. Dockray was presented with a memento of his stay in the country, which was subscribed to by every official. The vice-president of the Mess, Mr. A. G. Biden, then presented an illuminated "coat-of-arms," and the president, Mr. Thomson, handed him his gavel of office (a local work of art) along with the

beautifully drawn and appropriate menu card, which had been artistically designed by Dr. Drake-Brockman.

Mr. J. C. Hawkshead has returned to London after having served during the last six months as Marconi operator on board the yacht "Mahroussa," owned by H.H. The Khedive. Mr. Hawkshead landed in Alexandria on October 25th, 1911, and completed the installation of the Marconi apparatus on board the "Mahroussa." Amongst the interesting tours made on board the yacht was to Port Said to meet King George, who was then on his way to India. During the last fortnight of Mr. Hawkshead's stay on board a voyage was made to Dolman, in Turkey-in-Asia, at which place His Highness the Khedive spent ten days on a large estate owned by him there. Since his return to this country Mr. Hawkshead has received from His Highness a gold monogram scarf-pin with the letters "A. H.," signifying Abbas Hilmi (the Khedive's name), surmounted by a crown. "As a souvenir of the time you have served as Marconi operator on board the 'Mahroussa,' and as a mark of the Khedive's appreciation of the manner in which you carried out your duties."

Mr. A. A. Kift, the chief of the estimating department of Marconi's Wireless Telegraph Co., who was married in London on April 27th, was presented by the directors of the company and his colleagues on the staff with a handsome canteen of cutlery.

### Movements of Operators

C. E. Rookes, from the Marconi School to the "Teutonic."  
 W. C. Banbery, from the "Hilary" to the "Ambrose."  
 G. H. Sellars, from the Marconi School to the "Delaware."  
 A. Braddock, from the Marconi School to the "Campania."  
 A. H. Millard, from the Marconi School to the "Canadian."  
 C. Sandbach, from the "Elmina" to the "Celtic."  
 R. Jones, from the Marconi School to the "Dominion."  
 C. V. Coster, from the "Vandyck" to the "Irishman."  
 L. B. Cleary, from the "Ivernia" to the "Nigeria."  
 A. Fletcher, from the "Campania" to the "Vandyck."  
 G. E. Kemp, from the Marconi School to the "Minnetonka."  
 W. H. Monger, from the "Mooltan" to the "Mongolia."  
 K. W. Page, from the "Mongolia" to the "Danube."  
 G. Walters, from the "Moravian" to the "Maleja."  
 H. Rowlands, from the "Minnehaha" to the "Lake Michigan."  
 A. M. Howlett, from the "Devanha" to the "Orontes."  
 H. J. Gallagher, from the "Orontes" to the "Success."  
 W. J. Brown, from the "Dongola" to the "Walmer Castle."  
 G. Balding, from the "Minnehaha" to the "Minneapolis."  
 G. Keup, from the "Minnetonka" to the "Potomac."  
 A. Fletcher, from the "Vauban" to the "Minnetonka."  
 E. Ogilvie, from the "Mantua" to the "Moldavia."  
 J. Simons, from the "Moldavia" to the "Mooltan."  
 A. Rawlings, from the "Minnewaska" to the "Commonwealth."  
 B. Montgomery, from the "Navahoe" to the "Minnewaska."  
 A. Cookson, from the "Delta" to the "Marmora."  
 C. Sharpe, from the "Caledonia" to the "Goorkha."  
 J. Smith, from the "Cedric" to the "Oceanic."  
 S. Branton, from the "Corsican" to the "Miltiades."  
 E. Rumford, from the "Galeka" to the "Montfort."

H. Hardy, from the "Kildonan Castle" to the "Caledonia."  
 A. Blöw, from the "Beltana" to the "Kildonan Castle."  
 A. Bower, from the "Demosthenes" to the "Majestic."  
 C. Weller, from the "Otranto" to the "Matatua."  
 W. Merryweather, from the "Carmania" to the "Sicilian."  
 A. Langley, from the "Intaba" to the "Geelong."  
 C. Evans, from the "Californian" to the "Perugia."  
 P. Brownfield, from the "Perugia" to the "Navahoe."  
 W. Syme, from the "Asonia" to the "Potaro."  
 C. Masters, from the "Carisbrook Castle" to the "India."  
 E. Dexter, from the "Sicilian" to the "Grantully Castle."  
 W. Estlick, from the "Saxon" to the "Walmer Castle."  
 R. Atkinson, from the "Antillian" to the "Falaba."  
 J. Howard, from the "Asian" to the "Teutonic."  
 A. Jeffries, from the "Connaught" to the "Ulster."  
 W. Wing, from the "Empress of Ireland" to the "Corsican."  
 J. Boadella, from the "Mauretania" to the "Canadian."  
 A. Millard, from the "Canadian" to the "Lake Michigan."  
 G. Tyler, from the School to the "Empress of Ireland."  
 J. McLeod, from the "Ortega" to the "Mamari."  
 T. W. Murray, from the School to the "Merion."  
 C. Crossman, from the "Laconia" to the "Asian."  
 A. Cottingham, from the School to the "Cymric."  
 A. Bolster, from the School to the "Dominion."  
 F. Milford, from the "Herefordshire" to the "Hubert."  
 C. Peters, from the "Stephen" to the "Hyacinthus."  
 A. Lund, from the "Akabo" to the "Victorian."  
 A. V. Jones, from the School to the "Adriatic."  
 F. W. Garwood, from the "Andorinha" to the "Akabo."  
 R. McCutcheon, from the "Arabic" to the "Andorinha."  
 R. Darracott, from the "Empress of Britain" to the "Antillian."  
 W. C. Obey, from the School to the "Arabic."  
 L. A. Hancock, from the "Cestrian" to the "Californian."  
 C. Burgham, from the School to the "Canada."  
 W. Thomas, from the School to the "Canopic."  
 H. Miller, from the School to the "Caronia."  
 W. Banbery, from the "Ambrose" to the "Cheyenne."  
 J. Canfield, from the School to the "Empress of Britain."  
 W. G. Sutherland, from the "Leicestershire" to the "Herefordshire."  
 G. Sellars, from the "Caronia" to the "Hermione."  
 A. Jamieson, from the "Adriatic" to the "Ortega."  
 T. Rhodes, from the School to the "Tunisian."

### Movements of Engineers

A. B. Blinkhorn has joined the London Offices Staff of the Ship-fitting Department.  
 E. E. Robinson, P. Boucicault, and L. S. Hawkins sailed for Glace Bay on 6th May.  
 O. Trost has returned from Copenhagen, where he was fitting the Danish cruiser "Absolon," and is now engaged on directional tests at Chelmsford.  
 R. R. Cooke, J. D. White, and H. McCullough are on their way home from India.  
 C. G. Rattray has returned from Soller, and is now on sick leave.  
 G. J. Boome is attached to the Ship-fitting staff