THE MARCONIGRAPH

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MARCH 1912 PRICE 2

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DEPARTMENT B, MARCONI WIRELESS TELEGRAPH COMPANY *of* AMERICA

29 Cliff Street, New York, U.S.A.

THE MARCONIGRAPH

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The Early Critics of Wireless

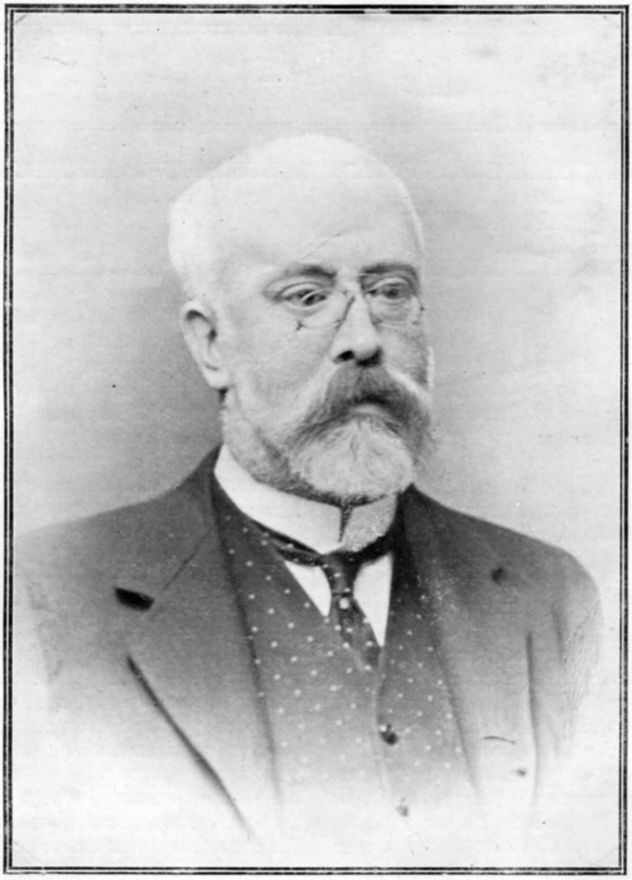
IT is almost superfluous to declare that anyone who attempts to forecast the future of an invention, and who thereby seeks to influence public opinion, should be possessed not merely of a knowledge of its principles, and of the factors bearing upon them, but that he should be absolutely devoid of prejudice so that he can illumine the obscure and uncertain promises of that discovery by the rays of an open mind. Unfortunately for the prognosticators of evil for wireless telegraphy their forecasts were not always based upon knowledge tempered by impartiality, and their outpourings, viewed in the light of modern achievements, seem to afford material for nothing but ridicule. In perusing the pages of an old magazine we alighted upon an article dated July 1st, 1909, in which the writer set out to discuss long-distance telegraphy. The impression conveyed by reading the observations concerning wireless telegraphy was that the writer had less faith in his convictions than in the vulnerability of his arguments, and the only wisdom which he showed was in withholding his name from the article in question.

"The great problem with the early inventors of the telegraph," he said, "was 'how to tie the current to a wire'; but the problem with the wireless people is how to let it loose, so that it may career over the face of the globe for anyone to catch hold of!" He magnanimously conceded that the system had undoubted advantages at sea, but then, "any ship within radius may help itself to the messages knocking about; and, although this was a mercy in the case of the wreck of the 'Republic,' it might be far otherwise in the case of ships of war at close quarters with the enemy." No doubt the reason why every navy worthy of the name is equipped with wireless telegraph apparatus is the desire to cultivate espionage in a new form.

But the massive imagination of our prophet has discovered one use for wireless telegraphy. "American millionaires have set up costly installations along the coast, near New York, as playthings for their sons, and to such an extent has the nuisance grown that legislation has been demanded to put a stop to it."

The fallacies collected by the writer of the article prove to his mind "what has been foreseen by practical telegraphists from the first, that the more the system is extended the less efficient it becomes; and if to this we add that it lacks the great essentials of speed, security and secrecy we shall see that it can never become of any real value for commercial purposes, although it may continue to excite interest as a scientific curiosity. Secrecy is of the very essence of all telegraphy; but there can be no secrecy where messages are thrust violently into the air, to be picked up by the first eavesdropper who comes along."

