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"Ocean Letters"—Marconi Innovation

THE "Ocean Letter" which comes into being to-day (March 1st) is the latest addition to our many forms of correspondence. It is a wireless message which reaches its destination by registered post.

The combination has been designed by the Marconi International Marine Communication Company to meet the demand of many travellers who desire to transmit inexpensive messages when they are beyond the range of direct communication with land stations. By this innovation it is now possible to send a wireless message from one ship to another ship going in an opposite direction for delivery by registered post from the first port of call of the latter vessel. Where registration cannot be effected the "Ocean Letter" will be forwarded by ordinary letter post.

The cost of such messages, which will only be transmitted when both vessels are beyond the range of communication with a shore station, is 5s. 6d. for the first thirty words, including postage and registration fee, and one penny per word thereafter up to a maximum of 100 words, international counting.

The messages can only be transmitted between ship and ship, and between ships going in opposite directions. The sender of an "Ocean Letter" is not free to choose a ship to which the message shall be sent. Its disposal will depend entirely on local conditions.

"Ocean Letters" will rank in priority after fully paid and franked messages, and will only be dispatched after radiotelegrams accepted under the provisions of the International Convention, and after ordinary traffic. Special forms and envelopes for this new class of traffic have been issued.

Until further notice "Ocean Letters" will only be transmitted to ship stations controlled

by the undermentioned, and under no conditions whatever will they be sent to a coast station for delivery by post:

The Marconi International Marine Communication Co., Ltd., Marconi House, Strand, London, W.C.

La Compagnie Française Maritime et Coloniale de Télégraphie sans Fil, 35 Boulevard des Capucines, Paris.

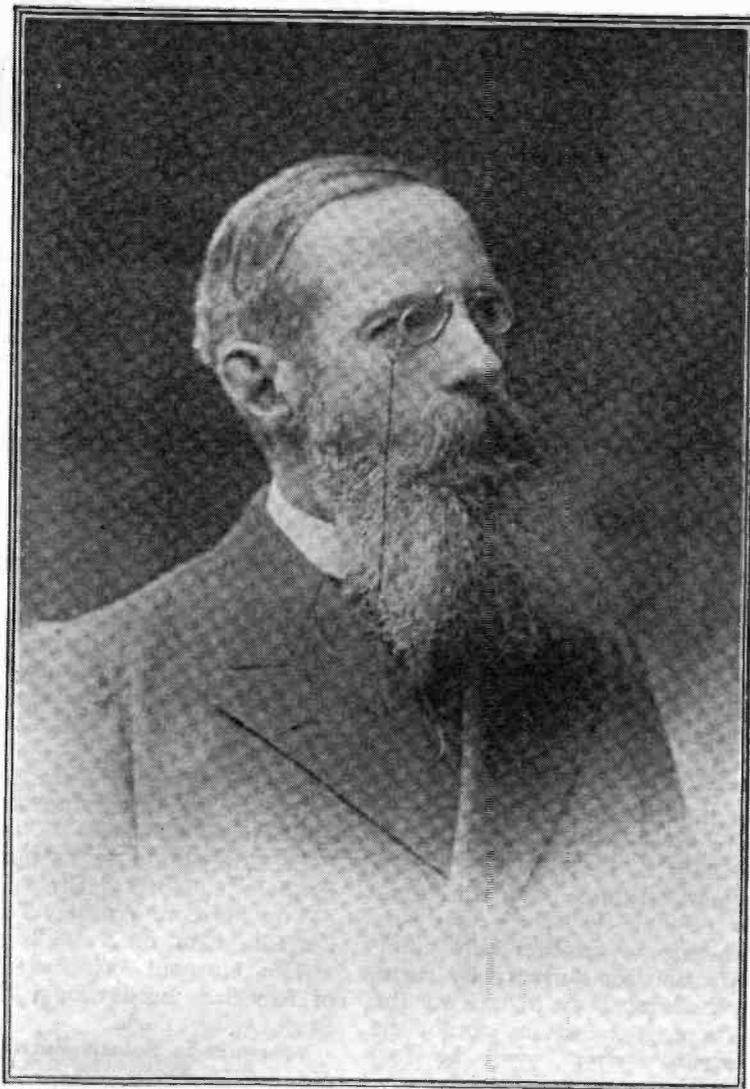
La Compagnie de Télégraphie sans Fil, Rue Brederode, No. 13, Brussels.

The Marconi Wireless Telegraph Company of Canada, Ltd., 86 Notre Dame Street, Montreal.

The Marconi Wireless Telegraph Company of America, Lords Court Building, 27 William Street, New York.

Marquis L. Solari, Via del Collegio Romano, No. 15, Rome.

The new service is already assured an extensive popularity with travellers, particularly commercial travellers and other business men, and when the facilities it affords are better appreciated the service will undoubtedly command an extremely large circle of users. Nearly two weeks in some cases will be saved by those who use "Ocean Letters" as a means of communication. A business man leaving Southampton for New York on a Saturday will probably find his vessel out of range of coast wireless stations on the following Tuesday. Should he then desire to communicate with a friend in England he would have in the ordinary way to wait until he reached New York to post his letter. By means of the "Ocean Letter" he can now at very slight expense have a letter transmitted to a vessel approaching Queenstown which will be put in the registered post on arrival in that port and delivered in London or Edinburgh next morning.



M. A. MUSNIER

M. Alfred Musnier
Administrator of La Compagnie Française Maritime et Coloniale
de Télégraphie Sans Fil

M. MUSNIER has surely no need of a formal introduction to our readers, for since the early days of wireless telegraphy he has been intimately connected with the development of this wonderful invention, and has contributed to the formation of La Compagnie Française Maritime et Coloniale de Télégraphie Sans Fil, of which he is one of the administrators.

Born in Paris in 1846, M. Musnier, after completing the usual college curriculum, applied himself vigorously to the study of the law. His terms completed, he immediately entered business and took up work with two companies in which, by reason of family ties, he already had a strong personal interest. These were La Société des Messageries Nationales (whose foundation dates from the latter part of the eighteenth century) and La Compagnie des Messageries Maritimes.

From the outset M. Musnier spared no pains to acquire a complete knowledge of the business, even to its smallest details. His was not the hasty career of the novice with friends at court, who makes a meteor flight through the various departments of a business house and ultimately finds himself in a position of trust for which he is ill-equipped and, worse still, ill-adapted. Slowly but surely, and with infinite thoroughness, he passed from grade to grade of the business ladder, so that when in 1876 he became manager of the Les Messageries Nationales he was possessed of two qualifications which everywhere ensure success—an intimate interest in and a personal knowledge of the work he was directing. Later, in 1901, M. Musnier was appointed President of Les Messageries Nationales.

But while M. Musnier has spent so largely of his time and energy for the benefit of these two great institutions, his activity has still found opportunity to interest him in other business enterprises. Setting aside his connection with La Compagnie Française Maritime

et Coloniale de Télégraphie Sans Fil, he is not the least important member on the board of many companies and associations founded to meet the public needs—amongst which are La Société Commerciale de Port Saint Louis du Rhone, an Italian mining society. He is president of a large maritime insurance company—La Compagnie Centrale, and a director of one of the largest shipbuilding companies in France—La Société des Forges et Chantiers de la Méditerranée, which possessed at La Sayne et le Havre two of the largest ship-yards in France. It was founded about the same time as La Compagnie des Messageries Maritimes, and is therefore long since past its jubilee, and looking forward to the celebration of a centenary.

Furthermore, M. Musnier is a member of the French Maritime League, and of the Society of Commercial Geography, as well as of the French Association of International Maritime Law. But, leaving his connection with the world of affairs, let us turn for a moment to the study of the man himself, or rather, as space is limited, let us briefly sketch his characteristics, and then, after recording a significant episode in his private life, leave the reader to draw his own conclusions. He is a large-hearted and generous-natured man, always ready to help a lame dog over a stile, and never concerning himself with the personal cost that his generosity may entail. He is shrewd and he is painstaking, and these two qualities conjoined with benevolence make M. Musnier a man worth knowing, and a friend worth keeping. Not a few have realised this fact, and amongst these are his old school-mates. About twelve years ago he was asked by the unanimous vote of Rollin College, his beloved *alma mater*, to become president of their Old Boys' Association.

A strong sense of good fellowship and a considerable amount of tact are required if such a position is to be successfully filled; but M. Musnier's comrades are disposed to congratulate themselves on their choice, and their satisfaction is demonstrated by the fact that M. Musnier still presides at their friendly gatherings.

The Resistance of Radiotelegraphic Antennas*

By Dr. L. W. Austin

IT has been known to many experimenters that the antenna resistance was much larger at longer wave-lengths than should have been the case according to the Hertzian theory of radiation. Dr. C. Fischer has carried out some interesting experimental observations, showing that this increase in antenna resistance is, under certain circumstances, proportional to the wave-length, and he appears to believe that this increased resistance is due to radiation.

Systematic measurements on the resistance

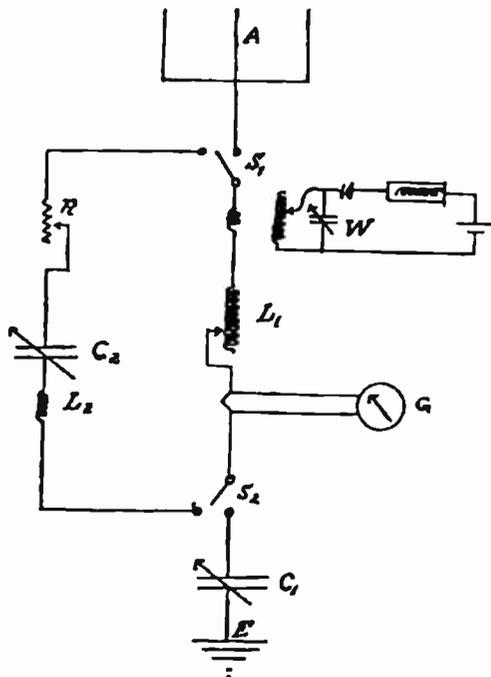


Fig. 1. Diagram of Apparatus for measuring Antenna Resistance

of the Bureau of Standards antenna have been carried out, and observations have been taken on the antenna of the U.S.S. "Dolphin," lying at the Washington Navy Yard, and on the antenna of the Navy Yard station.

The arrangement of apparatus is shown in Fig. 1. Here A is the antenna, E the ground, L_1 the tuning inductance, C_1 an air condenser for tuning to very short wave-lengths, Th a thermo-element, G a galvanometer, and C_2 a variable air condenser set at the capacity of the antenna to be measured. A small induct-

ance, L_2 , was sometimes inserted in circuit with the condenser, C_2 , to represent the antenna inductance. This has little influence on the results, and, at least, for the longer wave-lengths may be omitted. S_1 and S_2 are switches for connecting either the antenna and ground or C_2 to the rest of the circuit. R is a resistance introduced in the circuit, C_2 , to bring down the thermo-element deflection to the same value as that observed when the antenna and ground are in circuit. The high-frequency resistance consists of separate units of fine constantin wire inserted in mercury cups. The measurement circuit is excited by a buzzer-driven wave-meter, W, of the ordinary type.

Fig. 2 shows the curves obtained on the "Dolphin" at the Washington Navy Yard and at the Bureau of Standards. It is seen that, beginning with the short wave-lengths, the resistance falls rapidly in accordance with the Hertzian radiation theory, until a point is reached which is not far from twice the fundamental wave-length of the antennas.

Curve A is the Bureau of Standards, B the U.S.S. "Dolphin," and C the Washington Navy Yard. In curves B and C the resistance rises gradually, as observed by Fischer, but the rise is much slower than in his curves. The height of the flat-top antenna of the "Dolphin" is approximately 90 ft. above the water, while that of the Washington Navy Yard is 150 ft. The Navy Yard has practically a water ground, the station being but a few feet from the river, which is moderately salt at this point. The fundamental of the "Dolphin's" antenna is 315 meters, and its capacity is 0.0073 microfarad. The fundamental of the Navy Yard antenna is about 1,000 meters, and the capacity is 0.0036. The radiation resistance for these two antennas calculated according to the equation

$$R_r = 1600 h^2 / \lambda^2$$

is shown in the dotted curves, B', C'. It is seen that the observed curves for the shorter wave-lengths follow with a considerable degree of approximation the curvature of the calculated radiation resistances, although the observed curves lie somewhat higher, while beyond the minimum the two curves lie far apart. We have here an indication of two factors in the resistance—one decreasing as the square of the wave-length, while the other increases nearly directly as the wave-length.

* Abstracted from the Journal of the Washington Academy of Sciences.

It seems probable that the portion of the resistance which increases as the wave-length is ground resistance, or more properly earth current resistance.

The resistance of the Bureau of Standards antenna is shown in curve A. This antenna is a 8-wire harp, 180 ft. high at top, and 60 ft. high at bottom. This makes the centre of capacity 120 ft. from the earth. The natural period is 425 meters, and the capacity 0.0012 microfarad. The ground wires are connected to the water pipes of the laboratory. It is seen that the minimum ground resistance is much higher than in the case of the "Dolphin" and Navy Yard, and that the straight portion of the curve slopes more steeply upward than was the case in the other two antennas measured. It has been observed that the steepness of this portion of the curve, as well as the resistance at the minimum, differs by a very appreciable amount from day to day according to the dryness of the soil. On the day following a heavy rain the minimum frequently falls by two or three ohms; at the same time the

would cross the zero axis near the fundamental, and in the curve of the Washington Navy Yard this also appears to be the case. At the Bureau of Standards, the curve of which has been taken much more accurately than any of our other observations, it appears to point toward the zero of co-ordinates. This may, however, be due to the presence of an initial ohmic resistance of about 5.5 ohms in the pipes of the ground connection.

TABLE OF RESISTANCES FOR ANTENNA.

λ	G.	R _r .	R _r +G.	Observed.
Meters.	Ohms.	Ohms.	Ohms.	Ohms.
400	5.5	13.4	18.9	22.5
600	8.0	5.9	13.9	15.0
800	11.0	3.4	14.4	13.6
1,000	13.5	2.1	15.6	15.2
1,200	16.5	1.5	18.0	17.3
1,500	21.0	0.95	22.0	21.0
2,000	28.0	0.54	28.5	27.7
2,500	34.5	0.34	34.8	31.5

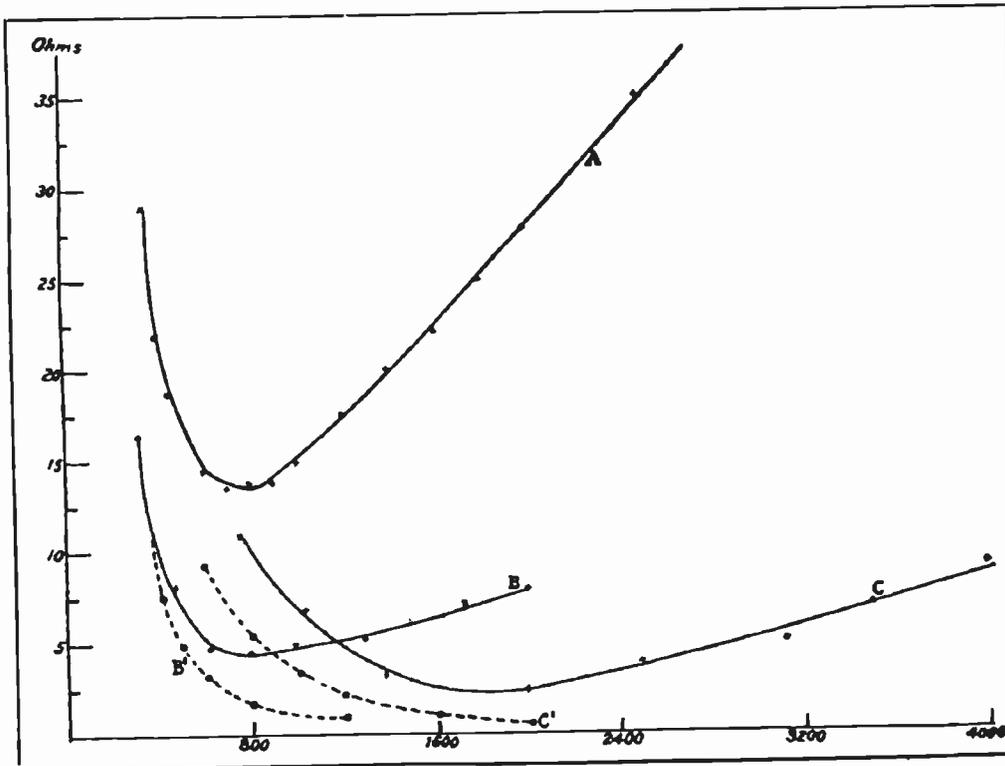


Fig 2. Diagram Showing Resistance Curves

resistance at a wave-length of 3,000 meters sometimes falls as much as ten ohms. The resistances are usually slightly higher in the afternoon than in the morning.

It is a matter of interest to know toward what point the straight portion of the resistance curve descends. According to Fischer it

In the table under G is given the ground resistance, taken from a prolongation of the straight portion of curve A. Under R_r is given the calculated radiation resistance, from the Ruedenberg formula, while in the last two columns are given the sum of these resistances and the observed values of the curve.

Technical Notes

A MAGNETIC SENDER.—From small equipments, such as may be used in outlying stations and by explorers, etc., where accumulators cannot be conveniently charged and maintained, quite good wireless signals can be emitted by aid of a simple magnetic tapper. As early as 1855 Ruhmkorff observed that, under certain conditions, the sparks obtained from the secondary circuit of his induction apparatus were longer and more intense when the primary circuit was broken by hand than when a high-speed hammer break was employed. This phenomenon was attributable partly to incomplete saturation of the magnet core in the latter case (owing to the short current duration), and partly to the effect of "extra current" on closing the primary circuit. These facts are applied in the following apparatus:

The core of a Ruhmkorff apparatus, without primary winding, is excited by a bundle of high-class permanent magnets (weighing a few pounds). To obtain a long spark from a light apparatus, the reversal of flux in the core must be as rapid as possible, the magnetising period must be as long as possible, and the air-gap in the magnet circuit must be reduced to a minimum. A convenient arrangement is to place a number of highly saturated U magnets of decreasing perimeter parallel to each other and so as to form opposite poles in two straight somewhat divergent extensions. The ends of the magnets terminate in soft-iron blocks. This arrangement permits the core of the induction apparatus to lie between the two poles, and the core is provided at its ends with two pairs of iron arms, of which one surrounds the two poles at the end where the latter lie closer together, and the other lies between the poles at the other end. This arrangement enables the magnetic circuit to be completed through the core, and practically the whole of the flux can be made to traverse the latter if care be taken that the movable arms make good contact with the magnet extensions. The displacement of the magnet core and arms, to reverse the direction of flux through the core, requires a certain expenditure of energy, but can easily be effected by hand.—*L'Electricista*.

* * *

BEHAVIOUR OF METALS UNDER THE OSCILLATORY DISCHARGE FROM A CONDENSER.—A paper on this subject, read at a recent meeting of the Royal Society by Prof. E. W. Marchant, is published in the *Electrician*. The method adopted in the investigation was to photograph by a revolving mirror the spark caused by the discharge. In order to check the accuracy of measurement, spark photographs were

taken of the discharge from an air condenser through an air-core inductance. The agreement between calculated and observed frequencies was within 1 per cent. With a glass condenser the capacity measured by the frequency of the discharge through an air-core self-induction was less than that obtained by ballistic measurements. When the discharge from these condensers was passed round a coil having a core of fine iron wires, the discharge consisted of a series of oscillations, the time for each oscillation increasing as the discharge died away. The discharge was much more quickly damped when the iron wire core was inserted. From these results a curve was drawn giving the relation between magnetising force and "effective permeability." This curve was employed to determine approximately the resistance of the spark. The method was adopted as follows:

For any given discharge the current passing during the first half oscillation was estimated; from the "effective permeability" for the second half oscillation, the magnetising force corresponding to it was found from the curve, and hence the current passing. Hence the loss in energy during the first half oscillation was estimated. The losses of energy consist of: (1) Ohmic loss in the resistance of the wires; (2) eddy current hysteresis loss in the iron core; (3) losses due to the resistance of the spark, and possibly due to dielectric hysteresis. The spark resistance increased with decreasing current through the spark. The values of the magnetising force used varied from 500 to 5,000 gauss, and of current in the spark from 100 to 1,000 ampères. The permeability of iron when subjected to the magnetising force due to an oscillating discharge was not sensibly different from that found by ballistic tests. The frequencies employed in these experiments varied from 10,000 to 100,000 cycles per second. With cores made of thicker iron wire it was found that the "effective permeability" was not very different from that obtained with very fine wires. The damping of the discharge was more rapid with the thicker iron wire cores. With cores of solid iron the discharge was reduced to one-half oscillation. With cores of solid brass or copper the damping was less rapid than with the cores of iron. Nickel wire cores produced similar effects to those observed with iron, but of diminished intensity. Some experiments were made in which the coils were wound round a brass tube about 0.5 mm. thick. This tube completely screened off the effect of the iron wire core when it was inserted. Cores made with fine insulated copper wire produced no effect either on the damping or frequency of the discharge.

Wireless Relieves Channel Islands Emergency Station for Fort George.

THE heavy weather experienced at the beginning of February broke the cable between England and the Channel Islands, and created a situation which threatened the utmost inconvenience to business men at both ends of the wire. It occurred at a time when considerable business transactions between growers and salesmen were in course of negotiation. It was impossible to communicate between England and Guernsey except via Sark, which put the growers in the awkward position of having, in addition to suffering additional delay, to pay 2d. a word in place of the normal inland rate of 1d.

Wireless telegraphy saved the situation. The Post Office hurried operators out to Fort George to open up communication, and for three days, during February 2nd, 3rd, and 4th, after the station was fitted up, the whole of the telegraphic business was conducted by wireless between the Islands and the Marconi wireless station at Bolthead, on the south coast. From Fort George the messages were delivered throughout Guernsey by the Post Office.

An average of six hundred messages were passed per day, in addition to the usual Press work. No hitch whatever occurred in transmission.

Residents of the Island, especially the commercial business men, greatly appreciated the service, and the Press commented in glowing terms upon it. So impressed was the Post Office by the satisfactory solution of what threatened to be a situation that would have entailed very serious loss to a large number of business firms in the Island, and by the necessity of preventing a repetition of it, that it will shortly erect at Fort George a wireless station which will be available for regular communication with Bolthead whenever the cable business is threatened with interruption.

Iceberg Patrol for the North Atlantic.

CO-OPERATION between the Board of Trade and the principal Atlantic steamship lines for the purpose of carrying out the recommendation of the Merchant Shipping Advisory Committee as to stationing an ice observation vessel in the North Atlantic will result in a vessel being located off the east coast of North America during the coming spring, to watch the break-up of the ice and to report its movement on the way to the routes.

The vessel chosen for the service is the "Scotia," a whaler, formerly employed on the Scottish Antarctic expedition.

The "Scotia" has been fitted with a 1½-kw. Marconi wireless installation, having a range which will permit her easily to keep in touch with the wireless stations in Newfoundland and Labrador. Three scientific observers will be stationed on board, who will make use of the occasions on which the vessel is stationary to carry out oceanographical and meteorological observations concerning currents which will not only be of general scientific interest, but of direct value to the work in hand. The White Star Line has acted on behalf of the North Atlantic shipping companies, who will share the cost of the "Scotia's" upkeep with the Government. The "Scotia" has been thoroughly overhauled in dry dock at Dundee, and is expected to leave on her mission early in March.

General satisfaction will be felt not only by navigators, but by the travelling public, that something has at last been done by the Government to co-operate with the United States in its humanitarian work.

The United States Government is notably to the front in this work of "policing" the ocean: its activities extending not merely to notifying mariners of dangerous ice, but to warning them against the equally menacing floating derelicts, of which more threaten navigation in the North Atlantic than on any other route. Last year the United States sent a special cruiser to patrol the ice region, but it has long had patrolling its own seaboard derelict destroyers designed specially for the work. There is at the moment a Special Derelicts Committee sitting in this country with a view to formulating some method of dealing with these floating perils, the danger of which is enormously minimised by the services of wireless telegraphy.

Berne Bureau.

The following countries have agreed to contribute to the funds of the International Bureau (Berne) for the purpose of wireless service: German East Africa (4th Class), Bosnia-Herzegovina (5th Class), Spanish Colony of the Gulf of Guinea (6th Class), U.S.A. (1st Class), German Protectorate of the Pacific (4th Class), Siam (4th Class), Togo, Cameroons and German S.W. Africa (4th Class).

According to *The Broad Arrow*, wireless telegraph operators in the employ of the General Post Office are not to be allowed to join the Territorial Force without the previous sanction of the Postmaster-General.

The International Radiotelegraphic Convention

Ratification by the United States Government

Report of the Delegates

THE International Radiotelegraphic Convention, signed by delegates representing the various countries in London on July 5th, 1912, comes into force in July of the present year. But before it can take effect it must receive the approval of the various Governments whose representatives appended their signatures to the Convention.

The United States Government have given a lead in the matter, for on January 23rd the Senate passed a resolution advising and consenting to the International Radiotelegraphic Convention with the final Protocol and Service Regulations. The following proviso was added:

That the Senate advise and consent to the ratification of said Convention with the understanding to be expressed as a part of the instrument of ratification that nothing in the Ninth Article of the Regulations affixed to the Convention shall be deemed to exclude the United States from the execution of her inspection laws upon vessels entering in or clearing from her ports.

The following message to the Senate was received from President Taft dated January 8th, 1913:

I transmit herewith, with a view to receiving the advice and consent of the Senate to its ratification, an authenticated copy of the Radiotelegraphic Convention, signed at London on July 5th, 1912, with the Final Protocol and Service Regulations connected therewith.

I also transmit, for the information of the Senate in its consideration of these instruments, a report by the Secretary of State, with accompanying papers.

The Secretary for War wrote as follows:

I have the honour to acknowledge the receipt of the copy furnished by the British Government of the International Radiotelegraphic Convention, concluded at London on July 5th, 1912, together with the Final Protocol and the Service Regulations. I beg to advise you that the War Department is in thorough accord with all the provisions contained therein, and that there is no reason why the Convention should not now be submitted to the Senate to receive the advice and consent of that body to its ratification.

Mr. Benjamin S. Cable, the acting Secretary of the Department of Commerce and Labour, submitted the following observations upon the report of the American delegates:

I have the honour to acknowledge the receipt of your letter of the 7th instant, enclosing a copy, furnished by the British Government, of the International Radiotelegraphic Convention concluded at London on July 5th, 1912, with the Final Protocol and Service Regulations.

Complying with your request that I advise you whether this department sees any reason why the Convention should not now be submitted to the Senate for the advice and consent of that body to its ratification, I have the honour to state:

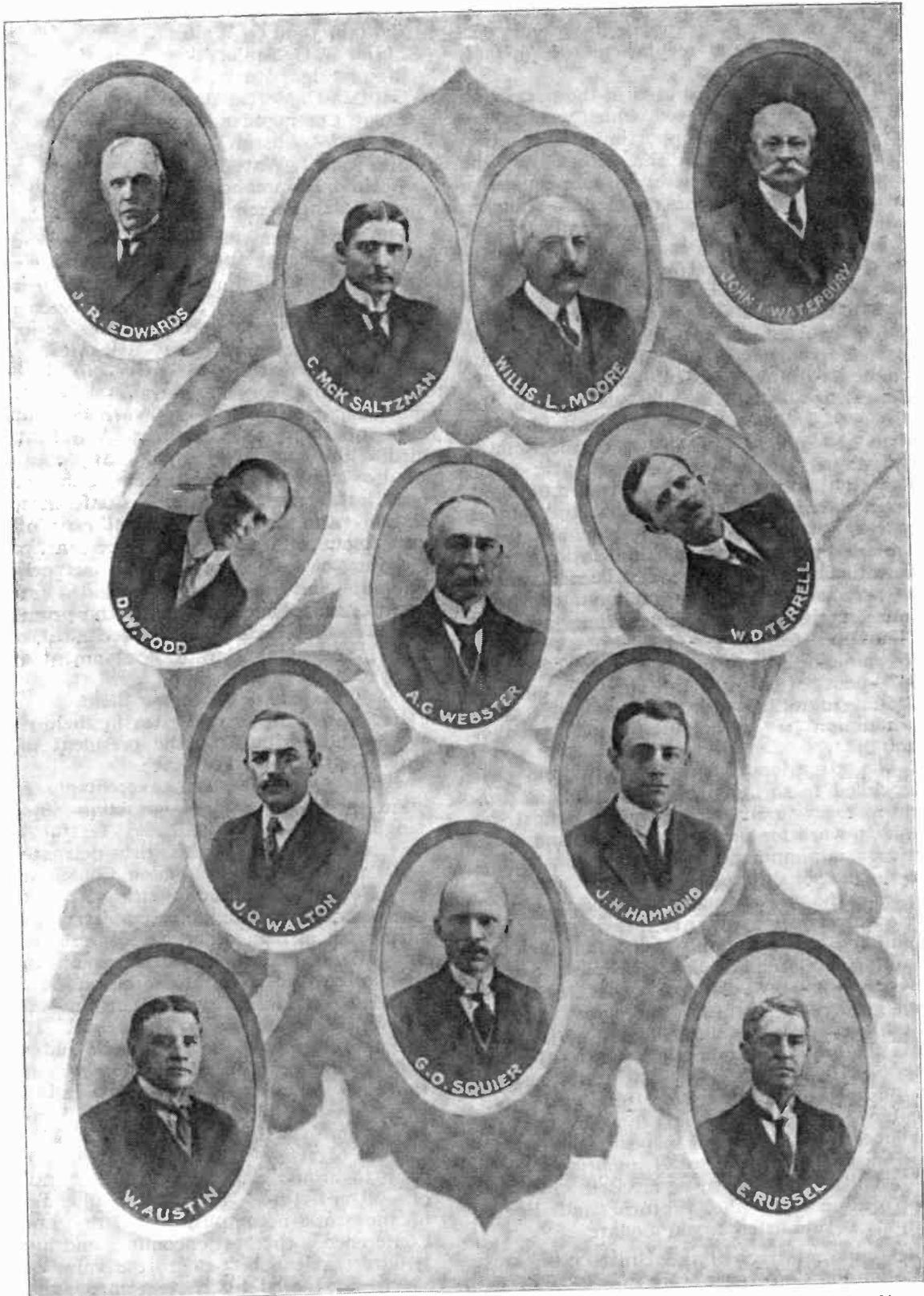
In submitting the Convention, Protocol and Regulations, the attention of the Senate should be called to the Service Regulations, Article IX., paragraph 2, which reads:

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

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

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

In legislation concerning safety of life at sea which it may be feasible to complete during the current session of Congress, it will be desirable, in my opinion, to follow the general principle that where the laws and regulations of a foreign country are as effective as the laws and regulations of the United States for the same purpose, such foreign laws and regulations should be recognised, subject always to the reservation



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(Dover St. Studios

THE UNITED STATES DELEGATES.

that our officers shall have the right by actual examination to assure themselves that such laws and regulations are, in fact, complied with.

This principle is disputed in the paragraph of the article just quoted, which would deny to our officers the opportunity by actual examination to assure themselves that the apparatus on a foreign ship in fact conforms, when the ship is about to depart from an American port, with requirements of the foreign licence which may have been issued long before. The ratification of this paragraph without amendment might seriously impair the legislation by Congress upon this subject during the past two years.

While the paragraph refers only to compliance with regulations included with the Convention, these regulations, it will be observed, in important respects are identical with or similar to provisions of the Acts of July 23rd, 1912, and August 13th, 1912. Our right to inspect under those Acts might be disputed on the ground that the subject matter for inspection on foreign ships was provided pursuant to the Convention, which permits inspection only if a licence cannot be produced. The paragraph quoted is not found in the Berlin Convention, and the difficulties it offers may readily be overcome by changing in two places the word "doit" to "peut" ("must" to "may"), and by striking out the words "A default de cette production" ("In default of such production").

The attention of the Senate should also be called to so much of Article XI, as provides that auxiliary apparatus "must be able to work for six hours at least, and must have a minimum range of 80 nautical miles in the case of ships of the first class and of 50 miles in the case of those of the second class." The Act of July 23rd, 1912, provides that the auxiliary power supply must enable the sending set "for at least four hours to send messages over a distance of at least 100 miles day or night." The provision for auxiliary apparatus agreed upon at London was before the Conference Committee of the Senate and the House at the time the provisions of the Act of July 23rd were under consideration, and this department believes that Act in this respect is preferable to the portion of Article XI, mentioned.

I shall be pleased to be advised when the Convention with the Protocol and Regulations is submitted to the Senate.

The representatives of the United States at the London Conference were:

Prof. A. G. Webster.

Rear-Admiral John R. Edwards.

Prof. W. L. Moore.
Captain John Q. Walton.
Major G. O. Squier.
Major Edgar Russel.
Captain C. McR. Saltzman.
Lieut. Commander David W. Todd.
Dr. L. W. Austin.
Mr. John I. Waterbury.
J. Hays Hammond, jun.
Mr. W. D. Terrell.

The report deals exhaustively with the subjects discussed at the Conference, and, in the opinion of the United States representatives, the *personnel* of the London Conference might be regarded as constituting a strong assembly. About 40 per cent. of the delegates present were administrative, executive, or technical officials acting for the postal, telegraph, and cable departments of the various countries represented at the Conference. About another third of the assembly (37 per cent.) were composed of army and navy officers of the various countries represented at the Conference, the relative ratio of naval and military officers being about 4 to 3. About 6 per cent. of the delegates were trained and experienced diplomats, and the remainder included eminent scientists, noted meteorologists, and prominent personages interested in the technical, commercial, and humanitarian development of the art.

Sir Henry Babington Smith

The United States delegates in their report pay a fitting tribute to the president of the Conference. They state that:

"The Conference was exceedingly fortunate in having for its presiding officer a singularly accomplished and tactful man, one who headed the British delegates at both the Berlin and London Conferences—Sir Henry Babington Smith. An experienced diplomat and able linguist, a parliamentarian of high order, a recognised postal and financial administration expert, and a man of culture, tact, and decision, he commanded the admiration, respect, and esteem of every delegate to the Conference. It was due to the policy, tact, and wise judgment of its presiding officer that there was maintained a conciliatory sentiment and spirit which enabled the Conference to conservatively and yet in its variance discuss and dispose of every proposal that had a tendency to arouse antagonism and resentment of a bitter nature. The extent and character of the work accomplished by the London Conference is the best encomium and highest tribute that can be paid to the value of the services rendered by its esteemed and able presiding officer."

In reviewing the work of the Conference it

is pointed out in the report that, as regards the settlement of purely technical matters, the American delegation took a prominent part. The work of the Berlin Conference was of an exceptionally progressive and meritorious nature, and it had anticipated advance along the line of radiotelegraphy to such an extent that the Convention of 1906 did not admit of any radical amendments or additions.

Scope of the Amendments

In all, about 350 amendments, additions, and proposals were considered in some form by the Conference. About 100 of these proposals were accepted in full or in part, the majority of the amendments adopted, however, being of a minor nature. The important changes effected were of the following general nature:

Commercial, humanitarian, meteorological, technical, and military and naval.

Under the first heading every maritime country was requested to establish certain coast stations whose equipment and permanent service would be of such capacity and character as to meet the following requirements:

(a) An installation of appliances that would not only enable the station to hear all calls of distress from ships near by or approaching the coast, but which would also be able to expeditiously and effectively handle necessary or emergency commercial work.

(b) Technical complement and installations that would possess continuous facilities for forwarding at regular periods will be demanded on certain classes of ships.

Priority of transmission of weather messages was secured by a proposition which regarded meteorological radiograms as of an important official character. The American delegates reported that if the regulations will be consistently complied with, such a system of reports and forecasts can be acquired as will reduce the loss of life and property on the Atlantic Ocean to a very material extent.

With the successful development of the project of the Atlantic Ocean it is intended to extend the service to all seas and oceans. For example, through co-operation between European Governments the Mediterranean may by this method be charted every morning, and forecasts made accordingly. The utility of this service will be particularly apparent when one contemplates that, with the opening of the Panama Canal, there will be a great increase of shipping in the waters adjacent to the steamer centres of the Gulf of Mexico, Caribbean Sea, and certain ports of the Atlantic and Pacific Oceans.

In the technical section it is pointed out that it was finally agreed that long range ship to shore communication should be transmitted

provided that a wave-length of 1,800 metres be used; that the ship should communicate only in this way to shore stations of its own country; and with the further restriction that such communication should not take place when a ship was within 25 miles of any coast station.

Naval and Military Services

With the exception of the United States delegation, substantially every maritime Power represented at the Conference refused to consent to a proposition made for extending the range of wave-lengths for commercial and maritime purposes, due to the probability that such action might lessen the efficiency and reliability of the military and naval stations; particularly in England and Germany is the fact recognised that even now radio apparatus is an important weapon of war, and that international safety may be involved in the delay in developing and extending radiotelegraphy concomitantly with the advance made by rival Powers.

The United States delegates were strikingly impressed by the zeal, economy, and efficiency by which the Bernese International Bureau has been conducted, and they report that, in view of the important and valuable service rendered by the officials of the Bureau, their emoluments and remunerations are not proportionate to the work performed.

There is a reference in the report to the chain of wireless stations which the British Government have in contemplation. It is pointed out that Germany and France are also contemplating the establishment of chains of high-power radio stations which are deemed absolutely essential for the development of their colonial trade and shipping, as well as for augmenting the efficiency of the fleet and the increased protection of their colonies.

The report concludes with a recommendation that the various executive departments of the Government directly interested in various phases of radiotelegraphy should urge the Congress to make such liberal provisions as regards extension and development of this means of communication as would not only meet the early future requirements of the departments concerned, but likewise the military and commercial demands of the nation.

Mrs. F. B. Chambers, of Philadelphia, recently obtained a wireless operator's licence at the examinations in that city, and, it is said, she showed greater proficiency than most of the male applicants.

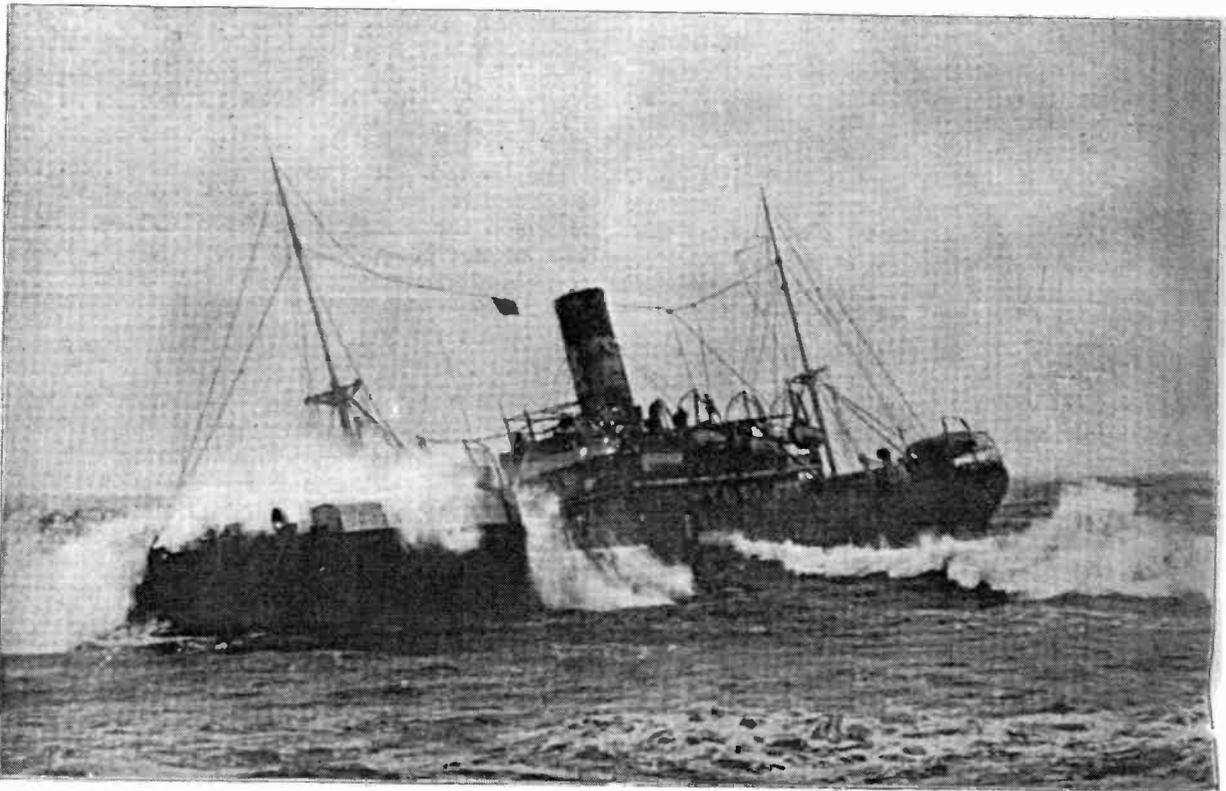
The Tragedy of Shipwreck

SHIPWRECK stories appear to us, who read of them seated in our easy chairs with our toes toasting at the fireside, to be so very similar one to another, that the account of another vessel wrecked arouses little more than a passing interest. Now, it is obviously true that, as far as the general outline of the event is concerned, the same procedure takes place on all occasions of shipwreck. A vessel is in danger, appeal for help is signalled, immediately other ships make every effort to

readers if we reconstruct the story of the wreck of the "Veronese" from information supplied by an eye-witness who has communicated a number of incidents which have escaped the notice of the daily Press.

The vessel left Liverpool for Vigo on January 11th, and there took on board some 300 Portuguese passengers, mostly emigrants. She weighed anchor on January 15th, outward bound for South America.

But she was destined to complete but little



The "Veronese" on the rocks, showing the aerial cut through to secure life line.

assist her, and the work of rescue is successful or otherwise as the case may be. But in detail there is quite sufficient variety of incident; in fact, rather more than suffices for the average mortal. For think what shipwreck means to the passenger aboard! Why, to him it is an earthquake in the midst of the sea, when his whole world is turned upside down and the very bulwarks of his existence are washed away.

It may, therefore, be interesting to our

of her proposed voyage, for the following day, at 5.30 a.m., she struck the Boa Nova Rocks, about half a mile outside Leixoes Harbour.

The first intimation of the disaster was a series of four jerks which were felt throughout the whole of the vessel, and it was fortunate that the impact was of sufficient force to send her well on to the sunken ledge of these sharp and precipitous rocks. As she lay in this perilous situation she leaned heavily to starboard, so that this part of the vessel was



An Isolated Chapel.

completely awash. Immediately on the first intimation of the disaster, Mr. Smith—the Marconi operator in charge—sent out the signal of distress, "S.O.S.," and quickly received a reply from the Dutch vessel "Hollandia," which straightway came to the aid of the wrecked vessel, and stood by her throughout this trying period. It was fortunate that she did so, for immediately after the collision the ship's dynamos were swamped, so that all lights went out, and the ordinary 1½-kw. wireless set was rendered practically useless. The operator, however, immediately changed over to the emergency set, which every Marconi installation carries, and this was in excellent working condition, so that he had no difficulty in communicating with the "Hollandia," which in turn sent messages to the marine station at Vigo. By this time all the passengers on the "Veronese" were aroused, and intense excitement prevailed. But the captain was prepared for such an emergency, and under the trying circumstances he acted with a promptitude and decision which were worthy of the best traditions of seamanship. The crew, which numbered about ninety, were called to keep order, and as soon as the "Hollandia" signalled that she was coming to their aid, he announced the fact to the passengers and so prevented anything

approaching a panic. Furthermore, he gave orders that all the women and children should be placed in lifeboats, and this accordingly was done, though the boats themselves were not launched, as they would never have lived in the heavy sea that was running. Only in one instance was this privilege abused, when one man was discovered dressed up in feminine apparel in order that he might be amongst the first to leave the ship. But when his craven attempt at self-rescue came to light, he was placed under strict observation, and was not allowed to leave the vessel until everyone else of the passengers had been saved.

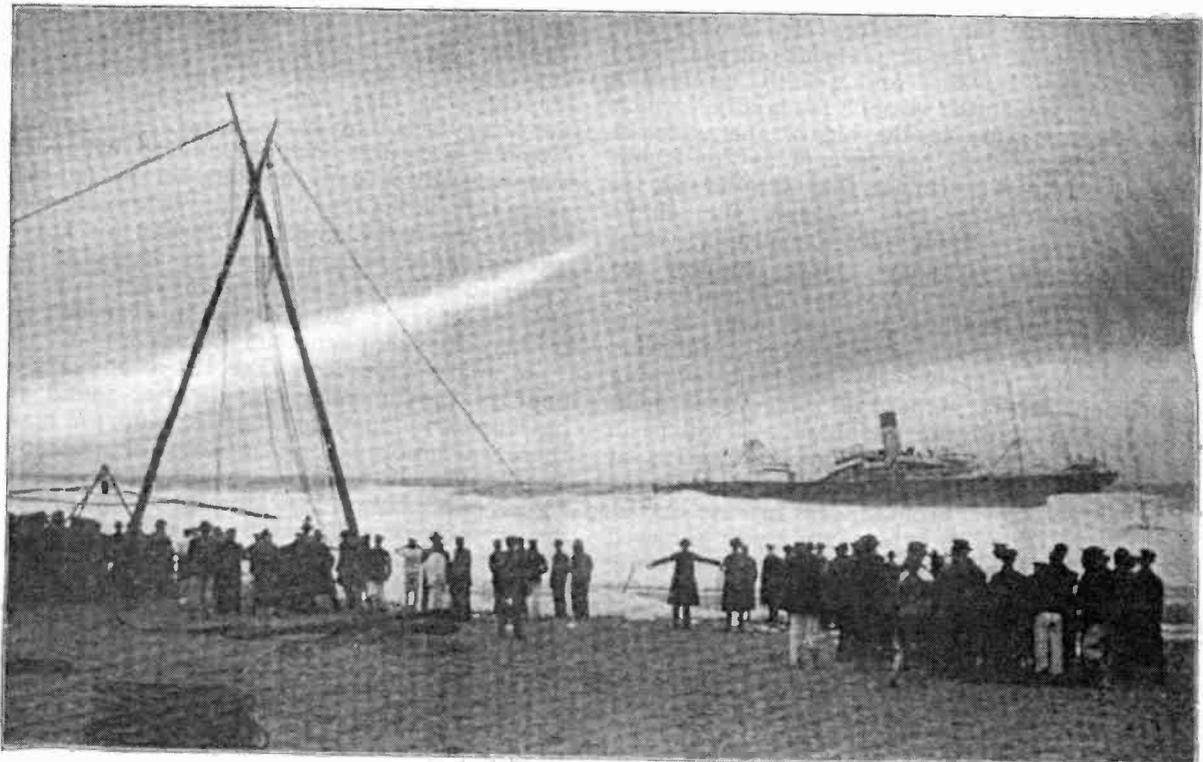
As might have been expected at so early an hour in the morning, the disaster found the passengers in but scanty attire, and for many there was no opportunity of securing garments, as the inrush of water made entry to the cabins impossible. But all available wardrobes were ransacked and every dry garment utilised, the officers themselves contributing their own kit to the common stock. The motley result of such promiscuous attire can be better imagined than described, and would, but for the seriousness of the situation, have been provocative of mirth. But all this time the sea was doing its best to wreck the vessel, and huge waves were washing the decks, while one monster

wave, invading the music room, wrenched its iron door from the hinges, and in titanic sport lodged it in the crow's nest. On another occasion a piano on the boat deck, which was securely packed and strapped to the deck, was completely wrecked, and afterwards its parts were discovered lying on the rocks more than half a mile away. By this time the authorities at Leixoes Harbour had installed their life-saving apparatus on the most likely position on the shore for reaching the distressed vessel, and at this point the "Veronese" was certainly not more than 350 yards away. Even then it was difficult to reach the vessel, and forty-eight rockets were fired before a rope could be secured on the "Veronese," for in many instances the rockets went wide of the mark; others again fell too short of the vessel, while others, in the course of their passage, burnt the rope to which they were attached, so that it fell adrift and was useless. The successful shot lodged the rope over the wireless aerial, and this had to be cut away before the hawsers could be secured to the mast. Even then the difficulties were not over, for the tempestuous sea greatly added to the strain placed upon the line during the working of the breeches-buoy; the rope—and it was some 3 inches thick—more than once snapped like cotton, and the work of communication had to be commenced all over again. As it was, throughout the Thursday,

only thirty lives were saved. But after this a fresh contingent of helpers joined forces with the rescue party, and the work of life-saving progressed more rapidly. These helpers were English officers, who were in charge of some Norwegian ships stationed in the River Douro, and their business-like methods acted as a gentle stimulus to the other rescuers, with the result that on the Friday night some eighty lives were saved.

But all this time the lot of the passengers was hardly one to be envied. Food was very scarce indeed; in fact, it was not until the breeches-buoy was in working order that anything could be procured at all, and then the only provisions which were sent from the shore by means of the buoy were eggs and bottles of water. When, on the Saturday, the sea calmed considerably, some of the crew were able to reach the refrigerators, and oranges and milk were procured.

The journey from ship to shore in the breeches-buoy was perilous in the extreme. On one or two occasions the rope by which it was suspended snapped, and the unfortunate occupant was thrown into a sea wherein nothing could live. On another occasion, during the manipulation of the ropes, the buoy, when half-way across, turned turtle, and again the occupant—this time a stewardess on the "Veronese"—was drowned.



Rocket fired from the shore.

Rescue by the buoy was, however, the means of bringing a curious fraud to light. One woman absolutely refused to divest herself of some over-voluminous garments which hindered the adjustment of the apparatus, and it was only by a herculean effort that she was squeezed into the ample girth of the belt. Finally she reached land, and equal force had to be used to haul her out of the buoy. Of course, in her transit she had been soaked to the skin by the waves, but she vehemently refused to have any of her garments removed; so when all peaceful persuasion failed, pressure had to be brought to bear on the refractory individual, and her clothes taken away by force. Then the reasons for her resistance were apparent. Bundles of the ship's spoons and forks were found completely encircling her waist.

By Saturday, however, the worst of the danger was over. From the turn of the tide the storm gradually subsided, and lifeboats were enabled to approach the wreck and take off the remaining passengers and crew. All the survivors were well looked after in Leixoes, the English by the English colony there, and the Portuguese by their own compatriots. The Portuguese Government offered to convey home those of the passengers who were anxious to return, while the company to which the "Veronese" belonged offered to find places on other of their vessels for those who still desired to make the journey to America. Both offers found ready acceptance, but still a fair percentage of the passengers could not be accounted for, and have not been to this day. They did not accept either of the proposals, they certainly were not drowned, and as far as evidences were concerned, they vanished into thin air. The reason for this peculiar conduct was afterwards explained. When examination of the ship's cargo was made for purposes of salvage, it was discovered that about 300 revolvers had been boarded by some of the emigrants. Apparently they had formed a gun-running combine on a small scale, and correctly surmising that after the shipwreck their dealings in contraband would come to light, they had thought it advisable to make themselves scarce as soon as possible.

In the course of a communication, Captain Chas. Turner, who was in command of the ill-fated vessel, paid the following generous tribute to the work of the wireless operator. He said:

"I beg to call your attention to the splendid conduct of Mr. L. Smith, Marconi operator, on the occasion of the wreck of the s.s. 'Veronese,' January 16th last, on the Portuguese coast. He stayed at his instrument from the beginning, until it was put out of action by the water pouring in on it.

During this time the breakers were pounding the vessel and sweeping over fore and aft. After the machine was out of action, he reported the fact to me and calmly helped in the work outside. At nights he took turns with the third officer signalling by Morse lamp to the shore (British seamen from vessels in Oporto were there by this time). In fact, the signalling was constant, as each person was saved by the breeches buoy. Nothing could be finer than the way he stayed at his post, constantly drenched by rain and seas. I may mention that 243 persons were on board, and towards the last I stated I would be the last to leave, the third officer next ahead of me, and that I would like 'Marconi' to go ahead of him. His answer, 'Right, sir,' exemplifies the man. The period of life-saving was from 5.30 a.m. January 16th to 2.30 p.m. 18th. Afterwards in fine weather in reboarding he gave me most intelligent and hearty assistance."

The public service of the wireless stations at Castiadas (Cagliari, Sardinia) and Sfer Racavallo (Palermo, Sicily) has been temporarily suspended owing to damage occasioned to the apparatus.

The New York Electrical Society has published in pamphlet form the lecture of Commendatore G. Marconi delivered before that body in New York on April 17th, 1912. Several illustrations are included in the text. Mr. G. H. Guy, 29 West 39th Street, New York, is secretary of the society.

At the annual meeting of the British North Borneo Company, the chairman announced that the company were entering into a contract for the erection of three wireless stations—at Sandakan, Selimpon (the headquarters of the coal-mining industry), and Jesselton—and the question of a fourth station at Lahad Datu in Darvel Bay was also being considered. One of the principal objects of the board's policy of development was to make Jesselton the chief port of call in the China Sea, and they were pushing ahead with a system of lighting those parts of the coast which at present were a danger to shipping. In connection with this matter they hoped to secure the assistance of the Government of the Philippines.

The *Bulletin de l'Union Panaméricaine* reports that a Bill has been submitted to the Congress of Peru concerning the opening of a credit of £17,750 for the installation of two wireless telegraph stations: the one at the north coast, and the other at the south coast of the country.

Progress Abroad*(Specially Contributed)***Australia***SYDNEY, January 4th.*

The station at Brisbane (call letter P O B) has been opened for public service, the rate for messages being 6d. per word without minimum. The Port Moresby (Papua) and Mount Gambier (South Australia) have also been opened for public service. Mount Gambier is situated in the vicinity of Cape Northumberland, close to the Victorian border.

It is proposed to erect a station at Gabo Island on the New South Wales coast, 242 miles south-west of Sydney.

Brazil*RIO DE JANEIRO, January 10th, 1913.*

The coast station at Cabo St. Thomé was inaugurated last week and opened for public traffic.

It is proposed to erect a station at St. Luiz de Maranhao, probably a 5-kw. Marconi. The Telegraph Department have been granted a credit of £6,000 to build a station at Porto Murinho.

The following are the wireless stations now in working order in Brazil:

Fernando Noronha, 35-kw.; range, 1,800 metres. Olinda, 5-kw. Amaralina, 5-kw. Sao Thomé, 26-kw. Mont Serrat. Florianopolis. Junçao, 5-kw. Lagoa. Senna Madureira, range, 2,800 and 1,800. Rio Branco, range, 1,800. Cruzeiro do Sul. Babylonia, range, 300. Manaos and Porto Velho.

A new wireless district has been created by Law No. 2,738 of January 4th, 1913, with a credit of 732 contos, to include the Acre, Amazonas and Para wireless stations, and after these stations have been taken over by the telegraph department they will be opened to public traffic.

Law No. 2,719 of December 31st, 1912, fixes the wireless rates at 6 francs for a telegram up to 10 words, and 60 centimes for each word extra; included in the rate is the transmission between a coast station and the telegraph stations to which the wireless station is directly joined up.

There is also a tax of 25 centimes a word for every State the telegram passes through. The ship tax, as fixed by the Telegraph Department, is 240 reis a word, and the coast station and forwarding charge is 360 reis, equalling together one franc; 10 words are charged for, and the extra tax of 25 centimes is collected when necessary.

Canada*MONTREAL, January 31st.*

The work in connection with the duplexing of the Transatlantic service has been finished as far as the Canadian side is concerned. Messrs. Round & Robb reached Glace Bay from England about the middle of January to attend to the final adjustment of the receiving apparatus for the duplex work. High-speed transmitting apparatus has also been successfully installed at Glace Bay.

The equipment of the station at Sarnia, Ont., for the Canadian Government is now well under way, and is expected to be completed about the end of February.

In connection with the closing of some of the Gulf of St. Lawrence stations, great difficulty was experienced last fall in relieving the operators owing to exceedingly stormy weather.

Engineer J. O. G. Cann is still at Battle Harbour. An attempt was made by the steamer "Portia," of the fleet of Bowring Brothers, Newfoundland, to reach Battle Harbour about the middle of January, but this steamer was unable to penetrate the heavy slob ice in the Straits of Belle Isle. Another trial will be made the next time the steamer "Portia" goes north, and it is hoped that she will be successful in getting Mr. Cann away.

Operator Cashell was unable to leave Point Amour station, and must remain there until the early spring unless he is able to obtain a passage by one of the sealing steamers which may reach Point Amour during the latter part of March.

The operators on the Heath Point station have been unable to leave. Several attempts have been made by the Canadian Government steamer "Montcalm" to take them away, but the stormy weather in the Gulf of St. Lawrence during the month of January rendered all efforts fruitless.

This extraordinarily stormy weather has been felt all over the North Atlantic Ocean. It appears to have shown itself in the Gulf of St. Lawrence in a winter so far exceptionally free from cold usually obtaining at this time of the year. The river St. Lawrence is still running freely wherever the current is at all rapid, and it would be quite possible to-day for a steamer to reach the city of Montreal. Owing to the unusual absence of ice it is expected that the season of navigation for the Gulf of St. Lawrence for the season of 1913 will open up earlier than usual.

From statements which were widely circulated in the Press during the early days of January, it appears that "extended wireless service" is among the good resolutions of the General Post Office.

Notes from the United States.

At the annual meeting of the Institute of Radio Engineers held last month, the following officers were elected to serve for the year 1913: President, G. W. Pickard; vice-president, Mr. R. H. Marriott; secretary, Mr. E. Simon; treasurer, Mr. J. H. Hammond, jun.; managers, Messrs. J. L. Hogan, jun., J. S. Stone, R. A. Weagant, and L. Espenschied. At a meeting of the Board of Managers shortly after, Dr. A. N. Goldsmith, of the City College of New York, was appointed editor of publications.

Transpacific Wireless Stations. The Marconi Company has commenced the erection of eight wireless telegraph stations, two pairs for Atlantic service, and two pairs for Pacific service. Receiving and sending stations thirty miles apart will be constructed at Oahu, in the Sandwich Islands; Tamales Bay and Bolinas, Cal.; near Belmar, N.J., and in eastern Massachusetts at a point not yet definitely selected. These stations will be part of a globe-girdling system which will continue to the east by way of Japan, and thence ultimately to India. Twelve towers ranging in height from 400 feet to 450 feet will be spread out over a semi-circle covering a square mile at each station, and it is estimated that the range of each station will be from 4,000 to 6,000 miles.

Honouring Wireless Heroes. The movement on foot in the United States to honour the memory of wireless operators who died in the performance of their duties during shipwreck has been advanced a stage further. Recently Park Commissioner Stover met at Battery Park Mr. H. B. Walker, president of the Old Dominion Steamship Company, Mr. H. H. Raymond, vice-president of the Clyde line, and Mr. C. C. Galbraith, of the Marconi Wireless Telegraph Company of America (who is chairman of the Phillips Memorial Fund in the United States), and selected a site for the fountain for Jack Phillips, George Sczpanck, and George C. Eccles, wireless operators who have gone down with their ships.

A prominent corner in the Children's playground at Battery Park was chosen. Commissioner Stover is fully in accord with the proposed memorial, and not only offered the most favourable position in Battery Park, but will plant two trees to shade the fountain.

The Marconi Wireless Telegraph Company of America is an important and ever-growing

organisation. It controls practically the whole of the wireless affairs of the United States, and is the fountain-head of a communication service which is indispensable to the administration of State affairs, and has its ramification in every variety of private enterprise. The central offices are situated in one of the principal thoroughfares of this vast metropolis of the New World.

The Marconi Organisation. The leading spirit in this great house of business is Mr. John Bottomley, whose biography appeared in the December number of THE MARCONIGRAPH. He it is who has organised and is responsible for the up-to-date methods in all its departments, and the fact that this immense organisation runs as easily as a well-oiled machine is sufficient testimony to the efficacy of his control.

His right-hand man is Mr. George S. de Sousa, who holds the responsible position of Traffic Manager. Many are the important branches of service which come under his supervision. He arranges for the maintenance of a continuous message service, sees that due observance is taken of the general regulations of the company, controls the telegraph staff on ship and shore stations, deals with reports from operators and the heavy correspondence connected with the general telegraph business. To him falls the task of issuing the sailing lists showing the approximate time at which steamers may be expected to be in communication with the coast stations, and which are supplied to all telegraph offices throughout the country so that radio messages destined for ships at sea can be properly routed. In close touch with the Traffic Department is the Contract Department, which transacts all business connected with the sale and rental of wireless apparatus, and negotiates all contracts for wireless installations on ship and shore.

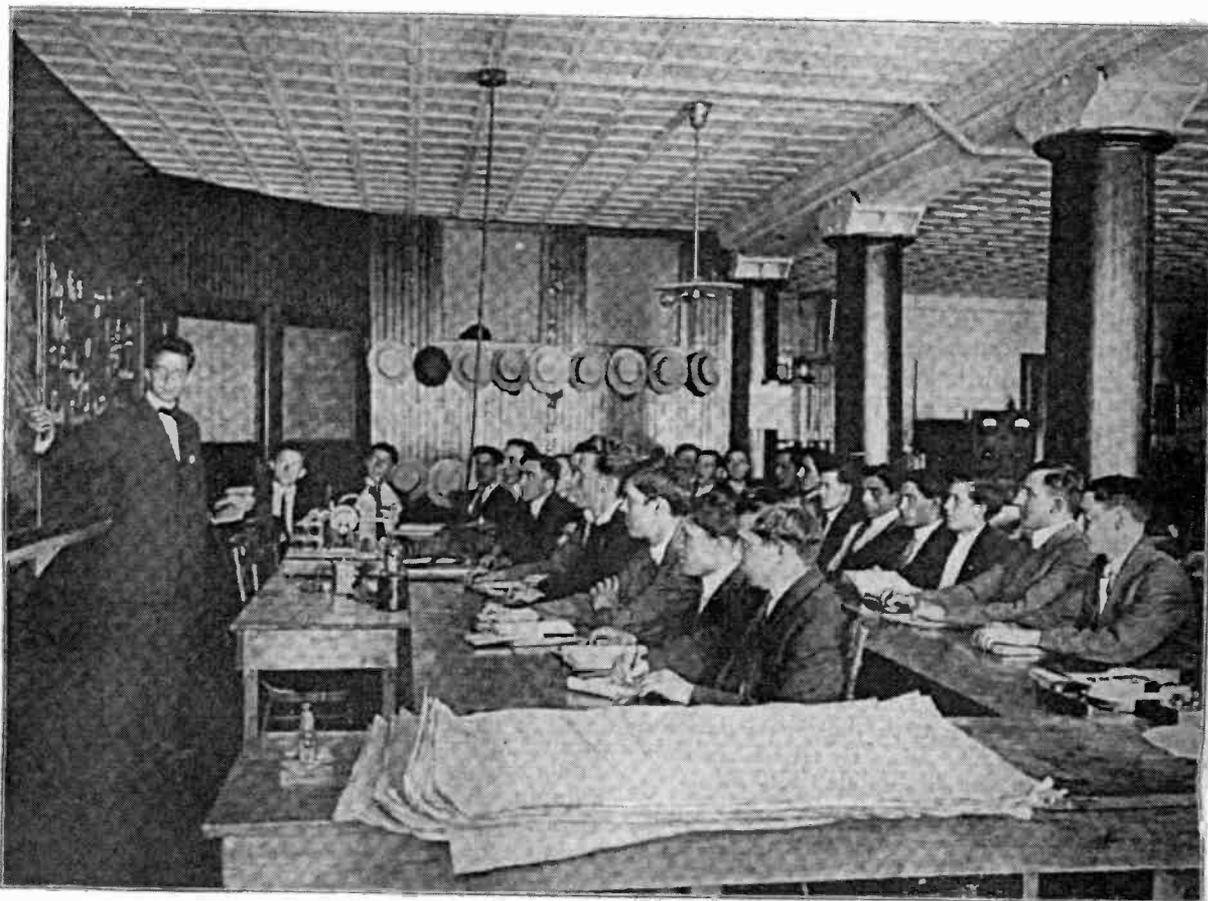
Another important branch of the organisation is the Engineering Department. It is under the guidance of Mr. Frederick Sammis, who supervises all work of constructing apparatus, and to whom all design sheets for new or improved machinery are brought for approval. The responsibility of such a position can hardly be exaggerated, and the fact that at the present time the Engineering Department is refitting and retuning some 650 ships and shore stations, and has just delivered a large number of sets to the United States Army and Navy Departments, while a 100-h.p. station for the United Fruit Company at Santa Marta, Columbia, has recently been successfully completed, another of the same type at New Orleans is about half-finished, and work has been commenced on a third at Swan Island, is sufficient proof of the immense amount of work that is here brought to a successful issue.

The Training of Operators in New York and Madrid

FOR no other hobby but wireless telegraphy surely can it be claimed that so many of its devotees have ultimately made it the business of their life; from a fascinating experiment it has become the chosen career of many hundreds of young men.

The reason is not far to seek. The operating side of wireless telegraphy offers nearly all

regulations of the ship. On a passenger vessel his life usually runs on pleasant lines. On ships carrying two operators a continuous watch is maintained, but where one operator is the rule the hours of duty are sometimes long and irregular. In port, however, there is very little for the wireless man to do, and splendid opportunities are presented for seeing



A Class Room at the Marconi School, New York.

those attractions for which a youth looks in a profession on which he contemplates embarking. The pay and prospects are good, there is no wearying "apprenticeship," the hours as a rule regular, the work interesting, and the life at sea an attractive and varied one.

The honorary rank of a junior officer is usually that of a wireless operator on board ship. He signs the ship's articles as a member of the crew, and is subject to the disciplinary

regulations of the ship. On a passenger vessel his life usually runs on pleasant lines. On ships carrying two operators a continuous watch is maintained, but where one operator is the rule the hours of duty are sometimes long and irregular. In port, however, there is very little for the wireless man to do, and splendid opportunities are presented for seeing

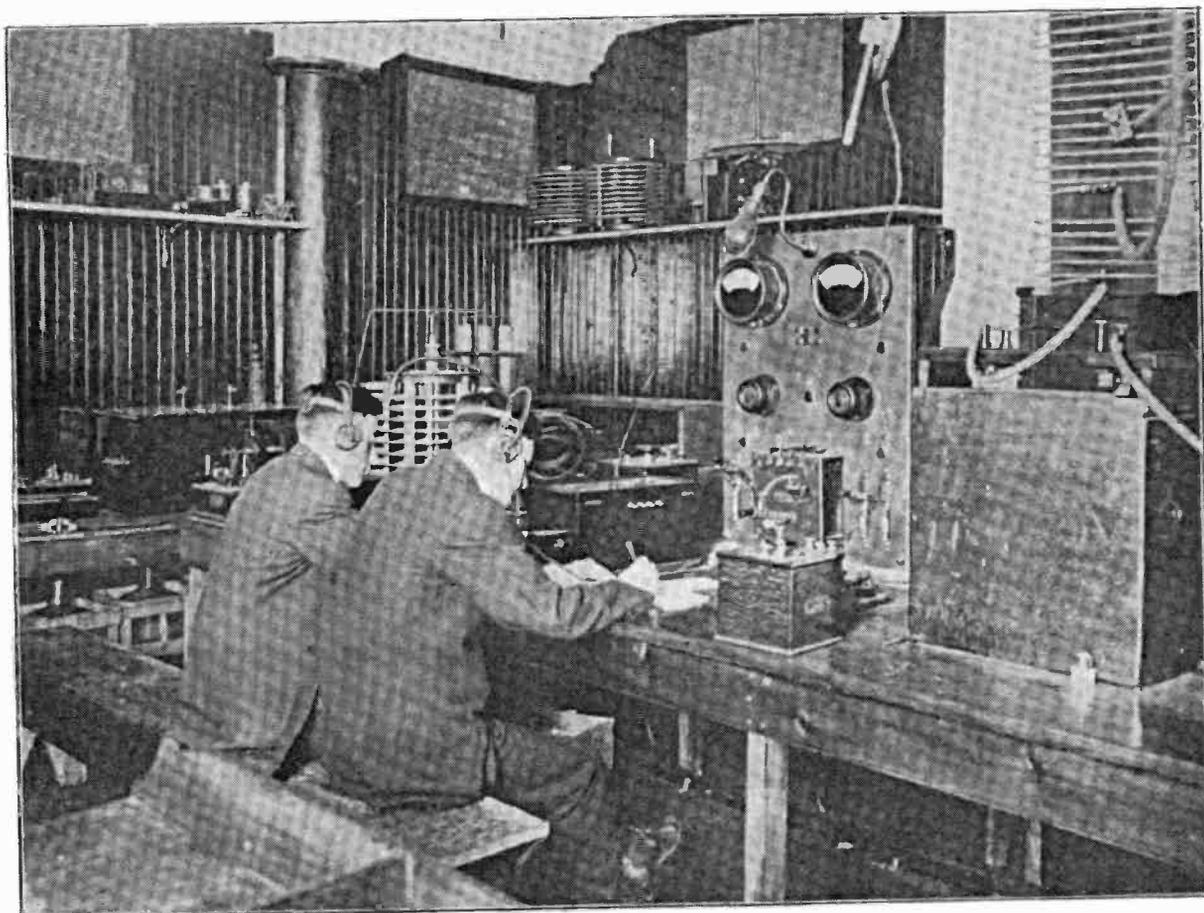
foreign countries which, in the old days, would have meant for a young man an arduous voyage "before the mast." The scale of pay is slightly higher than that paid to telegraphists in the home Government and cable services, and much higher than that received by railway telegraphists, and is increased more rapidly. Good quarters, food and attendance are provided in addition, and, except in very special circumstances, the

operator is called upon to do nothing but attend to his wireless work. After a term at sea the operator may qualify for a shore appointment or for a travelling inspectorship, with special pay; if he fits himself for it he may be transferred to the engineering staff of the company. But, apart from these opportunities, valuable appointments become vacant from time to time in many parts of the world on yachts, warships—even airships—and special services on land.

The young man between 21 and 25 who has

tuition. Others not so well qualified take longer, but as a rule not more than six months.

Such is the demand for qualified operators that the Marconi companies have been compelled to make special arrangements for training men as wireless operators. Four of their largest schools are in London, Liverpool, Madrid and New York. The Liverpool school, the pioneer of wireless schools, was established in 1903, and is under the charge of Mr. F. E. D. Pereira; the school in Marconi House, London, was opened in September last, and described in



Receiving Messages at the New York School.

a pretty sound general education, a knowledge of electricity and magnetism, knows something—even a little—of foreign languages, and has had some previous experience of telegraphic work, has everything in his favour.

To turn him into an efficient operator is one of the special features of the work which the Marconi companies have set themselves in various countries. Coming fairly well prepared to the company a man should, without undue trouble, pass the necessary examinations to obtain an appointment after only six weeks'

our issue of that date; the New York school was also opened in September, and the Madrid school is the latest to be added to the list. The number of students who attend the schools more than justifies their existence.

No excuse for subsequent lack of proficiency exists in these schools; the apparatus installed is of the most up-to-date pattern, and such as is in actual commercial operation, and every student is thoroughly drilled in its use. The New York school possesses a set such as would be fitted to a large vessel. It consists

of a 2-kw. 240 cycle-discharger transmitting set with switchboard and controlling appliances, and a 2-kw. quencher spark set, with all the necessary apparatus for adjustment and the obtaining of resonance. There is also a standard auxiliary set with storage cells, and a large amount of apparatus for demonstrating the application of electricity and magnetism to wireless telegraphy. A Fleming cy-mometer, which enables the operator to ascertain the number of oscillations determining the frequency of the Hertzian waves, is also provided. For daily instruction a standard auxiliary set with storage cells is in use, and amongst a large amount of experimental equipment there are wave meters for measuring wave-lengths and obtaining resonance in transmitting circuits, and a decimeter, an instrument used in measuring the logarithmic decrement of

damping. A Wheatstone transmitter in the class room for Continental Code practice enables messages automatically to be sent to the class at any speed desired.

When they attain some little proficiency in their work the American students are allowed

to receive actual messages direct from ships at sea, the class-room being fitted with the latest type of receiving apparatus connected to an aerial on the roof of the building.

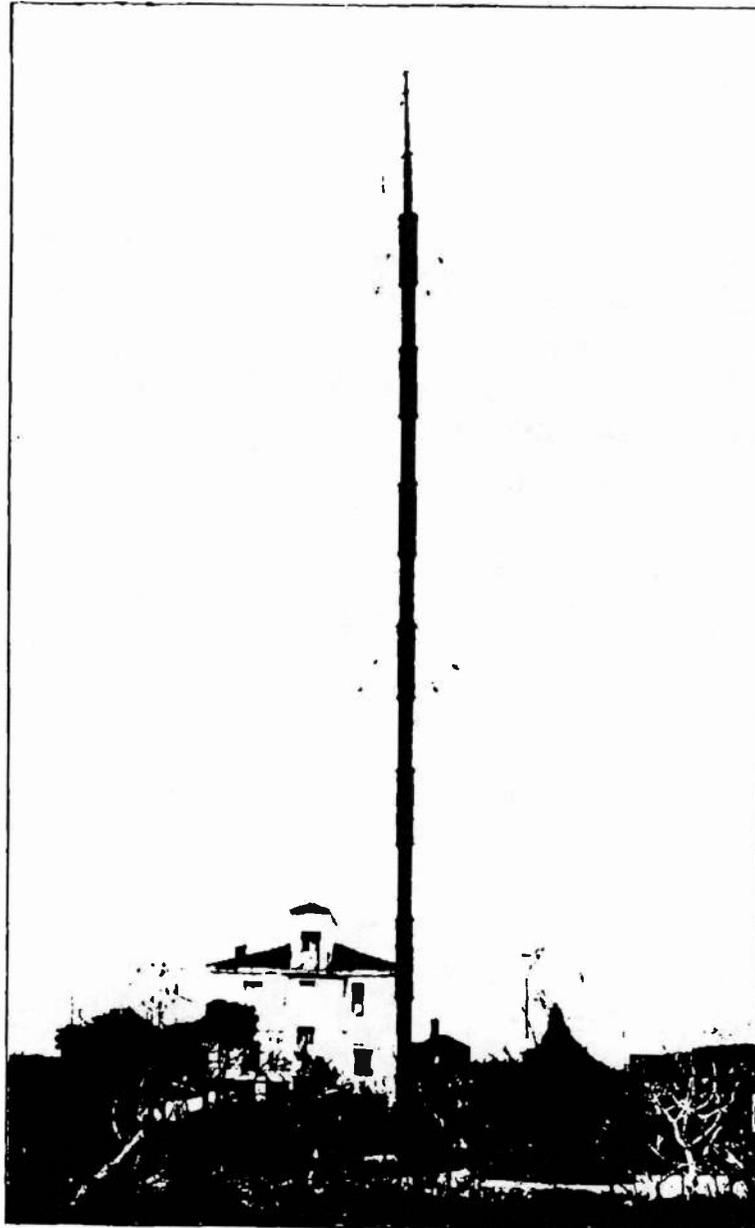
The Marconi school at Madrid is situated in the Barrio de Tetuan, 5 kilometres from the

centre of the city and easy of access by a good service of tramcars. It stands with various minor buildings in extensive grounds, which were acquired by the Compañia Nacional de Telegrafia sin Hilos for the purpose.

The school is directed by Lieut. Don Manuel Moreno Quesada, engineer of the Compañia Nacional, and Don Juan Gonzalez Rueda, ex-professor of the naval school. Mr. W. Grey Martin, of the Marconi school at Liverpool, is also an instructor.

The spacious class-room, which is a feature of the school, provides ample accommodation for the students.

It is well equipped with apparatus necessary for wireless telegraph work, and it is arranged in such a fashion that students can receive instruction in both sending and receiving wireless signals. Instruction in the various schools is carried out more or less



View of the Madrid School and Mast.

on similar lines, and to describe the Madrid school in detail would merely be to go over ground which has already been adequately covered in our description of other schools. The features which distinguish the Madrid school are those calculated to meet the peculiar requirements of Spain. Instruction is given under conditions which make it possible to obtain the highest efficiency. Not only is technical instruction given, but the clerical side is included, and French and English are also subjects taught at the school.

then turns his attention to a course in elementary magnetism and electricity, and on attaining proficiency in this theoretical work he is taught the practical manipulation of the various apparatus in use, how to trace and remove faults, and how to repair break-downs. A thorough instruction in the rules and regulations laid down by the Radiotelegraphic Convention for the commercial working of wireless telegraphy, and a drilling in clerical work connected with telegraphic accounts and returns, brings the course to a close.



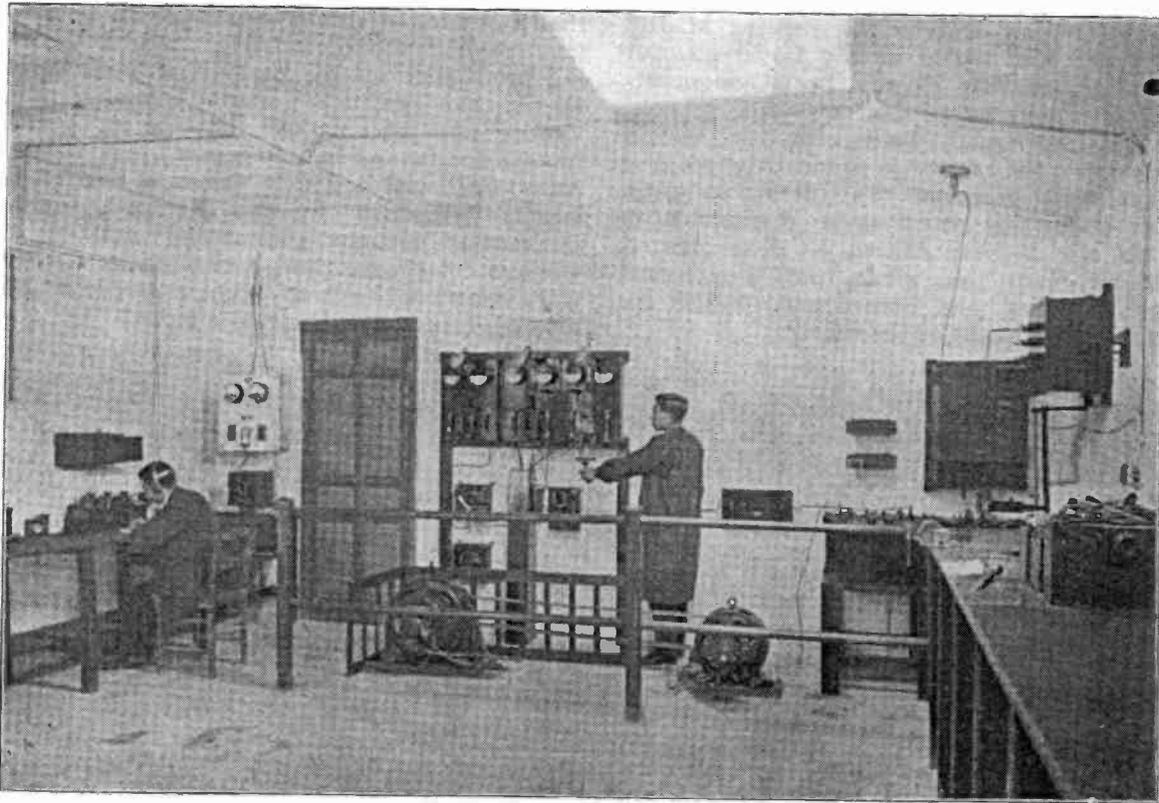
One of the Class-rooms in the Madrid School.

The library contains an important collection of modern works on wireless telegraphy. Adjoining the main class-room is the 1½-kw. transmitting set, which is constantly in service; the students taking watches of eight hours each, during which they are able to familiarise themselves with the practical work of a wireless station.

On entering one of the Marconi schools a student, if a beginner, is first instructed in the sending and receiving of signals by means of the Morse sounder, buzzer and telephones. He

Thoroughness is the keynote of the Marconi instruction. Both the theory and practice of wireless telegraphy are comprised in the course of daily instruction. As soon as a man succeeds in passing the necessary examinations and can receive and send messages at the rate of 30 words per minute, he immediately joins the operating staff of the Marconi Company and at the first vacancy is drafted for service at sea, and the total fees paid during the period of his instruction are refunded.

There is no disappointment, no weary



The Marconi School in Madrid.

waiting after you have qualified for your job. Of how many openings can it be said that there is a bright future and—after less than a year's training—a position which yields an income sufficient to make a man independent?

The Sculptor and the Model.

Prince Paul Troubetskoi has long ago come into the kingdom of his art. Indeed, it is not to be supposed that such vitality as is displayed in his sculpture would long wait for appreciation. His work may lack smoothness, it may be wanting in those little caresses which make the medium "flow," but it has reality. Whatever Troubetskoi purports to portray, that he re-creates whether it be in bronze or marble or precious metal—precious indeed after his hands have welded it—for it is no longer a model, but an individuality instinct with life. One of this artist's latest works is a gold tablet which was presented to Mr. Marconi by prominent members of New York Society on his leaving America earlier this year. It bears the head and shoulders of Mr. Marconi modelled in basso-relievo, and it shows all the marked characteristics of the great sculptor—not excluding his energy and impatience. A reproduction of this tablet appeared in the June MARCONIGRAPH. The methods Troubetskoi employs in working out his effects have given Mr. G.

Bernard Shaw an opportunity for including an entirely "Shavian" paragraph in his review of "L'Art," Auguste Rodin's new book, which appears in *The Nation*:

"Troubetskoi once made a most fascinatingly Shavian bust of me. He did it in about five hours, in Sargent's studio. It was a delightful and wonderful performance. He worked convulsively, giving birth to the thing in agonies, hurling lumps of clay about with groans, and making strange, dumb movements with his tongue, like a wordless prophet. He covered himself with plaster. He covered Sargent's carpets and curtains and pictures with plaster. He covered me with plaster. And, finally, he covered the block he was working on with plaster to such purpose that, at the end of the second sitting, lo! there stood Sargent's studio in ruins, buried like Pompeii under the scoriae of a volcano, and in the midst a spirited bust of one of my reputations, a little idealised (quite the gentleman, in fact), but recognisable a mile off as the sardonic author of 'Man and Superman,' with a dash of Offenbach, a touch of Mephistopheles, and a certain aristocratic delicacy and distinction that came from Troubetskoi himself, he being a prince. I should like to have that bust; but the truth is, my wife cannot stand Offenbach-Mephistopheles."

Original from

Wireless on the Gold Coast.

WIRELESS telegraphy made its *début* on the Gold Coast on Christmas Eve, when the following messages of congratulation were exchanged between the Governor and Commander-in-Chief, Sir Hugh Clifford, K.C.M.G., and Major Bryan, through the newly-erected Marconi station at Accra :

GOVERNMENT GAZETTE

(Extraordinary),

ACCRA, GOLD COAST, WEST AFRICA.

FRIDAY, DECEMBER 27TH, 1912.

Telegram.

Sir Hugh Clifford,
s.s. "Falaba."

In this, the first message transmitted by the Accra Marconi station, I tender, on behalf of the Gold Coast Colony, a hearty welcome to Your Excellency and Lady Clifford.

BRYAN.

Major Bryan, C.M.G.,
Accra.

Hearty thanks and Christmas greetings to you and to all my friends, colleagues and associates in Gold Coast Colony, from my wife and myself, and my earnest hope is that we may succeed, by our united efforts, in enhancing the prosperity of the Colony. I fear we shall not reach Accra before 1 p.m. to-morrow.

CLIFFORD.

A notable impulse to the development of the British Colony, it is confidently anticipated, will be given by the establishment of the radiotelegraphic station in the capital. Accra, with a population of 20,000, lies on the seaboard 70 miles from Cape Coast, in a territory which, though notoriously unhealthy in the matter of climate, is exceedingly fertile, particularly near the coast, and abounds in mineral wealth. Gold is plentiful in the districts of Wassau and Tarkwa in the west. The annual export of products is valued in the neighbourhood of £1,000,000, and consists principally of palm oil, rubber, palm kernels, lumber, cocoa, kola nuts and gold dust.

Wood is almost absent in the construction of the Accra station, the excessively damp nature of the climate rendering the sparing use of it advisable. The main mast consists of a sectional steel mast 200 ft. in height situated in the centre of a circle, on the circumference of which are four other tubular steel masts 60 ft. high. The main aerial is of the umbrella type, the second being a twin wire type aerial.

The length of the wave normally transmitted will be 300 metres, but the station is capable of transmitting waves varying in length from 600 to 900 metres.

The equipment consists of a 5-kw. set driven by an oil engine. No special features distinguish the power plant. The prime mover is a 5 h.p. oil engine, to which is direct-coupled a 3-kw. continuous current dynamo, having a pressure regulation suitable for enabling it to be used to charge the accumulator battery of 54 cells. The motor alternator consists of a continuous current motor, designed to run off the accumulator battery and to drive a disc discharger mounted on an extension of its shaft. The transformer is designed to afford a transformation ratio of either 300 to 10,000 or 300 to 5,000 as desired.

A Wireless Lament.

THAT the Admiralty just now is engaged in a series of long-distance experiments, to which the southward voyage of the Dominion battleship "New Zealand" lends itself, is the belief of the London correspondent of the *Yorkshire Observer*, who seems to have a hobby in wireless telegraphy.

Dramatic, indeed, was the message sent out from the Admiralty on the evening of February 17th and passed from Portsmouth to Gibraltar for transmission to the "New Zealand," then well on her way down the West Coast of Africa.

"It came to me," states the correspondent, "as it must have come to every naval wireless operator within a thousand miles of Portsmouth. This was the message :

'They sleep in peace amid the eternal snows.

Their goal achieved, their duty nobly done.

And over these whose victor's crown is won,
The loud shrill requiem of the tempest blows.'

"No words are needed," continues the correspondent, "to suggest the thrill with which suddenly out of the void a remarkable message of this kind materialises to the ear. It is almost as though the universe itself were brooding over the dead."

"Messages," he concludes, "are being sent out every two or three hours—mostly in code, but some, as in this, in plain language. The majority of them have been of the commonplace kind usual in such tests, but for once at least the operator, or whoever may have been responsible for the message, was stirred by something little short of inspiration."

The "message" is the first of the stanzas of a tribute to Captain Scott and his comrades, headed "England's Debt," which appeared in the *Daily Mail* of February 12th over the signature "Touchstone."

The Influence of Wireless Telegraphy upon National Defence.

THE report of the Director-General of Ports and Telegraphs of the Republic of Columbia contains a summary of a letter addressed to one of the leading newspapers in the country advocating the establishment of wireless telegraph stations. The Director-General also emphasises the necessity for establishing stations on the frontier as an aid to national defence, and he recalls the Bill submitted before Congress in 1911. The purport of this Bill was to authorise the Executive to erect wireless stations in the districts in the east and south of the Republic, and at other places where it should be thought necessary, by means of a credit of \$200,000 for the cost of the installation. The Bill was well received in the Senate, where it was amended by raising the sum to \$300,000, and also put forward for approval at the first discussion, but there was not time to deal with it afterwards.

Whilst the Bill was under discussion it was thought opportune to accept former estimates which the Government received for stations at Santa Marta and Cartagena.

The Plan Outlined.

In the course of his letter to *El Tiempo*, Mr. G. Perez deals with the radio-telegraphic service as an element of national defence, as well as of colonisation and exploitation of extensive and wealthy districts.

"If in the report," he adds, "I expressed my opinion regarding the establishment of this modern system in Columbia to-day as a luxury, it was because the scheme submitted for my consideration dealt with wireless stations in Bogotá, Medellín, and Cartagena, where the existing telegraphic system would have to be maintained, and, at the same time, the outlay for the installation and maintenance of the wireless system would be incurred. To-day the outlook has changed. There are vast regions to explore in the extreme east and south of the country; we have to colonise and cultivate various places from Arauca down to Caquetá.

"The Government opens roads in the south of the ancient Tolima and through Pasto; from Pore and from Salina de Chita one goes slowly and with difficulty to Arauco, on our frontier with Venezuela; through San Martin travel with great sacrifice brave explorers in search of rubber and other products of the wild regions of the rivers Vaupés and Guayabero.

"But who hears from these travellers, unless after long and weary intervals? When will the intrepid pioneer who penetrates into these

forests receive news from his friends concerning the government of his country, the state of political feeling, the course of business, the fluctuations of trade and commerce? Silence accompanies him in his struggles against hostile Nature, and courage and hope alone sustain him until he returns from his banishment, if he ever returns.

"Such conditions as these must not be allowed to remain indefinitely. It is necessary and extremely urgent to facilitate rapid communication between all the towns of the Republic and other principal centres of the wild portions of Columbia.

"Arauco, San Martín, Puerto Arturo (at the junction of the Ariare and the Guayabero), Calamar (upon the River Unilla), Tresesquinas (where the Ortequasa drains into the Caquetá), and Puerto Córdoba and La Pedrera (where the Caquetá receives the tributary Apoporís) should receive telegrams in a few minutes, as any other Columbian office.

Opening up the Forest.

"Our army in the middle of the forests, even in the neighbourhood of the Amazon, over by the Putumayo, should be capable of transmitting news and detailed information regarding its position in less than an hour to the Minister of War at Bogotá, and the latter should be able to give the army precise instructions a few minutes later.

"The opportunity to acquire this great advantage to-day is exceptional. A wireless mast erected upon the Cordillera Oriental, in Andalucía, would control all as far as the Amazon plain, and would be the axle of the radio-telegraphic service. The distance to the Customs port of Arauco is 140 leguas; to San Martín, 50; to Puerto Arturo, 72; to Calamar, 63; to Tresesquinas, 35; and to Puerto Córdoba, 148.

"The greatest distance from the central to another corresponding station, as that of La Pedrera, is 148 leguas. The Andalucía station, the only one situated at an altitude (it is 2,760 metres above sea-level, and has an average temperature of 13° centigrade), would directly control all the others in the scheme, and would become the central station between any two of the others. Moreover, it would also be the base for the future installation of other stations in various parts of the Republic and on the Atlantic and Pacific coasts.

"The army will soon possess its portable wireless apparatus; two military bodies will be able to communicate by its means over a distance exceeding 15 leguas. The Minister of War, sitting in his office, would then be able to communicate with all sections of the army through the Andalucía station."

Monthly Miscellany

WIRELESS telegraphy will be a feature for the equipment of the "Fram," Captain Roald Amundsen's vessel to be used in his expedition to the North Pole, which is due to start in May. Captain Amundsen also intends to carry a wireless equipment on the sledges in his final dash to the Pole. It has been queried whether a wireless equipment on the sledges would not have averted the tragedy to Captain Scott's party. They were only eleven miles from One Ton Depôt, where there was food, and, but a few days before, help, when disaster overtook them. One Ton Depôt itself was 150 miles from the base at Cape Evans. While it would have been possible for a wireless station at Cape Evans to make its signals heard at One Ton Camp, the explorers would have required an equipment rather heavier than it might have been thought worth while to carry to transmit a reply.

* * *

In Polar exploration, of course, the minimum of weight is essential. One of the lightest types of wireless equipment made is of the "Knapsack" type for conveyance by hand. The total gross weight of the complete "station" is only 86 lbs. It can be erected in six minutes by four men, and has an approximate maximum range of twelve miles. It will be highly interesting to note from Captain Amundsen's experience with his wireless equipped sledges what future radiotelegraphy has in Polar exploration.

* * *

The world watched with a deep pity the breaking of the sad news to Mrs. Scott. The wife of the gallant explorer left home for New Zealand to welcome her husband on January 4th, and was aboard the s.s. "Aorangi," not far from Hawaii, when the news of the fate of the polar party reached England. To wireless it fell to convey the message that her mission was ended. It was the first news of her husband since his last letter, dispatched ere he began his dash to the Pole in November, 1911, which came to hand in March. A wireless message was sent to the s.s. "Aorangi," which was due at Hawaii on February 11th. Throughout the night messages were being sent over the ocean to the steamer on which Mrs. Scott was hastening joyfully to keep the promise she had made in her farewell words to Peter, her blue-eyed, fair-haired, three-year-old boy, to fetch him home. The latest messages from Honolulu state that Mrs. Scott received the news by retransmission from vessels within the wireless zone.

Amongst the members of the Shackleton expedition to the South Pole was a young Australian explorer, Dr. Mawson. On his return with the party he decided to retrace his steps in order to systematically explore the land which had just been opened up to the world of men by these intrepid adventurers. Accordingly he, at the head of a party of thirty-two scientists, has for more than a year been engaged in important researches over this virgin territory—the coast extending westward for 2,500 miles.

The main exploring party was landed in Adelie Land, where a base was formed preparatory to another journey to the magnetic pole. Other parties were landed to the westward by the "Aurora," and will be taken off by the vessel on her return journey. She sailed from Hobart last month for this purpose. A wireless telegraphic station was established at Macquarie Island by the expedition in 1911. This is midway between Tasmania and the Antarctic Continent. Since then another wireless installation has been made in Adelie Land, and the connecting link of Macquarie Island will enable Dr. Mawson to communicate the adventures and discoveries of the three parties to his agent in Hobart. With characteristic enterprise the *Daily Chronicle* has made arrangements with the agents, whereby they will receive the messages immediately they have come through to Hobart, and will publish them at the earliest opportunity. This is the first time that wireless communications have been telegraphed direct from the Polar regions, and marks an interesting stage in the progress of journalism.

* * *

Scarcely a day passes but the word "wireless" appears in the headlines of our daily newspapers. By wireless, Shakri Pasha, the commander of Adrianople, transmitted to Constantinople from the beleaguered city the news of his losses in the bombardment; by wireless, too, the *Daily Mail* was able on February 17th to secure from the Rev. Albert Knight an exclusive message explaining his sensational disappearance from Leeds, and his communication to the Bishop of Ripon resigning Holy Orders. This message reached London in a very roundabout fashion. It was transmitted by wireless from the steamship "Port Lincoln" to Luderitzbucht, on the coast of German South-West Africa, and from there sent over the land telegraph to Swakopmund in the same area. From Swakopmund it was sent to Capetown, thence to England.

* * *

Public clocks, which cause endless delay by faulty regulation, will shortly be placed

under strict supervision. They are to be regulated every minute by wireless. The Imperial Post Office in Germany is about to attempt the novel method of controlling public clocks throughout the country by means of wireless telegraphy. Most people, of course, are familiar with the electric clock which, under the influence of the "master clock," has its hands moved every minute. By this means all clocks in a building controlled by the "master clock" record the same time. The new wireless scheme is more far-reaching. From one great central clock situated in Fulda—a large German wireless telegraph station—signals will be sent out once every minute which will control public clocks throughout the whole country. By wireless every signal given once a minute will actuate all the public clocks fitted with the necessary receptive mechanism.

* * *

A recent issue of *L'Economista Italiano* of Rome contains an interesting account of the development of the Marconi organisation, and points to the excellent position in which the Italian Government has been placed by the use of Mr. Marconi's inventions. In an interesting narrative describing the progress of radiotelegraphy our contemporary shows how that progress has been almost entirely due to Mr. Marconi and the company over which he presides, and it adds that "all those who had confidence in the work of Guglielmo Marconi, and who had invested capital in it, have had the double satisfaction of contributing to the development of an industry which has conferred far-reaching benefits upon mankind, and which has amply repaid those who had the foresight to avail themselves of a profitable investment. Moreover, they are associated with an undertaking which is splendidly organised throughout two continents—Europe and America—and which is only just beginning to be extensively applied in Africa and Asia, two continents which afford exceptional scope for wireless telegraphy."

* * *

The principles of wireless telegraphy, discovered by Mr. Marconi, has been adapted to means for detecting thunderstorms. A small aerial wire, similar to that used for wireless telegraphy, collects the electricity from the atmosphere and transmits it to a coherer, or detecting device, connected to the earth. When a clap of thunder takes place the electricity produced passes from the aerial wire, through the coherer, to the earth, and closes a delicate electric circuit, when a needle is jerked. This needle traces a line on a piece of paper

attached to a revolving cylinder. Each jerk of the needle caused by a discharge of atmospheric electricity produces a V-shaped deviation in the line traced. In order to measure the actual strength of electrical disturbances in the atmosphere a special apparatus has been designed. A delicate detector is connected with a sensitive meter, a pointer on the dial of which registers the strength of the discharges. The aerial wire collects the electricity from the atmosphere and discharges it through the detector. The pointer of the meter then indicates the amount collected.

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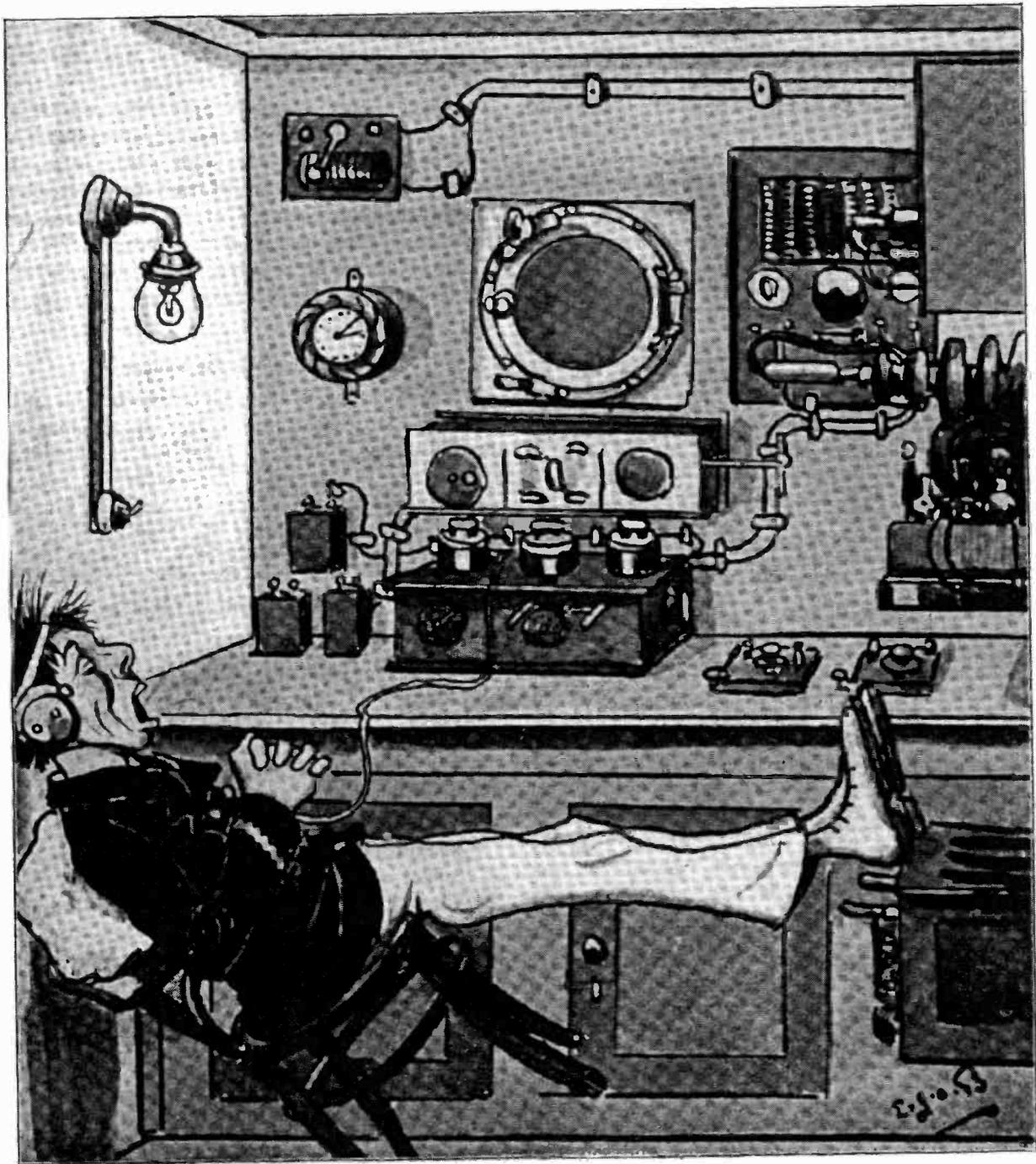
Mr. F. E. D. Pereira lectured, under the auspices of the Holy Trinity Literary and Debating Society, on wireless telegraphy during the past month. There was a large audience, and considerable interest displayed in the lecture, which was made more attractive by a number of experiments and the display of lantern slides. Mr. Roland Shelley, who was largely instrumental in arranging for the lecture, proposed a vote of thanks to Mr. Pereira.

◆

Mr. Richard Kerr, who is well known all over the country, recently delivered his interesting and popular lecture on "Wireless Telegraphy" in the Corn Exchange, Maidstone. There was a large attendance of the public, over which the Mayor presided, and Mr. Kerr kept his audience deeply interested throughout the evening by his racy story of the history of the development of wireless telegraphy, which was made even more attractive by the experiments which he carried out. Mr. Kerr is a very popular figure on public platforms with his lecture on "Wireless Telegraphy," and his success is well merited by the manner in which he treats his subject. After an evening with Mr. Kerr, the public cannot be excused if they have failed to realise that, through the genius of Mr. Marconi, an abstruse scientific phenomenon has been turned into an instrument of great public utility.

◆

Rev. H. V. Gill, S.J., B.A. (Cantab), recently delivered two lectures on "Electric Sparks: Their Use in Wireless Telegraphy," at the Royal Dublin Society. The reverend lecturer reminded his audience that the *Dublin Daily Express* was the first newspaper to utilise the Marconi system for sending Press messages, when an installation was set up on the occasion of a regatta, held some years ago at Kingstown, and the results were announced by wireless telegraphy.



NOTHING DOING. ALL QUIET



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The Editor will be pleased to receive contributions; and Illustrated Articles will be particularly welcomed. All such as are accepted will be paid for.

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CRYSTAL DETECTORS. Have you a really sensitive Detector? We have, and will be pleased to send you full particulars together with a copy of our No. 4 List upon receipt of a P.C.—**GRAHAM & LATHAM Ltd., Military Engineers and Signalling Specialists, 104 Victoria Street, Westminster, S.W.**

The Share Market

London: February 24th, 1913.

Business in the share markets during the past month has been at a low ebb. The prolonged uneasiness with regard to the political situation in Eastern Europe, combined with the scarcity and dearness of money, has caused an all round depression. Scarcely a single market has been exempt from the prevailing conditions, and in some sections the fall in values has been very considerable. Although dealings in the various Marconi issues have been very restricted, the market has been a firm one, and the shares have moved up to a moderate extent.

Prices, as we go to press, are: Ordinary, 4½; Preference, 3½; Canadian, 17s. 9d.; Spanish, 1; American, 1½.

Mr. Godfrey C. Isaacs

At a meeting of the executive of the Mid-Essex Liberal Association, held at Chelmsford on February 17th, it was decided to appoint a deputation to wait upon Mr. Godfrey C. Isaacs, of the Marconi Company, to request him to fight the division against Mr. Pretyman at the next election.

Alleged Criminal Libel

At Bow Street Police Court, on February 19th, Mr. R. D. Muir applied to Sir Albert de Rutzen, on behalf of Mr. Godfrey Charles Isaacs, managing director of Marconi's Wireless Telegraph Co., Ltd., for a summons against Mr. Cecil Chesterton, the editor of a newspaper now called the *New Witness*, formerly called the *Eye Witness*.

The summons applied for, said Mr. Muir, was in respect of a series of libels begun in the *Eye Witness* and continued in the *New Witness*. They were libels of a very serious character, directed principally against Mr. Isaacs, as managing director of the Marconi Company, and they were also directed against him in his personal capacity. They were contained in the issues of the paper dated August 8th, 15th, 22nd, September 26th, October 3rd, 17th, 24th, 31st, November 14th, 21st and 28th, and December 5th, 1912, and January 2nd, 9th, 16th and 23rd, 1913. The papers were before Mr. Justice Bucknill in Chambers, and he made an order, dated February 18th, that Mr. Isaacs be at liberty to institute criminal proceedings for libel against Mr. Chesterton.

The magistrate granted the summons, and made it returnable for February 26th.

“The Wireless World”

THIS issue of THE MARCONIGRAPH is the last to bear the familiar title on its cover. The April issue will appear in an entirely new guise, under the title of *The Wireless World*. Its size will be considerably increased and its scope extended to deal, as its name indicates, with everything of interest in the world of wireless telegraphy.

This change is a sequel to the enormously increased popularity of the magazine, not only amongst those who are interested in radiotelegraphy from a professional or scientific point of view, but amongst the general public, who, more and more, are taking a keen interest in wireless progress.

The record of the magazine established by us is one of unchecked growth. The first issue, in April, 1911, contained 16 pages. As the months passed it was found necessary to add to the number of pages, and on its first birthday 52 pages were presented to its readers. Next month the issue will consist of 96 pages.

Two years of life will thus show *The Wireless World* at six times its original size, with every prospect of a further increase being necessary. Of what other magazine can the same be said?

The April number of *The Wireless World* will mark a notable development of the magazine, not merely in size, but in contents. It will make a strong appeal equally to the scientist, the engineer, the operator, the amateur, and to that vast body of the public who take an interest in things scientific. As has been indicated, its pages will summarise and comment on the developments in wireless telegraphy all over the world, and will contain a variety of scientific and general information written in a popular and easily comprehensible style.

From time to time eminent scientists will contribute articles on various aspects of the

subject, and it is hoped that the results of many important investigations will find the light in its columns.

The chief points of interest in papers read before scientific bodies will also be presented. A feature will be made of useful hints and advice to amateurs. For business men a monthly record dealing with the commercial development of wireless telegraphy will be included. Short stories, light verse, and sketches are an innovation which will help to enliven its pages and render it an indispensable magazine.

Never at any time abstrusely technical, *The Wireless World* will aim always to interest the general public, and give them a really good understanding of the subject.

To this end it will publish a series of twelve special articles, written in simple language by experts of wide practical experience, which will take the uninitiated right through a course in wireless telegraphy. These articles will be easily intelligible to those who have no knowledge of wireless work or electricity. They will explain the principles of electricity and magnetism as far as they apply to wireless telegraphy, and will describe the function of each piece of apparatus in a wireless station.

On the conclusion of the series *The Wireless World* will set a number of questions to its readers based on these articles. Valuable prizes will be awarded for the best papers submitted. Particulars of this will be published in the April number.

To boy scouts, amateur wireless clubs, and Territorials these articles will have a strong interest, as they may have a profitable outcome.

The demand for the April number of *The Wireless World* will be a large one. A copy on the bookstalls will cost 3d.; it may be had post free for a year for 5s.

The Imperial Wireless Scheme

WHEN the Select Committee of the House of Commons on the Marconi Contract met on Wednesday, January 22nd, practically the whole of the sitting was occupied with the evidence of Mr. William R. Lawson.

The course of the examination-in-chief, which was conducted by Mr. Douglas Hogg, counsel who appeared on Mr. Lawson's behalf, covered a review of the Agreement from a business point of view; the treatment of the Marconi Company as contrasted with the treatment by the Post Office of the old cable companies and the National Telephone Company; the financial position of the Marconi Company and the Marconi share market; and the position of the Post Office in the negotiations.

Mr. Falconer asked witness whether, as a member of the Stock Exchange, in the course of his business he had had any dealings in Marconi Shares; if so, what were they? He replied, "I had two dealings last year—the only dealings I ever had—one was in May, I think, and the other in August."

Were you a seller or a buyer?—I sold two lots of fifty shares for contango purposes.

By Mr. Primrose: Did your profit depend upon the shares falling, or did it depend upon the shares going up?—My personal profit was in the contango in the first place, but I took the risk of the market going up or down.

Under which circumstances would you get your profit, if they went up or if they went down in this particular transaction?—I had the profit on them going down, certainly.

On Thursday, January 23rd, Mr. Lawson, who had declared in his examination-in-chief that the Government was "indirectly associating itself with a huge Stock Exchange gamble," was questioned by Mr. Falconer on the contrast he had made between the Post Office's attitude in having charged the Telephone Company a 10 per cent. royalty and its "generous attitude" towards the Marconi Company. Mr. Falconer pointed out that the Telephone Company got a licence as well as 90 per cent. of the receipts, while the Marconi Company got no licence, got none of the receipts except a 10 per cent. royalty for their patents; and, further, that the Marconi Company agreed to reduce the rates on messages one-half; and the witness admitted after considerable questioning that the terms offered by the Marconi

Company were much more favourable to the Government.

Mr. Lawson admitted that at the time there was perhaps no company in the same position as the Marconi Company. On the other hand, nobody knew what the Marconi long-distance stations were capable of doing.

On Wednesday, January 29th, Mr. Lawson, again examined by Mr. Falconer, M.P., agreed that if the Postmaster-General had satisfied himself that there was no other choice, a 10 per cent. royalty on the gross receipts might be reasonable.

Mr. Falconer: Then it comes to this—that there was no other company which could be relied upon to do this work over the distance to such an extent as would justify the Government in accepting them as contractors and paying the large sums under the contract?—The Witness: That there was no other company on the same level and of the same capacity as the Marconi Company I admit. If the thing had to be done within six months, then probably they were the only people who could do it. And a sound principle for the Government to proceed upon would be to make an agreement with them on the lines that they should be free to adopt any other system at any time if they thought it better to do so.

Would not that follow?—Yes, I admit that.

As to his statement that wireless telegraphy had never been considered from the point of view of its effect in naval warfare, he meant to say that the Admiralty had not satisfied themselves on the question of risks of wireless telegraphy in naval warfare, and how to minimise them. He admitted that he had no inside knowledge of what the Admiralty have been doing.

"Then you say," continued Mr. Falconer, "the most obvious cause of the failure of this agreement was the absence from first to last of an Imperial policy of wireless telegraphy. Have you anything new to say in justification of that statement?"—No.

He withdrew the statement, "There is no mention of the subject ever coming before the Cabinet," which suggested that in the negotiations the Postmaster-General acted without the authority of the Cabinet.

After considerable questioning on a statement that the matter was "casually taken up by the Committee of Imperial Defence," Mr.

Lawson admitted that it was not precisely correct to say that the matter "drifted into the hands of the two Committees." Later he substituted the word "passed" for "drifted."

Mr. Lawson agreed also that he approved of the principle of the State owning the six long-distance stations which the Government wished to have erected, and further conceded later that the attitude of the Government, which he had described as "illogical, inconsistent, and untenable," would be "logical and consistent" when the Poldhu and Clifden stations were acquired. His contention that the Government had saddled themselves with a service to be carried on for the benefit of the Marconi Company he admitted went by the board, for in supplying apparatus the "Marconi Company would have no advantage; they would be on the same level as other people." He did not mean to suggest from his statement that "the State was indirectly associating itself with a huge Stock Exchange gamble," that the Postmaster-General, or any of his subordinates, or any Minister, or any official of any department—the Admiralty, the Post Office, or the War Office—took part in it. He meant it only in the sense that the managing director of the company from time to time made communications to the Press. He referred only to rumours current at the time, and these he had never been able to verify.

Mr. Falconer referred the witness to the following sentence from his *précis* of evidence: "For the first time is admitted the liability of the State to pay a huge annual royalty to patent exploiters."—Mr. Lawson replied that it was especially dangerous for the public that such companies with an enormous nominal capital should have a free hand to put up patents. He agreed that the company had carried on a larger business in wireless telegraphy than anybody else in the world.

What do you mean when you make use of words like "patent exploiters" about people who are developing an industry of that kind in this country? Is it merely as a term of opprobrium?—No, it is not.

Is that what is meant when you use the words "patent exploiters," that in connection with some of the companies which they have formed for the purpose of working these patents in other countries, they have over-capitalised?—Certainly.

Pressed on the point that the British company was over-capitalised, witness said the market value was over-capitalised, but that that was not the fault of the Marconi Company. That the amount at which the Marconi companies were capitalised would not in any way affect the amount of the rates which might be charged by the Post Office for messages sent by the Imperial Wireless Scheme, he acknowledged.

On the resumption of the examination on Thursday, January 30th, Mr. Lawson withdrew the statement that wireless telegraphy had never been considered from the point of view of its effect on naval warfare. The next statement in his examination-in-chief that "by giving 10 per cent. royalty to the first patentee it employs, the Post Office effectually shuts itself out from the services of all other patentees," he also consented to withdraw. He agreed that the word "properly" should be inserted in what Mr. Falconer described as the peculiarly offensive suggestion that negotiations were "carried on behind closed doors." That the treatment of the cable companies "was all in striking contrast to the favours that had been heaped on the Marconi Company" Mr. Lawson withdrew, agreeing that with regard to the cable companies there could be no analogy, and therefore no comparison with the agreement under discussion. The witness said that his assertion that "Mr. Godfrey Isaacs seems to have dictated terms to the Post Office" was based on the statement of more than one official that they had acted under compulsion and could not help themselves. In a review of the negotiations he admitted that there was no dictation. "I simply say," he remarked, "that Mr. Godfrey Isaacs was more successful in the negotiations than the Post Office."

Towards the conclusion of the sitting the witness, in order to justify his statement that "radiating from this common centre (the Marconi Company) we find half a dozen tentacles all heavily loaded," was taken through a list of allied companies, and admitted that the financial condition of the Marconi International Marine Communication Company was sound; that the Canadian Company was not over-capitalised; that, tested by the market value, he could not say that the Spanish Company had not been overloaded, and he could not say it had been; and that he could not say that the capital of the Russian Company was overloaded. The use of the word "tentacles" was not intended to imply any reproach. He meant that in proportion to their earnings the affiliated companies were very heavy capitalised.

He agreed that "they were all heavily loaded" was an overstatement, and withdrew it.

Mr. Lawson's attention was drawn to the letter which he addressed to the chairman of the Committee on November 25th, 1912, and which arose out of an article written by him for the *National Review* of that month, to which the *Spectator* afterwards referred.

The letter contained two statements:

(1) A reference to a paragraph which appeared in the *Financial News* of January 24th, "the very day on which, according to the

Postmaster-General, the first Marconi tender was signed"; (2) "A very few days later (after October 11th) the Postmaster-General had to admit that not a single one of the Dominion Governments had followed his example and saddled itself with the Marconi contract."

Having regard to the fact that in answer to Sir Ryland Adkins, Mr. Herbert Samuel said in the House of Commons that :

"These statements, which have appeared in the *National Review*, and have been reproduced textually in the *Spectator*, are totally false, like much else that has been written in regard to this contract. No agreement of any kind was made with the Marconi Company with respect to these stations until March 7th, 1912, when their tender in general terms was accepted, the contract itself being signed on July 19th. I have made no reference to any date. . . . The South African Government is participating in the contract, and the statement which I am alleged to have made is a mere invention"—

Mr. Lawson was asked why he had put into the Postmaster-General's mouth the words "that the Marconi tender had been practically accepted"? The witness replied that he was condensing what the Postmaster-General had said. He had not idea of imputing anything to the Postmaster-General; the idea that he was in league with the Marconi Company was absurd.

Ultimately he said he desired to withdraw the whole of his evidence with reference to the Government being tied to the Marconi Company.

The question of monopoly then came to the fore, and Mr. Lawson agreed, in response to Mr. Falconer's queries, that the Marconi Company were in a financial position to carry out the contract; that they had got a system which had been proved to be capable of communicating across the Atlantic, that they had a large staff of highly-qualified engineers and constructing people which could be made available for the erection of the Imperial stations, and that there was more important consideration than that of patents. Ultimately he conceded that the Marconi Company had no monopoly.

The examination of Mr. Lawson by Mr. Falconer on Wednesday, February 5th, was devoted to an attempt to ascertain the scope of the Stock Exchange transactions in Marconi shares, and came to a conclusion with a number of questions as to the circumstances under which the witness began his attack.

Lord Robert Cecil asked the witness if he intended to charge any Minister with improper

conduct. He replied that he did not intend to make any charge. He admitted that some of the words in an article in the *Outlook* for August were rather unfortunate, and went beyond what he really meant. He withdrew later any suggestion that Cabinet Ministers were openly promoting a monopoly. He confessed that he could not suggest the exact meaning for a sentence suggesting that the "Postmaster-General was closely and peculiarly associated with the Marconi Board."

Questioned about another passage concerning "the mysterious relations that have obtained between certain members of the Government and the Marconi Company," the witness admitted that it was too lax an expression, the only basis for which was the telegram sent by Sir Rufus Isaacs to New York, and that "mysterious," too, was an unfortunate word. He was only thinking of the rumours that certain Ministers had been financially interested. The articles, he said, were written under strong provocation, and, he maintained, in the public interest, without malice, not for any selfish purpose. His statement in one article that "three members of the Government have figured more or less in this suspicious episode" was professedly based on public rumours.

Mr. Lawson wished it to be clearly understood that he referred to the rumours only for the purpose of getting them denied, and having a proper inquiry made into the Agreement.

"In some passages I admit I have gone too far, and have given the impression that I was making charges against Ministers. So far as I have done that, I want to say most emphatically I did not intend them. I did not want to harm Ministers personally."

Lord Robert Cecil: And you made these statements about Ministers in order to achieve a purpose?—I say that in the heat of writing the articles I have written several things I should certainly not write again.

Thursday, February 8th, was the seventh and last day of Mr. Lawson's appearance before the Committee. In reply to Mr. W. Redmond, he admitted that he would not write again any suggestion that the Chancellor of the Exchequer would be a party to jobbery in any way. Asked who were the three Ministers whose names (according to his articles) "figure prominently in these disclosures," the witness said he was only referring to rumours.

Eventually witness admitted that he had made no special effort to find out whether there was the slightest foundation for these rumours, or for those implicating the Chancellor of the Exchequer and the Postmaster-General, to whom he had referred. He had not a single shred of evidence that these rumours were true. Mr. Lawson withdrew his

statements that the Government tried to sell the Lodge-Muirhead patent because they were in league with the Marconi Company, and that the Government were in league with the company.

Mr. Redmond elicited from the witness that he had no evidence of any kind to support the charges before the Committee. Finally, in answer to his counsel, Mr. Hogg, Mr. Lawson said his articles were the expression of his honest opinion at the time they were written.

On Monday, February 10th, Mr. Walter Guinness, proprietor of the *Outlook*, was called to give evidence. He was abroad or ill at the time of the publication of all but the first of Mr. Lawson's articles, he explained in reply to his counsel, Mr. Hogg. He had expressed a wish that all personal attacks should be avoided, and he regretted if anything had appeared which could possibly be construed as a suggestion of improper financial conduct on the part of Ministers. He could certainly not justify the attacks on individuals, but he thought that when rumours were so widely prevalent as these were, the rumours which he certainly thought were not well founded, their origin ought to be explained.

He agreed, in answer to Mr. Falconer, that vague charges should not be made against Ministers without there being any ground for them; they ought not to be referred to in such a vague way that the Minister concerned is not able to take action. He did not think there was anything in the articles to justify action, and he should have felt very great regret if there had been any such attack. He did not think any charges were intended. He thought that the Postmaster-General, as to whose honour he had not the slightest doubt, acted rather unwisely in the way in which he dealt with the Marconi contract.

Mr. Edward Oliver, editor of the *Outlook*, denied that the articles accused Ministers of personal corruption; the reflection was in a political sense. He held that the articles were a most valuable series, and was proud of them. The circulation of the paper did not go up in consequence of them.

He had never suggested that the Attorney-General had used his influence as a member of the Government to induce the Government to give the contract to the Marconi Company. He admitted that "perhaps" he intended his readers to form an opinion that the Attorney-General was in the background as a mutual friend of the Government and the company. If you could not make a suggestion like that in a political paper, political comment became impossible. He admitted that he had nothing to prove that the Attorney-General acted in the negotiations.

For refusing to give the name of persons who

had supplied him with information on which he had criticised the Government's agreement with the Marconi Company, the Select Committee decided, on February 12th, to report Mr. Leo Maxse, editor and proprietor of the *National Review*, to the House of Commons as a contumacious witness.

When the matter arose in the House on the following day the Prime Minister, on the grounds that the Select Committee had adjourned for the Session, and in the circumstances and having regard to the period of the Session, and to the fact that experience has shown that the House of Commons should proceed in matters of this kind only after due deliberation, stated that he was not prepared "to assume the responsibility of advising the House to take any immediate action."

Cross-examined by Mr. Parker, Mr. Maxse said he declined to give the names of any persons who had supplied him with information, on the ground that it was given to him in an editorial capacity, and it was his duty to respect the confidence placed in him. He would never have taken a hand in the matter unless he had been satisfied from inquiries he made that, at any rate, there was strong ground for suspicion.

He admitted he had not what would be regarded by lawyers as evidence that Ministers were connected with the Marconi activity on the Stock Exchange, but there was a very widespread belief, held rightly or wrongly, that Ministers participated in the gambling. He declined to produce any letters from correspondents bearing on the rumours that Ministers were financially interested in the Marconi Company; and, therefore, after a deliberation in private, the Committee passed a resolution that he be reported to the House.

The Committee adjourned until next Session.

Interchange of Correspondence

The application of Marconi's Wireless Telegraph Company to be released from the contract on the grounds set forth in the company's letter to the Postmaster-General on January 15th (*THE MARCONIGRAPH*, February, p. 503) was submitted to the Select Committee, who ordered the following letter to be sent to the Postmaster-General on January 27th:

SIR,—The Select Committee on Marconi's Wireless Telegraph Co. (Ltd.) Agreement direct me to inform you that at their meeting to-day they have come to the following resolution:

"That the Postmaster-General be informed, in reply to his letter of the 17th instant, that the Committee having now

heard a statement from Mr. Marconi and the evidence of Sir Alexander King, are of opinion that, pending further inquiry, the Committee do not consider themselves in a position to advise the Postmaster-General as to the desirability of releasing the Marconi Company from the agreement entered into in July, 1912.

Your obedient servant,
R. BAILEY,
Clerk to the Committee.

Mr. Herbert Samuel replied as follows on January 28th :

DEAR SIR ALBERT SPICER,—I beg to acknowledge receipt of the resolution passed yesterday by the Select Committee on the Marconi Contract referring to my letter to yourself of the 17th.

In that resolution the Committee say that, pending further inquiry, they do not consider themselves in a position to advise me as to the desirability of releasing the Marconi Company from the agreement entered into in July, 1912.

From the conversation which has subsequently taken place between us I gather that the phrase "pending further inquiry" does not imply that the Committee propose to engage in further inquiries with a view to advising as to the desirability of releasing the company, and that meantime they would prefer that I should withhold a reply to the company's request. I understand that the resolution is to be taken to convey that until the Committee's general investigation into the subject included in their reference was further advanced they would not be in a position to advise on this particular point, and would not wish to intervene meanwhile with respect to any measures I might think fit to take. I propose therefore to proceed on that assumption.

Yours very truly,
HERBERT SAMUEL.

The following letter was sent on February 5th by direction of the Postmaster-General to the company :

GENTLEMEN,—With reference to your letter of the 15th ultimo, in which you ask that the Government will agree to the company's treating the contract of the 19th July, 1912, as no longer binding upon either party. I am directed by the Postmaster-General to express his regret that, after full consideration, His Majesty's Government are unable to accede to the company's request.

The Postmaster-General regards the delay which has taken place as very regrettable, but it is the consequence of the provision, embodied in the contract, that it should not

take effect until approval had been given by the House of Commons. The fact that delay has occurred from this cause cannot be regarded by the Government as an adequate reason for releasing the company from their obligations.

I am to add that the Postmaster-General proposes to publish this reply.

I am, gentlemen,
Your obedient servant,
A. F. KING.

On February 6th the following letter was sent by the Marconi Company to the Secretary of the General Post Office :

SIR,—We have to acknowledge the receipt of your letter of the 5th instant. Whilst agreeing with the Postmaster-General that the delay is a consequence of the provision in the contract, we do not understand that it is suggested that such delay is a natural or necessary consequence, or that it was such as was contemplated by either party to the contract.

For the reasons set out in our letter of January 15th, we feel we are morally entitled to ask that the agreement should be considered as no longer binding on either party, and we had every hope that in view of the facts to which we called attention, and which are not in question, our request would have commended itself to His Majesty's Government, whose decision we now learn with much regret.

We should add that in addition to the matters in respect of which we were being prejudiced, and to which we have already called attention, we have been obliged to reserve, for nearly a year, to enable us to carry out the work which we have undertaken, a sum exceeding £300,000. This is a serious matter for a business company, and if continued would necessarily tend to restrict and hamper our commercial programme generally.

Apart altogether from the moral position, we thought it well to take the opinion of Sir Robert Finlay as to our legal rights, and he has advised that we are now entitled to intimate that unless the Postmaster is in a position to definitely confirm the contract by March 1st next we will treat such contract as at an end.

We should, however, be reluctant to rely upon our legal rights did we not feel that we had strong moral grounds for the position we are taking up.

In these circumstances we would venture to ask that our letter of the 15th ultimo be further considered, and we trust that as a consequence we may not be put under the obligation, through no fault of our own, of

rescinding a contract entered into with His Majesty's Government.

Inasmuch as this matter has become public, and your letter of yesterday has been published, we would ask that publicity be also given to this letter.

I am, Sir, your obedient servant,
GODFREY C. ISAACS,
Managing Director.

To this the Postmaster-General caused the following reply to be sent to the company on February 15th :

GENTLEMEN,—In reply to your letter of the 6th inst., I am directed by the Postmaster-General to say that he can do no more than repeat the conclusions stated in my letter of February 5th, and arrived at after careful consideration—namely, that, while he greatly regrets the delay which has taken place, he cannot admit that the delay has been such as to entitle you to withdraw from the contract.

In view of the deliberations of the Select Committee and of the inquiries that are being made at their request by the Technical Committee, there is, of course, no prospect that a decision can be reached in the matter by March 1st.

I am, etc.,
A. F. KING.

The company's reply on February 20th was as follows :

SIR,—We have to acknowledge the receipt of your letter of the 15th inst., in reply to our letter of the 6th inst. We regret to learn that the Postmaster-General is unable to do more than repeat the conclusion stated in your letter of February 5th.

In these circumstances we are very regretfully obliged to inform you that after March 1st next we shall no longer consider ourselves bound by the contract of July 19th last.

When a definite decision may be taken with regard to the building of the Imperial stations we will be pleased again to take this matter into consideration.

I am, Sir,
Your obedient servant,
G. C. ISAACS,
Managing Director.

On January 27th Mr. Marconi attended at the invitation of the Committee, and was asked to state the reasons for his desire to withdraw from the contract. He replied :

"My views on the suggested withdrawal of the Marconi Company from their agree-

ment with the Postmaster-General are expressed in a general way in the letter which the company has addressed to the Postmaster-General, and which is now, I believe, in the hands of the Committee. I understand, however, it is the wish of the Committee that I should give my views at greater length. I am personally a party to this agreement, and I am, of course, very desirous of doing so. There is, however, only one way, in my opinion, that this can be done efficiently, and that is by my giving evidence in reply to all that has been said in this room. It is, I feel sure, the only possible means of the Committee understanding and appreciating the reasons for the course I have adopted. If the honourable members of this Committee do not wish to hear my reasons in full and the evidence which I have prepared in the form which I think necessary, it will be better for me to confine myself to my general views, which are expressed in the letter to the Postmaster-General ; but, inasmuch as my company, my work, and my honour have been frequently attacked during the three months the Committee have sat, if I am to say anything at all, I must be allowed to submit a full reply to those attacks."

Later, the Committee deliberated in private, and on the public being admitted to the Committee room, the Chairman, addressing Mr. Marconi, said :

"The Committee have considered your application to be heard, and they have decided that you be heard in full at a convenient date, probably at the end of the journalists' evidence, and we do not propose to call Mr. Godfrey Isaacs at this stage."

Sir Alexander King, the Secretary to the Post Office, was also recalled, and, in reply to the Chairman, said : "I have told the Committee on more than one occasion that the bargain we had made was, in my opinion, a very good bargain, and if that is the case, as I think it is, it would be a serious mistake to give up a good bargain merely for the sake of sentiment."

Asked what he meant by "sentiment," he replied : "Perhaps I might say sympathy with Mr. Marconi." Continuing, he said : "I cannot help feeling that Mr. Marconi has not been well treated. He has been attacked before the Committee by all and sundry. A large number of people have attacked him, and his system, and his company, and although he is the wireless expert of the age, he has not been given an opportunity of answering those statements. That is all I meant by 'sentiment,' but, of course, as the Secretary to the Post Office, I have to look at it as a business transaction."

Contract News

Some Recent Marconi Orders

The Italian Government has placed further orders with Marconi's Wireless Telegraph Co., Ltd., for two 1½-kw. portable cart sets, nine 3-kw. motor-car stations, while an order has been received from Turin for another of these motor-car stations, and three 1½-kw. sets have been sent to Spezia for installation on battleships, together with one 3-kw. battleship disc set; while the naval department has commissioned two 10-kw. sets for special use. Especially interesting is their order for a 30-kw. land station at Assab, for this is an important position in Eritrea, an Italian possession extending for some distance along the African coast of the Red Sea; and the order demonstrates Italy's keen and increasing interest in her colonies.

The Portuguese Government has also placed large orders, comprising a 1½-kw. set for installation on the battleship "Douro," and the equipment for five land stations which are to be erected at Lisbon, St. Miguel, Funchal, St. Vincent and Oporto. The latter scheme was recently described in THE MARCONIGRAPH.

The Brazilian Government has ordered two 3-k.w. sets for their battleships "Deodoro" and "Floriano," in addition to an order issued by the Brazilian Naval Commission for three 3-kw. ship installations to be fitted on Monitors

The Brazilian Admiralty have placed orders for four land stations—two of 25-kw., and two of 15-kw., to be used for naval purposes.

Several orders have been received from the British Government—one from the Postmaster-General to erect a station at Valentia, Co. Kerry, Ireland, the westernmost harbour in the British Islands; one for fitting the training ship "Exmouth" with a ½-kw. set. (This is an excellent move, as a practical acquaintance with wireless should prove an inestimable benefit to these seamen in the making). While from the War Office has come orders for twelve more cavalry stations.

The Canadian Government have also placed orders for three 1½-kw. sets. Two of these are to be fitted on Cruisers No. 80 and 81, which patrol the Canadian coast for the pur-

pose of protecting the fishing interests, while the third is destined for installation on a Hydrographic steamer.

The Compagnie de Télégraphie sans Fil of Brussels have received orders for fitting the following vessels: "Noorderdijk," "Westerdijk," "Osterdijk," running between Rotterdam and American ports, and owned by the Holland-American Line—The Jylland of Copenhagen. They have also arranged for fitting 1½-kw. sets on the Norwegian steamships "Kristianiafjord" and "Bergensfjord," and have forwarded another 1½-kw. set to Copenhagen.

The following vessels have been equipped with wireless telegraphy by the Debeg: the steamships "Dania" and "Karl Schurz" belonging to the Hamburg-Amerika Line, and the steamship "Aachen" of the Norddeutscher Lloyd Line.

Five 1½-kw. sets and three ½-kw. sets have been dispatched to Rio de Janeiro for the Lloyd-Brazillero Line.

The Marconi Company's new factory is now completely fitted, and all apparatus has been removed from Jersey City, N.Y. Already the manufacture of apparatus employs sixty men, and it is expected that this number will be doubled as soon as the work of installing the apparatus of the high-power stations has been commenced. This will take place very shortly.

The Colonial Sugar Refining Co., Ltd., of Sydney, N.S.W., have placed an order with the agency of the Marconi Company in Australia for a 1½-kw. standard ship installation and emergency apparatus to be installed on board their s.s. "Fiona."

The "Fiona" is an up-to-date cargo steamer of 4,471 tons gross register. She trades between Sydney and Fiji carrying sugar and general merchandise. The "Fiona" was expected at Sydney on February 18th.

Some time ago an agreement was signed by Messrs. Burns, Philip & Co., Ltd., for the equipment of their s.s. "Matunga" with a Marconi 1½-kw. ship installation and emergency apparatus. The "Matunga" is engaged in

regular passenger service between Sydney, Queensland ports and New Guinea,

We have received the following information of contracts entered into and fulfilled during the three months ending December 31st last from Marconi's Wireless Telegraph Company of America.

Seven 1-kw. quenched spark-gap sets have been delivered to the United States Army, while two more have been ordered and are in course of construction.

Two 5-kw. sets have been delivered to a sugar company in Porto Rico.

The Phelps Dodge Company have recently purchased two 2-kw. sets for use in their mines in the West.

One 5-kw. quenched-gap set complete for direct current with gasolene generating plant has been shipped to Manila in charge of a

wireless expert. It is proposed to use it in connection with some demonstrations which are to be held in the Philippines, as the Philippine Government is about to enter into a very large contract for the purchase of wireless apparatus, which will be installed throughout the islands.

One 25-k.w. set with gasolene engine has been installed for temporary work at Honolulu.

One 5-kw. quenched-gap set has been installed on the roof of Filene building, Boston, Mass., the offices of the Filene Company, one of the largest dry goods houses in Boston.

Four private yachts have been equipped with wireless apparatus.

Sets have been installed on forty trading vessels.

Two hundred and fifty ships have been equipped with auxiliary sets.

Four hundred and thirteen ships have been refitted with tuning apparatus, as well as fifty

The following Vessels have been equipped with Marconi Apparatus.

Owners.	Name of Vessel.	Installation.	Remarks.
The Eastern Telegraph Co.	c.s. "Levant II." ...	½ kw. and emergency set	Cable ship
The Anglo-American Oil Co., Ltd.	s.s. "Cheyenne" ...	½ kw. and emergency set	Cargo vessel between Baltimore, Philadelphia, and New York
Ellerman Line (Hall Line, Ltd.)	s.s. "Melford Hall"	½ kw. and emergency set	Trading between England, Bombay, and Karachi
The White Star Dominion Line	s.s. "Cornishman"	1 ½ kw. and emergency set	Passenger travelling between Avonmouth or Liverpool to Portland Maine
" " "	s.s. "Turcoman" ...	1 ½ kw. and emergency set	Passenger travelling between Avonmouth or Liverpool to Portland Maine
The White Star Line ...	s.s. "Cevic" ...	1 ½ kw. and emergency set	Passenger between Liverpool and Australia
" " "	s.s. "Georgic" ...	1 ½ kw. and emergency set	Passenger between Liverpool and Australia
The Nelson Line ...	s.s. "Highland Scott"	1 ½ kw. and emergency set	Cargo vessel carrying limited number of passengers between London and Buenos Ayres
" " "	s.s. "Highland Corrie"	1 ½ kw. and emergency set	Cargo vessel carrying a limited number of passengers between London and Buenos Ayres
" " "	s.s. "Highland Loch"	1 ½ kw. and emergency set	Cargo vessel carrying a limited number of passengers between London and Buenos Ayres
The Royal Mail Steam Packet Co., Ltd.	s.s. "Oratava" ...	1 ½ kw. and emergency set	Travelling between Southampton, New York, and the West Indies
The New Zealand Steamship Co., Ltd.	s.s. "Rimoutaka"	1 ½ kw. and emergency set	Destined for New Zealand to make circular trip via Cape Town and Monte Video
Ellerman Line (City Line)...	s.s. "City of London"	1 ½ kw. and emergency set	Passenger between England and India via Suez Canal
" " "	s.s. "City of Karachi"	1 ½ kw. and emergency set	Passenger between England, Bombay, and Karachi
" " "	s.s. "City of Poona"	1 ½ kw. and emergency set	Passenger between England and India via Suez Canal
" " "	s.s. "City of Marseilles"	1 ½ kw. and emergency set	Passenger between England and India via Suez Canal
The Tyser Line ...	s.s. "Nerehana" ...	1 ½ kw. and emergency set	Cargo vessel destined for the East
The Adelaide Steamship Co., Ltd.	s.s. "Willochra" ...	1 ½ kw. and emergency set	Travelling in Australian waters
The Leyland Line ...	s.s. "Lancastrian"	1 ½ kw. and emergency set	Carry limited number of passengers between Liverpool and Boston
The Allan Line ...	s.s. "Scotian" ...	1 ½ kw. and emergency set	One of twenty vessels belonging to this line, all of which are being refitted
The British India Steam Navigation Co	s.s. "Ellora"	1 ½ kw. and emergency set	Travelling in Eastern waters

shore stations. This has been rendered necessary in order to fulfil the conditions of existing wireless laws.

Besides the above, numerous foreign vessels have been equipped with auxiliary sets and additional tuning apparatus.

Orders have been received to Equip or to Refit the following vessels with Marconi Apparatus

Owners.	Name of Vessel.	Installation.	Remarks.
The Tyser Line	s.s. "Whakaru"	1½ kw. and emergency set	Cargo vessel destined for Eastern trade
The Allan Line	s.s. "Victorian"	1½ kw. and emergency sets.	The Allan Line were amongst the earliest shipowners to have wireless telegraphy installed on their vessels; but in accordance with their policy of progress they have decided to refit their ships so that their passengers may have the benefit of the latest type of installation. This, it goes without saying, will give them the advantage of the very latest improvements which have been introduced into the 1½-kw. installation, and the superiority of this newest type over the coil set, which it will replace, cannot be over-estimated. The route of all these vessels is between England and North America.
"	s.s. "Virginian"		
"	s.s. "Corsican"		
"	s.s. "Tunisian"		
"	s.s. "Grampian"		
"	s.s. "Hesperian"		
"	s.s. "Scandinavian"		
"	s.s. "Ionian"		
"	s.s. "Corinthian"		
"	s.s. "Sicilian"		
"	s.s. "Pomeranian"		
"	s.s. "Sardinian"		
"	s.s. "Parisian"		
"	s.s. "Numidian"		
"	s.s. "Mongolian"		
"	s.s. "Carthaginian"		
"	s.s. "Alsatian"		
"	s.s. "Calgarian"		
The Leyland Line	s.s. "Philadelphian"	1½ kw. and emergency set	These vessels carry a limited number of passengers, but their transport trade between Liverpool and Boston is very considerable
"	s.s. "Kingstonian"	1½ kw. and emergency set	
"	s.s. "Georgian"	1½ kw. and emergency set	
"	s.s. "Columbian"	1½ kw. and emergency set	
"	s.s. "Anglian"	1½ kw. and emergency set	
"	s.s. "Cambrian"	1½ kw. and emergency set	
"	s.s. "Oxonian"	1½ kw. and emergency set	
The Booth Steamship Co.	s.s. "St. Vincent"	1½ kw. and emergency set	Running from Liverpool to Man as and Brazil
The Viking Cruising Co.	s.s. "Atrato"	1½ kw. and emergency set	General trade
The Ellerman Line (Hall Line, Ltd.)	s.s. "City of Marseilles"	1½ kw. and emergency set	Passenger between Liverpool, Bombay, and Karachi
Canadian Pacific Railway Co.	s.s. "Empress of Russia"	1½ kw. and emergency set	Passenger between Vancouver, China, and Japan
"	s.s. "Empress of Asia"	1½ kw. and emergency set	Passenger between Vancouver, China, and Japan
Union Steamship Company of New Zealand	s.s. "Aparima"	1½ kw. and emergency set	General trading in New Zealand Waters
The White Star Line	s.s. "Scotia"	1½ kw. and emergency set	Liverpool to Australia
Messrs. J. and T. Harrison, Ltd.	s.s. "Historian"	1 kw. and emergency set	Running between Liverpool and South America
The Isthmian Line	s.s. "Bantu"	1½ kw. and emergency set	The second of this company's steamships to be fitted with wireless
"	s.s. "Kentra"	1½ kw. and emergency set	
Messrs. Watts, Watts & Co., Ltd.	s.s. "Ascot"	1 kw. and emergency set	These vessels go eastward to Australia, and New Zealand, and return through the South Atlantic
The Tyser Line	s.s. "Marere"	1½ kw. and emergency set	
"	s.s. "Niwaru"	1½ kw. and emergency set	
"	s.s. "Muritai"	1½ kw. and emergency set	Private yacht
"	s.s. "Miruiri"	1½ kw. and emergency set	
Garwin P. Grant, Esq.	s.v. "Solgar"	1 kw. and emergency set	

A Message to Mars

JOHN NETHERHOLME had always been a pensive youth. In the village where he was born the old men used to stroke their beards and say: "That 'ere lad will either be a genius or a fool. He's always a-dreaming." Often his parents would find him sitting in the attic reading solemnly and religiously the works of Jules Verne. He would sit for hours reading and pondering over that writer's work, "Seventy Thousand Leagues Under the Sea." He appeared to become entranced whilst reading it, and at night, instead of sleeping the sleep of the healthy child, he would rise up in his bed and recite aloud parts of this interesting book.

But this happened some twenty years ago, and John, although still pensive and dreamy, was neither a genius or a fool.

In the last three or four years he had purchased and studied the latest works on wireless telegraphy. For some time it was difficult for him to comprehend how it was possible to communicate from one place to another without having some visible means of connection. But he had mastered this fascinating question to his own satisfaction, and he was now considering the problem of communicating over any distance he desired. He would argue to himself in this way: If it is possible to communicate over 5,000 miles by means of a powerful electrical apparatus connected to a long wire suspended from a high mast, and the aether as the conducting medium, and knowing that the latter pervaded the whole of the sidereal universe, why should it not be possible to send messages to some of the planets—either Venus, Mars, or Jupiter? He had read with intense interest and fascination the work of Mr. Marconi—how, by sheer perseverance, that brilliant scientist had conquered the many difficulties that at first sight appeared almost insuperable, and how he had in a comparatively short space of time increased the distance of intercommunication from ten to thousands of miles. He had observed that occasionally messages were received over distances up to 6,000 and 7,000 miles, and he averred that it was possible, therefore, to send messages hundreds of thousands of miles; and this problem he promised himself to conquer.

A year or so back he had, whilst travelling from England to the Cape, observed during the voyage that the compass became very agitated, and on inquiring the cause he was informed that it was due to magnetic storms caused by the sun. This was most interesting and useful news, for he remarked inwardly: "Is not this effect tantamount to sending a message from the sun to the earth? and, being so, it is only necessary for me to find out the cause and I

shall then be able to send a message to Mars." He was more than anxious to do this, as he had read that people inhabited that planetary body; and, therefore, if successful, it was within the bounds of possibility that he would get a reply.

He concentrated the whole of his mind upon this difficult problem for several days, and one night he solved it in the following way. He built a huge generating station, and erected a gigantic "aerial," supported by four lattice-work towers, each tower being 900 feet in height and 1,000 feet apart. Every part of the "aerial" was carefully insulated to ensure that no energy should be wasted. He very carefully "tuned" up his transmitting apparatus, and assured himself that each part was working perfectly. The generator was arranged in such a manner that he could obtain any "frequency" he desired from 50 periods to 100,000 periods. Having satisfied himself that all was in order, the aerial was disconnected from the apparatus, and he attached it to an instrument which he had specially designed, and which was termed an "aetherometer." This instrument would indicate the natural "frequency" of the aether at any given moment, for he firmly believed that the "aether" was electrically charged to a given potential, and that it was only necessary for him to upset the "fundamental" to achieve his object. He watched the instrument very intently, and took very carefully the various readings over a given time. After finding the "mean" of the different readings he connected the aerial to the transmitter, adjusted the generator to give him the "frequency" he had ascertained, and sent out very slowly his message to Mars. He repeated the message several times, being desirous of giving the Martians every opportunity of thoroughly understanding that he was speaking to them from the earth, and at the end of the message he asked them to answer him by replying "O.K." very slowly. All excitement, he switched over to his receiver and listened, with his whole mind concentrated upon his aural faculties, so that he should be sure to receive the slightest impulses indicated by this instrument. For some few seconds—which seemed an age to him—he heard not the slightest sound, and then, *eureka*, a few dots and dashes were faintly audible! He grasped the table to steady himself, his grip became firmer and firmer, the veins on his forehead stood out like small ropes in his anxiety, and then suddenly the aerial collapsed with an awful crash, the cabin appeared to fall down, the instruments faded away like ghostly ogres, and, with beads of perspiration standing out all over him, he awoke with a fearful start, to find it was only a dream.

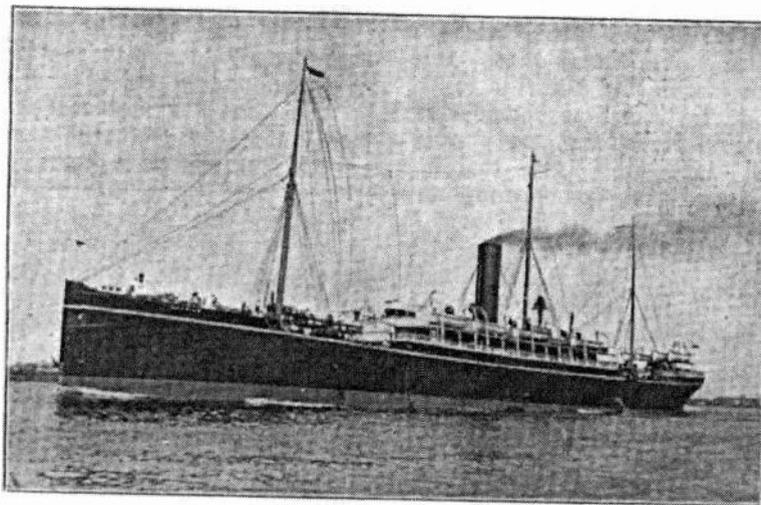
Maritime Wireless Telegraphy

LACKING a wireless equipment, the s.s. "Abyssinia," with a valuable cargo, was in an unenviable plight 1,100 miles from Halifax. Encountering a heavy gale on January 2nd, her rudder was smashed during the night by a mountainous wave. The rigging of a jury rudder, with the vessel drifting round at the mercy of the seas, was, states a correspondent, a most daring piece of work. There was no proper diving outfit on board, so two men unprotected had to dive beneath the broken rudder in an endeavour to effect repairs. The water was two degrees above zero, and air five degrees below. An unsuccessful attempt made by the British oil-tramper "Rockby" to tow her was followed by an endeavour on the part of the "Abyssinia" to tow the "Rockby," the latter vessel acting as a rudder. For half an hour, as though the tail wagged the dog, the "Rockby" steered the big vessel in front of her, and then the hawser broke. A snow-storm in the night drove the "Rockby" from sight, but she appeared in the morning and promised to report the "Abyssinia's" condition to all ships she met.

On the evening of the 9th February there arose a gale of almost typhoonic force which changed its direction from S.W. to N.W. within an hour. In the welter of conflicting seas that resulted the helpless "Abyssinia" was tossed like a cork. Broad sides of water crashed against her and upon her, and in all their united force swept over the decks. The porthole windows, iron frames and attachments were smashed out in one piece, the spar-decks flooded with five feet of water, and the hatches in immediate danger of being battered in. In this plight help was offered by the Dutch steamer "Chester," and later by the s.s. "Cedric," which also called the s.s. "Armenian." The

"Armenian," which was preparing to tow the "Abyssinia," was lost sight of during the night in a fog which, when it lifted a day later, disclosed no signs of her whereabouts. When 400 miles from Halifax a lull in the storm enabled the "Abyssinia" crew to arrange a jury rig of wires and cables which brought the rudder shaft under control, and permitted the freighter to be brought safely into Halifax after being uncontrollably adrift from January 2nd to January 13th. During this period so great was the anxiety felt that the Marconi stations at Halifax and Sable Island issued bulletins to all passing ships.

The Camperdown wireless station at Halifax,



The s.s. "Uranium."

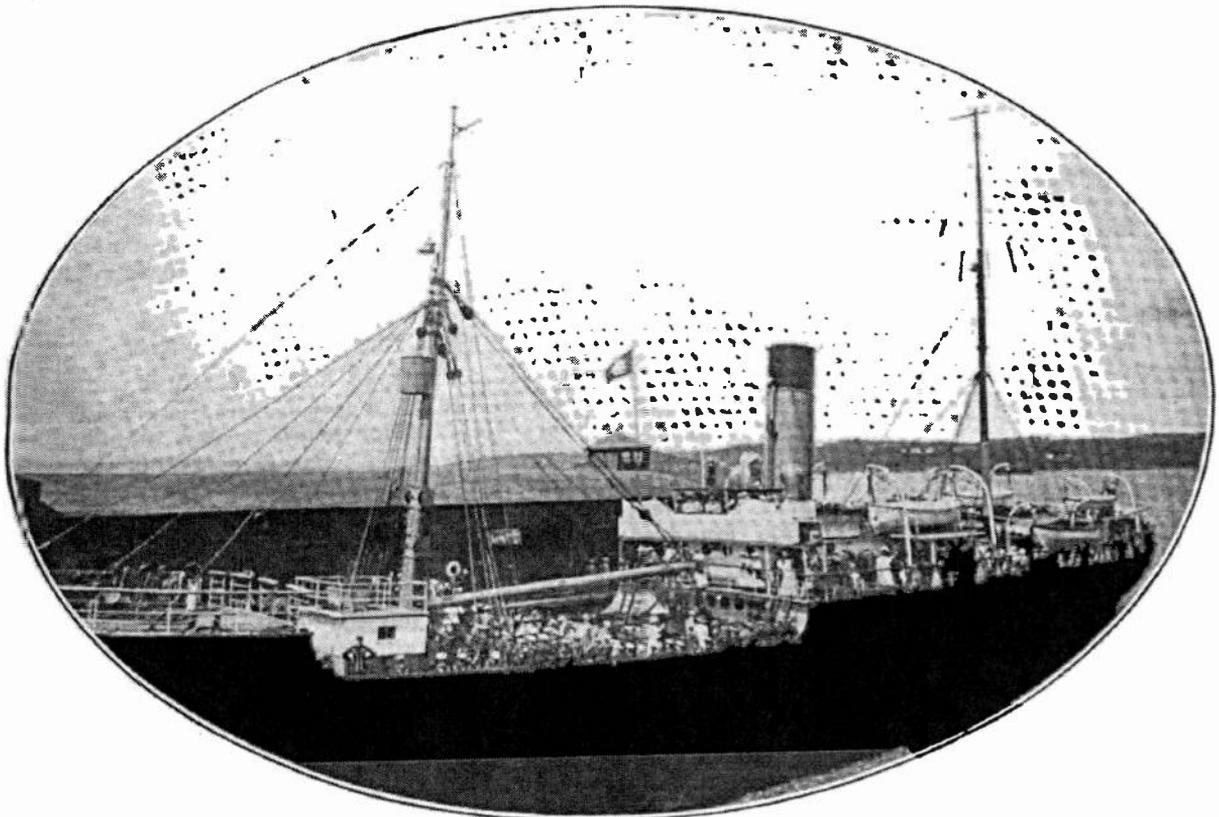
N.S., was able to render valuable assistance to the Uranium Steamship Company's vessel "Uranium," which, when going dead slow in a dense fog completely obscuring the coast line, grounded on Chebucto Head on January 12th. Gripped fast by a granite rock which worked its way through her

bow plates, the "Uranium" notified her plight to Camperdown. Help was promptly forthcoming not only from the Duncan's Cove life-saving station, but from the Government steamer the "Lady Laurier," the s.s. "Caonna" (Dominion Coal Company), and the s.s. "Seal" (J. A. Farquhar & Co.). All these vessels in turn made attempts to tow the "Uranium." Five trying days intervened, during which the station on the s.s. "Uranium" (in charge of Mr. Ridley) and the station at Camperdown (in charge of Mr. L. R. Johnstone) were in continual communication, handling the press of messages for inquiry with praiseworthy celerity. Arrangements had been made to save the wireless apparatus should the vessel have shown signs of going to pieces. Fortunately, however, the weather and sea conditions remained favour-

able, and the stranded vessel was successfully hauled off by the Furness Withy Company's steamer "Rappahannock."

For days lashed by a north-east hurricane while ablaze in mid-ocean was the experience—an experience as thrilling as any in the history of North Atlantic navigation—recently reported by the s.s. "Carthaginian" on her arrival at St. John's, Newfoundland. The fire broke out in the hold, and, owing to the difficulty of coping with it under the bitterly cold weather conditions, rapidly made headway. So serious was the situation that a wireless appeal for help for the 100 passengers in jeopardy was

ship Line. Recent events at sea have proved so unquestionably the grave importance of Marconi equipment on board vessels that the latest step taken in this direction by Messrs. Booth & Co., Ltd., receives a very general and genuine appreciation. In consequence of the new wireless regulations brought in by the U.S. Government for passenger steamers, all such with a crew of fifty or over must have two operators. For some time now the Booth Line have carried on their vessels a number of boys from the Navy League Home in Liscard, and knowing that many of these had a knowledge of wireless telegraphy—as a special course of instruction caters for this at



The s.s. "Lady Laurier."

flashed out. It was immediately answered by the s.s. "Heligoland," a Danish ship bound from New York to Hamburg, which proceeded in turn to summon other liners. Fortunately, ere they could arrive Captain McKillop, of the "Carthaginian," was able, with the help of the passengers, to get the fire under control and cancel the "S.O.S." signal. The conduct of the passengers, particularly of the women, was, in the captain's opinion, in every way commendable.

Liverpool and the shipping world in general have benefited on many occasions in the past by the enterprise shown by the Booth Steam-

the home—they placed them as assistant operators on the New York service of the line. All these boys hold the Postmaster-General's certificate for proficiency in wireless telegraphy. The Marconi Company gives every facility for training, and the boys go through a course of training for three months at the Seaforth station, under Mr. F. E. D. Pereira (the Liverpool superintendent of the Marconi International Marine Communication Co., Ltd.). As a rule, the Booth Line carry four of the Navy League boys on each of their large vessels. With the completion of their three new New York service boats eleven boy operators will be employed.

The Wrecker of Shark Reef

A Story of How both Woman and Wireless came to the Rescue

DURING the year 19— the laws of mathematical probability seemed to have been abrogated. That was, at least, the only explanation Dick Traynor could give of the series of disasters which overtook the marine insurance market in general, and his firm of Bertram and Hayward in particular, during that year. Underwriting is, of course, a gamble, but it is a gamble undertaken on strictly scientific lines. By a judicious selection of risks, the chance of total loss is eliminated or, at any rate, reduced to vanishing point.

That is the theory. It is a theory which holds good in nine hundred and ninety-nine cases out of a thousand.

Dick was pursued by the fear that the thousandth case had occurred. It was bad enough for his firm when the "Narva" struck an uncharted reef near the Falkland Islands, and also when the "Eugenic" collided with a Brazilian cruiser and got the worst of the encounter. These disasters were accepted with philosophical equanimity. But they were followed by a bitter disappointment at the foundering of the "Bella Vista" within fifty miles of port, after her captain had navigated her, with funnel gone, deckworks smashed, and rivets sprung, through five hundred miles of tempest. Then followed an autumn gale which appeared to have selected the vessels insured by Messrs. Bertram and Hayward as the special victims of its wrath.

Dick accepted this crescendo of disaster with a very bad grace. When a man is anxious to get married, he expects the Fates to exercise themselves so that he may get a rise in his salary and have a business partnership in prospect to sustain the other partnership. In this instance, however, the Fates were combining to forbid the banns.

A Philosopher at Tea

His friend, Sammy Verrall, who was in the cocoa trade, had a very simple explanation of these events. He expounded it as they sat together in the Royal Exchange tea rooms—a place where, in Sammy's words, "gamblers refreshed themselves in the midst of their iniquities."

"Fact is," he said, "Providence is against all this sort of thing. If your firm goes bust and flings you on the street, it will be a salutary judgment on your nefarious trade, and a clear sign that you must take up a respectable

business with an ethical implication. Like cocoa, for instance, or soap."

"Bosh!" replied Dick.

"Wait! You will be tried as Job was tried—boils, and all the rest of it."

"Things couldn't be worse than they are," responded Dick, seeking for comfort.

"We shall see about that when all your ships come home," replied Sammy, with a chuckle.

It is easy to curse an evil prophet, but difficult to get his prophecies out of one's mind. Dick became obsessed by the certainty of bad luck. The sound of the Lutine bell haunted him. It tolled through his dreams, announcing the loss of every vessel in which he had any interest. It tolled so persistently and diabolically that he began to wish that it would toll for his own funeral.

The Disaster of Shark Reef

After a week of suspense, there came the news of the total loss of the "Lancelot" on Shark Reef. Dick heard it as a man hears a sentence of death. His firm, as he knew too well, was heavily involved. There was no doubt about the truth of this final catastrophe. The information came from the owners, who had received a cable message from the captain.

When Dick heard the news, he put on his hat and coat, left the office, and walked all the way to a certain house in Hampstead. Amy was in the drawing-room, dreaming, not of the Lutine bell, but of wedding bells.

"Good gracious, Dick," she exclaimed, "what is the matter?"

"It's all up," replied Dick, flinging himself on to a chair. "You had better take that ring off. I'm done. Everything's done."

Amy looked at him steadily, and raised her right eyebrow—a signal of defiance.

"Go on," she said, mockingly. "'Henceforth we meet as strangers. Naught remains for me but the clammy silence of a pauper's grave.' And so on."

"It is nothing to joke about," protested Dick. "The 'Lancelot' has broken her back on the Shark Reef. She is scrap iron by this time."

"Oh, Dick! was anybody drowned?"

"No, the whole lot of them got off, confound them."

Amy sighed with relief. "What a blessing!" she exclaimed.

"Blessing? Oh, woman, lovely woman! And as like as not Bertram and Hayward will sink with that rotten hulk."

"Well," she said, "you are a smart business man, and there are other firms in the world than Bertram and Hayward."

"Talk sense, there's a good little woman. I used to think you had a good business head."

"Perhaps I have. Anyway, you are not to blame if the 'Lancelot' did break her back. You didn't ask Bertram and Hayward to take the risk, did you?"

"Worse than that, I advised them not to take it."

"How worse? You are talking awful nonsense, Dick."

"No, I am not. Every time Bertram or Hayward looks at me, I shall look as if I were saying 'I told you so.' They could forgive me anything but telling them that the risk was a rotten one."

Amy twisted her engagement ring thoughtfully for a minute or two.

"Why rotten?" she asked at last.

"For various reasons. I met the captain once, and hated him at sight. Holy old ruffian he looked."

"Was the boat a new one?"

"No, an old hulk held together with paint. It was bought a year ago by a private syndicate."

"Where is Shark Reef?"

Dick told her, but there is no need to reproduce the data which he gave. The reef is known to mariners under another name, and it lies ten miles to the south of a group of islands not far from a certain trade route. Even the most venturesome tramps give Whale Islands a wide berth, since Shark Reef is not the only hidden danger of that region. The "Lancelot," according to the brief account cabled by the captain, had been navigated by dead reckoning for three days prior to the foundering. Fog, which had not lifted until an hour after she struck, had prevented observations being taken. The "Lancelot," going dead slow, had slid on to the reef, and had broken her back as the tide fell.

The Feminine View

These were the facts so far as known; and they seemed to rouse a lively curiosity in Amy.

"Are you going to let it rest at that?" she asked.

Dick answered her in an absent-minded tone.

"Oh, there will be an inquiry, of course!"

"Then I should like to be cross-examining that captain for an hour or two," she declared fiercely. "Oh, you may smile!" she added.

in response to Dick's expression of patronising amusement. "I mean what I say."

"Not even you could make any impression on Captain Luxmoor," he replied.

"Not if he had a clear conscience."

"My dear girl, you are becoming stagey. What is in your mind, anyway?"

Amy rose and stood before him, accentuating her words with an uplifted finger.

"I am perfectly certain that he wrecked that ship."

"Oh, really now——"

"Yes, I am. I am just as positive about it as if I had seen him do it with my own eyes, and known what was in his evil heart."

Dick surprised himself by laughing heartily. A few minutes earlier he would have thought it impossible to do more than produce a twisted smile.

"You are absolutely magnificent," he said.

"I have never seen your Surrey-side character before. Perhaps you won't believe that people do not go about with evil hearts wrecking steamers nowadays."

"Don't they? Why not?"

"Because they don't, my dear."

"That is a woman's answer, and it will not satisfy *this* woman. Why, you yourself have told me often that many steamers are over-insured. What about the 'Lancelot'?"

Dick pondered for a moment or two with knitted brows. "Perhaps she was more than covered," he admitted.

"There! I told you so." Amy was as jubilant as if Captain Luxmoor were already convicted. "And let me tell you this, Dick. If you have not spirit enough to worry this business out and show that old ruffian up, I shall never forgive you. I shall never marry you, never."

"Oh, Amy," he protested. "What rubbish to talk when you know absolutely nothing about the man."

"I know everything!"

Whereupon Dick, showing that he had in him the beginnings of wisdom in such matters, held his peace and took his leave immediately.

The Artistic Captain

One result of Amy's habit of giving her decision before the case had been heard was that Dick took the most active part in connection with the inquiry into the loss of the "Lancelot." He was determined that Amy should have no just cause for accusing him of lack of spirit. Little or no assistance was given to him by his own principals. They certainly did not share Amy's melodramatic view of Captain Luxmoor. The man's story was so

clear and so natural that the inquiry would, in their view, be almost a formality.

Such was also the view of the King's Counsel who had been briefed to represent the firm. At least, it was his view until Dick began to sow the seeds of suspicion in his mind. There had been one or two peculiar events in Captain Luxmoor's career—one or two cases where he had been formally exonerated, but left in a distinct haze of suspicion. Moreover, Mr. Hilary Eustace, K.C., was constrained to admit, on the eve of the inquiry, that Captain Luxmoor's statement was so very straightforward as to be intrinsically doubtful. It was, in a word, too artistic to be true.

Breaking the Rock

The first day was occupied by the captain's evidence. Then began a process which Dick watched with something of the fascination a gambler feels when he plays for high stakes with ruin at his elbow. He had been afraid that Mr. Eustace lacked some zeal for his cause, and had even omitted to master the important points of the case. But he soon realised that Mr. Eustace had understood everything and forgotten nothing. The cross-examination of Captain Luxmoor had not proceeded for an hour before Dick began to cherish the first signs of hope.

Captain Luxmoor's statement had been concerned mainly with the last three days prior to the disaster. Mr. Eustace, however, began his questions at the point of leaving port, and dealt with each succeeding day in patient succession. Dick fretted at the slowness and apparent aimlessness of the process; and at the end of the first day of leisurely question and answer he put his view very strongly before Mr. Eustace.

Mr. Eustace smiled. "Did you have a good look at Captain Luxmoor?" he asked.

"Rather!"

"Well, when a man is bearded up to the eyes, he has no expression except in his eyes. Sailors' eyes are very steady and well under control. Up to the present he has made no sign; and, if I were to finish to-morrow, he would come through it with flying colours. He is like a rock, and I am like the waves breaking on it—I must go on breaking before I can make any impression. If he is telling the truth, he will not mind the process. But if he is lying, I shall find it out before five or six days."

"Five or six days!" echoed Dick dolefully.

"Meanwhile," added Mr. Eustace, "you can make further inquiries as to whether any vessels were near Whale Islands at the time of the disaster."

Dick exhausted himself and a fair proportion of the shipping world in these inquiries, but

without result. It appeared that the vicinity of Whale Islands was, as far as vessels were concerned, a desert.

The Captain Hesitates

On the third day of the cross-examination Mr. Eustace had brought the story down to the point at which the fog had suddenly descended upon the "Lancelot." Two suspicious circumstances made their appearance at this stage. Fogs were unusual events in that latitude, and during that season. And when the fog appeared, the first and second mate and the engineer had fallen ill with a disease which the captain described as enteritis. As the crew had taken French leave at the first port they had reached, everything depended upon these four; that is to say, on the captain alone.

On the first of these questions Mr. Eustace appeared unexpectedly as an expert on fogs. He cited Tyndall and Aitken and a dozen other investigators, and he eventually drew from Captain Luxmoor the admission that a fog under the atmospheric conditions revealed by his log was something of a miracle. This was the first point scored, and even Dick could perceive that it had some effect on Captain Luxmoor. The expression of the witness's eyes had changed. From being blank and unconcerned they had become alert and wary. And there was a longer pause than usual between question and answer.

Another day was spent in discussing the absence of other craft during the four days preceding the foundering. The whole system of look-outs was minutely investigated, and with a negative result. Not a flag, not a light had been seen, nor a fog-horn heard for four times twenty-four hours.

A Word about Sardines

A second point was, however, scored when the mysterious sickness among the responsible officers was investigated. Mr. Eustace professed an inexhaustible curiosity about the cause of sudden illness in the case of such sturdy men as the mate and second mate and the engineer appeared to be. He called upon Captain Luxmoor to give details of the diet on board. The records were ransacked to discover where the microbes could have lurked before they emerged to keep the three officers conveniently in their bunks during a chronic fog.

It was Captain Luxmoor himself who suggested sardines.

Mr. Eustace levelled a long forefinger at him and smiled benignly.

"Were sardines among the stores?" he asked.

"No, they were not."

"How, then, could the cause have been sardines?"

"Because I took a few tins on board, on my own account," retorted Captain Luxmoor.

Mr. Eustace dwelt upon this luxurious act with so much invidious humour that Captain Luxmoor lost his temper.

"Down the sardines," he roared.

"And I have no doubt the first mate and the second mate and the engineer said the same," remarked Mr. Eustace pleasantly.

Despair

When all was said and done, however, the captain's story was not seriously shaken. If all the crew had been present there might have been some chance of contradicting his evidence about the fog, but with only the mates and the engineer available there was little hope of making a breach in that manner. Dick foresaw that their evidence would be a blank. According to their depositions, they had all been sick men, who had had no thought for anything but Davy Jones's locker.

Dick yielded once more to despair. He was convinced that time and money had been utterly wasted. And when he called in the evening to "report progress" (ironical phrase!) to Amy, he told her so with almost tearful emphasis.

"My dear boy," she said, "you want a tonic!"

"I want Captain Luxmoor's blood," he replied.

"You shall have it. Let us go down to the exhibition to-night."

"Is it on tap there?"

"Silly! There was no connection between my first and second. Come along, and let's enjoy ourselves. It will do you good."

Dick groaned and protested, but, of course, he went. They strolled through the Hall of Lights, the Machinery Gallery, and the Palace of the Arts, and finally, led by luck and Amy, they came to the most interesting place of all—the Marconi exhibit.

"Let's go in and see it," pleaded Amy. "Perhaps Jack Binns is inside."

Mr. Binns was not inside, but the exhibit was presided over by a sun-burned young man who, one may be sure, was quite ready to behave like Jack Binns if the lucky chance came his way.

This young man smiled brightly when Amy entered, but modified his welcome when he caught sight of Dick behind her.

"Can I send a message?" asked Amy.

She could. The operator signalled the station in another part of the grounds, and asked her what the message was.

"My costume was made by Madame Aubert," she said.

It is to the operator's eternal credit that he did not smile. He tapped the message out with perfect solemnity. Nevertheless, he allowed some faint signals of amusement to appear when the answer came back.

"Shall I read it?" he asked.

"Oh, do!"

"The reply is, 'Minc was made by contract.'"

The Lady Moves

Amy was delighted, and to show her delight she sat down and began to talk to the operator as if he were her nephew.

"Tell me," she said, "all the voyages you have been."

It is possible that the operator drew upon his imagination to some extent, since a rapid calculation proved to Dick that the young man must have become a Marconi operator at the age of three. However, Amy listened as Desdemona did to Othello.

"Now tell me," she repeated, "have you ever been near Whale Islands?"

"Within fifty miles," replied the operator. "Not any nearer, thank you! It was about four months ago."

"And did you sight a vessel called the 'Lancelot'?"

"The 'Lancelot'?"

"Yes, a steamer of 4,000 tons, painted a dirty white, with a high freeboard and a black strip along the side, and two masts with no drake. Surely you must!"

"Good gracious, Amy," Dick broke in, "you remind me of the villager who was surprised that the returned emigrant had never met his old friend Farmer Giles in the States!"

"Don't be rude, Dick. I am only asking questions."

"So was he."

The operator expressed his deep sorrow at not having sighted the "Lancelot." Amy graciously forgave him, and took her leave.

The Operator Remembers

She had not gone far, however, before she heard the sound of rapid footsteps behind her. The operator appeared, breathless and apologetic.

"I suddenly remembered," he said, "that when we were near Whale Islands my brother sent me a wireless message about a boat. He is operator on the 'Miranda,' you know, a yacht that has been cruising all over the place. We were having a long talk together, when his signals were suddenly interrupted. He explained that there had been a thunderstorm; and in the middle of it the captain had got a whacking scare, because a triple flash of

lightning showed a vessel close on the port beam. What scared them was that she was so near, and had no lights. He described her at the time, and I remember something about a white hull and a black funnel."

Amy looked at him as if she wanted to throw her arms round him and kiss him.

"What date was that?" Dick inquired hastily.

"Wait till I think," the operator replied.

They waited till he thought.

"It must have been about the middle of May," he said.

"Can you fix the exact date?"

"Not at the moment; but I can from my records. Is it important?"

Amy flung her arms out. "It is everything!" she cried.

"All right. I can let you know to-morrow."

Dick explained the situation to him, and arranged to meet him on the following afternoon. Amy smiled upon him till he positively blushed—a magnificent tribute to the service.

"There, you see," said Amy, as they turned away, "it is quite simple if you go about it in the right way."

"Simple!" exclaimed Dick. "You don't know what you are talking about."

"Yes, I do. Hurry up, now!"

"Where are you going?"

"Never mind. You do as I tell you. Take me to the nearest entrance, and call a taxi-cab."

They drove first to Amy's house in Hampstead, and thence to Marconi House. On the way citywards Amy asked Dick a number of questions which showed that she understood the case almost as well as Mr. Eustace. Then she relapsed into thought, with knitted brows and puckered lips.

At Marconi House

At the Marconi telegraph office she wrote out a long message. Occasionally she asked Dick to spell a word for her, but she did not let him see the message until she had written the last word. Then she handed it to the clerk with the casual air of a stockbroker sending a six-penny telegram.

"Please send that at once."

The clerk looked at it and raised his eyebrows.

"This is rather unusual," he ventured, and murmured something about the cost.

"I don't care what it costs," Amy replied, producing some banknotes.

Dick swore under his breath, and caught her hand. She looked round at him quickly.

"If you dare," she whispered fiercely, "I shall give you back the ring."

"Good Lord!" said Dick, resigning himself.

"This is my affair," added Amy. "You

men don't know how to manage anything." Turning to the operator she continued, "I want that message sent at once, and if it is not delivered in twelve hours I shall complain to Mr. Marconi and the Postmaster-General, who are both personal friends of mine." Dick was on the point of protesting against this magnificent lie, when the edge of a heel on his shin made him reconsider his objection. "I shall leave you enough money to pay for the message and for a reply of equal length."

"We shall have to find the 'Miranda' first," said the operator.

"She is somewhere in the North Atlantic," replied Amy. "You can find her more easily than you can find a collar stud."

Playing for Time

Dick went to bed that night with the feeling that the world had gone mad. When he awoke in the morning he had some difficulty in persuading himself that Amy's wild performance had been a reality. But he had enough faith in his recollection of events to tell Mr. Eustace to play for time.

The day brought forth nothing. Dick kept a messenger waiting at Marconi House, and several times he himself darted out to make inquiries on his own account. As the day wore on he became haunted by the conviction that the "Miranda" herself had sunk to the bottom of the sea.

He had given Mr. Eustace only a vague idea that he was hoping for further news. The possibility of a reply from the "Miranda" was so remote that he had not the courage to suggest it definitely. Mr. Eustace told him that the process of cross-examination could not go on for ever; and he mentioned the luncheon adjournment on the following day as the utmost limit.

That morning was one of the longest, and yet the shortest, that Dick ever spent. The agony of suspense made it long, and the desire for time, and yet more time, made it seem short. He kept one eye on the clock and another on the door, and each time that the door opened his heart leaped in hope, only to sink back in renewed despair. Twelve o'clock, one o'clock, came with mocking swiftness. Then the big hand began to drop past the quarter, towards the lowest, and, for Dick, the last figure.

At twenty-five minutes past one the door opened, and this time not in vain. Dick clutched the envelope from the messenger's hand and tore it open. He had to steady himself with a great effort before he could read a single word; but when he had read the message he was cool and collected. Seizing a moment when the witness was consulting a chart, he handed it to Mr. Eustace.

"Adjourn till five minutes past two," said the usher.

"I have just one or two questions to put to you before I am finished with you, Captain Luxmoor," said Mr. Eustace.

Captain Luxmoor answered with a nod and a grim smile.

More Wonderful than Wireless

After the luncheon adjournment Mr. Eustace was even more bland than usual.

"Let us go back a little," he said, "to the night of the 14th May."

"Yes."

"That is to say, to the night of the thunder storm."

Captain Luxmoor made no sign for a few seconds; then he looked up sharply.

"What are you talking about? There was no thunder storm."

"Was there not? Have you forgotten so soon?"

Captain Luxmoor glared at him wildly. His mind seemed to be reviewing his evidence, as if to recall how and when he had spoken about a thunderstorm.

From that point Mr. Eustace proceeded coolly and ruthlessly to break the witness. From the moment that the thunderstorm had been mentioned, it must have been obvious to Captain Luxmoor that the flaw which always exists in even the best-planned scheme of villainy had showed itself. Within two hours—and although not a line of the telegram had been read in court—the witness had practically admitted every vital fact which it contained. On the night when the "Lancelot" had been supposed to be feeling her way through a dense fog, she had been plunging along at full speed, with her lights out, on a course three points to the north of the course which would have brought her clear of Shark Reef.

"It is a wonderful thing, wireless telegraphy," remarked Amy that evening, after the event had been discussed, with affectionate interludes, for the hundredth time.

"Wonderful enough," Dick admitted. "But I know something more wonderful."

Amy beamed upon him. "Flatterer," she said.

"I was referring to women in general, not to you in particular," protested Dick.

Men—and Their Hats

THE only man who can afford to lose his identity is he who is wanting in all egotism and self-respect. Fortunately, specimens of this class are becoming rarer and rarer. This growing rarity is no doubt due to

the advance of education and the increased facilities of travel whereby men can for a while immerse themselves in the vortex of civilisation ere they migrate once more to the wastes of suburbia. As a result our streets are infinitely more interesting, our fellow man so much more worth our while contemplating. Even in the matter of hats this change is apparent. Not so very long ago the City was besieged each morning by an army of tailors' dummies, each immaculately turned out in top hat, frock-coat, and stripey trousers. Then followed a short period, when the bowler in its multiple shapes of inconceivable ugliness was *de rigueur*. But at last *nous avons changé tout cela*. We have dared to flout fashion in her own domain, and make a bid for variety—soft felts, hard felts, round hats, squash hats, top hats, Homburgs, Panamas, and Tyrolese, all are in fashion together, with that latest favourite, the cosy, soft, and velvety Velours. What is the result? We can tell what kind of man our neighbour is by the hat he wears. The "correct" inheritor of family tradition still clings to the well-groomed, glossy top-hat and well-cut morning coat. The conscientious but unambitious clerk is content with his hard felt. The owner of an artistic or philosophic temperament requires something more adaptable and unconventional, so favours the slouch hat, while his more prosperous comrade finds a velour satisfies all his requirements. Finally, there is the man who must always be up to date, and is willing to waive personal attractiveness for the prevailing fashion. At the present moment he, too, wears the velour, but tucks a mount of wild-fowl feathers or a tuft of badger hair in the hat-band; and if he be lacking in the saving sense of refinement, this addition assumes quite startling proportions. Perhaps some of my readers may be inclined to doubt my statements. Well, if they do, let them go to Messrs. Henry Heath, Ltd., of Oxford Street, Piccadilly, Cornhill, and Moor-gate Street, where they will be able to convince themselves of my veracity. I suggest this firm, for they are the *cognoscenti* of the hat trade. Their hatterie was inaugurated in the days of George IV., and ever since that time they have been the premier hatters, with royalty for their *clientèle*. They have followed the fortunes of the hat through its varied career, from the tri-corne to the velour. But "followed" is hardly the word, for they themselves have been its pioneers, and it is through their instrumentality that the public have been educated to the present-day elegance in the fashion of hats. One speciality of theirs is the wireless silk hat! If the material used in the hat is sound, there is obviously no need to adopt a means to keep it in shape.

Personal

Commander W. H. G. Bullard has been appointed chief of the Navy Department's radiotelegraph office in Washington, and will have charge of all the wireless stations of the department.

Mr. E. Sa'is, who represents Marconi's Wireless Telegraph Co., Ltd., in Brazil, has opened offices at 76 Rua de Ovidor, Rio de Janeiro.

Mr. Charles J. Close has been appointed to represent the Marconi International Marine Communication Co., Ltd., in the North-Eastern counties. Offices have been acquired at Milburn House, Newcastle-on-Tyne. The registered telegraphic address of the north country branch is "Empire, Newcastle," and the telephone number Central 1125.

MARCONI ATHLETIC CLUB.—The Annual Dinner will take place at the Holborn Restaurant on Saturday, March 16th. It is hoped that every member of the Club will make an effort to attend. Mr. W. W. Broadfield will preside at 7 o'clock. After the Dinner a concert will be held.

Movements of Engineers

E. J. Watts has returned from Shanghai, China, and will shortly take foreign service leave.

W. B. Cole is temporarily at Cowes, Isle of Wight, supervising the work of installing a torpedo-boat destroyer with Marconi apparatus for the Chilean Government.

J. C. E. Chevallier, who has been in the service of the American Marconi Company, has now joined the parent company as probationer engineer, and is at present at Chelmsford undergoing a course of instruction at the company's works.

P. H. Flood-Page and R. Price-Smith have joined the engineering department of the Marconi Company as assistant draughtsmen, and are engaged in the drawing and design section at Marconi House.

A. W. Hall and W. F. Kent have joined the engineering department of the Marconi Company as test-room assistants, and are engaged in the test-room of the company's works at Chelmsford.

R. J. Hobson has resigned from the company.

S. F. Kos has been transferred to the construction section of the engineering department, and is now assisting with the work of that section at Marconi House.

A. H. Morse has been transferred from London to Poldhu, where he is now temporarily attached for experience in turbine and high-power stations work generally.

V. Muirhead, an engineer in the service of the Russian Company of Wireless Telegraphs and Telephones, who has been undergoing a course of instruction in up-to-date work at Broomfield Instructional School and Chelmsford Works, has now returned to St. Petersburg, Russia.

D. H. and L. S. Payne have been transferred from Poldhu to the ship equipment section, and are now at Glasgow and Liverpool respectively for experience in practical ship-fitting work.

P. E. Privett has been transferred from Broomfield to Poldhu high-power station for experience in power-station running.

H. S. Tisshaw has been transferred from Clifden high power station to the head office, London, and is now temporarily attached to the engineering department.

R. C. Tootill has joined the company as probationer engineer, and is stationed at Chelmsford in the test-room of the company's works.

O. Trost, who has until recently been assisting in special experimental work at Chelmsford, is now temporarily at Clifden high-power station.

Engineers attached to the ship equipment section of the engineering department are located as follows:

G. J. Boome, London Docks.

F. E. Robinson, London Docks.

G. H. Major, London head office.

N. C. Rackstraw, London head office.

K. Tremellen, London head office.

W. H. Brown, Glasgow district.

A. Flood-Page, Glasgow district.

D. H. Payne, Glasgow district.

W. H. Venn, Glasgow district.

G. S. Wood, Hull district.

F. E. Burrowes, Liverpool district.

W. F. Fielding, Liverpool district.

L. G. Jeffery, Liverpool district.

L. S. Payne, Liverpool district.

H. F. J. Merton, Liverpool district.

(Brazil)

Mr. Welpley arrived in December last to take charge of the department concerned with military equipment.

Movements of Operators

F. H. Baker, from the "El Argentino" to the "Urubamba."

A. S. Beattie, from the "Commonwealth" to the "Mongolia."

F. A. Bradley, from the "Dunluce Castle" to the "Vauban."

J. M. Butterworth, from the "Deseado" to the "Warwickshire."

J. G. Bull, from the London School to the "Athenia."

R. M. Chetham, from the "Amazon" to the "Athenia."

W. L. Cormack, from the "Urubamba" to the "Oronsa."

A. D. Cottingham, from the "Anselm" to the "Campania."

L. G. Croke, from the "Marengo" to the "Buffalo."

G. G. Chapman, from the "Vauban" to the "Highland Scot."

A. G. Dicks, from the "Virginian" to the "Rangaitira."

L. A. Dods, from the "Merion" to the "Carpathia."

A. W. Davey, from the Liverpool School to the "Royal Edward."

R. Fraser, from the "Corinthian" to the "Caledonia" (Anchor).

H. J. Gallagher, from the "Persia" to the "Minne-waska."

A. D. Hathaway, from the "Asian" to the "El Argentino."

B. J. Hibberd, from the "Pretorian" to the "Tongariro."

W. C. Henderson, from the "Ivernia" to the "Empress of Britain."

E. L. Henri, from the "Arzila" to the "Ausonia."

(Brazil)

The following operators have been transferred from the Lloyd Brasileiro staff to the ships named:

Euclides Silva, to the "Minaes Geraes."

Mathias de Araujo, to the "Sao Paulo."

José Campos, to the "Rio de Janeiro."

Bernardino P. Barreta, to the "Bahia."

Ricardo F. de Lima, to the "Ceara."

Sebastiao Campos, to the "Para."

José Rebeiro, to the "Acre."

Severino P. de Oliveira, to the "Maranhao."

Joaquim M. Lopes, to the "Olinda."

Antonio a Ferreira, to the "Brazil."

Daniel Collins, to the "Manaos."

Carlos Magno Filho, to the "Sergipe."

Ataulpa Magalhaes, to the "Jupiter."

Augusta Costa, to the "Sirio."

Marcelino Garcia, to the "Orion."

None, to the "Saturno."

Manoel F. de Oliveira, to the "Aymoré."

None, to the "Iris."

Mario Samaruga, to the "Ladario."

Abel Fernandes, to the "Venus."

José M. Delhuo, to the "Mercedes."