It would be useless to attempt to answer such an absurd and unsupported statement, for enough evidence has been produced during the past few years to expose its hollowness, but we would recommend readers to turn to the report of Mr. Marconi's speech on page 24 of this issue, which should finally dispose of the dying echoes of the malicious statements concerning wireless circulated in the early days. We have referred to this article not because, in our opinion, it deserves an answer, but because it has a certain amount of historical interest, showing as it does the kind of opposition against which Mr. Marconi had at one time to contend. That he has overcome it is due entirely to the imperishable greatness of his work.



DON ANTONIO COMYN,
CONDE DE ALBIZ.

His Excellency Don Antonio Comyn, Conde de Albiz,

Managing Director of La Compania Nacional de Télégrafia sin Hilos.

WITH the opening by His Majesty the King of Spain of the Marconi Station at Aranjuez, near Madrid, thus completing an important chain of internal and external wireless communication for Spain, the past month will stand out with prominence in the annals of wireless telegraphy. It must be a supreme happiness to the Directors of La Compañia Nacional de Telegrafia sin Hilos to contemplate the results of their work, and it is no mere figure of speech to say that the whole civilised world will, with the passing of time, feel with increasing effect the benefits conferred on it by those who have adopted Mr. Marconi's great work in Spain and the Canary and Balearic Islands. It is appropriate, therefore, whilst the world is still echoing another great Marconi success, to place before our readers a study of the central figure in the Spanish organisation, which has ensured that success.

Don Antonio Comyn, Conde de Albiz, is a typical specimen of the men who have made wireless telegraphy a great world power.

Moreover, he combines qualities which are, unfortunately, not too commonly found in association. A man of high social standing, and holding a distinguished position at the Court of Mis Majesty King Alfonso, the courtly nature of Señor Comyn covers a genius for work which comprises legal, political, and commercial spheres. The hackneyed saying that genius is an infinite capacity for taking pains is a sort of half truth. The man of genius possesses that capacity, but it is simply because he is inspired by a great idea. He sees the object of his quest before him like a light which he must follow. He is intensely possessed by it, and cannot desist from the search until he finds it. He is forced to take infinite pains by the fire within him, and that is the real genius.

Señor Comyn was born in Madrid in the year 1858. His father, who was for a considerable number of years Minister Plenipotentiary for Spain at the Court of St. James's, before Spain was represented in London by an Ambassador, is of Scottish origin, but the family have been settled in Spain for several centuries. On the maternal side Señor Comyn is of Irish descent, but there is no mistaking his loyalty and devotion to the country of his birth—Spain. The early education of the subject of our sketch was well conceived with a view of fitting him for the distinguished rôle which he was destined to fulfil in later life. He has had a cosmopolitan education, having studied at the University of Madrid, at University College, London, in Austria, and elsewhere. He is a gifted linguist, and in addition to his native tongue he speaks fluently French, German, Italian, and English. He graduated as a Doctor of Law at the Madrid University, and was later engaged in the Spanish Diplomatic Service, leaving that to enter the legal profession where he became distinguished as an international jurist. As has already been mentioned, Señor Comyn holds a prominent part at the Spanish Court and moves in the highest Society in Madrid. It is no wonder to find a man of his patriotism, his extensive knowledge, and instinct for work absorbed for many years in political life. He was elected in the Conservative interest a Member of the Spanish Cortes, and served, first as a Deputy and later as a Senator, for the last twenty years. He has held the office of Attorney-General in the Court of Accounts, and has been the Under Secretary of State in the Ministry of General Azcarraga.

Possessing a natural aptitude for finance, he quickly discovered his *métier* in the Cortes, and was for four years Secretary to the Budget Commission, which is one of the permanent Committees of the Parliament, and took a very prominent part in the deliberations of this Commission and in the discussions on financial subjects in Parliament.

Some time ago, whilst holding the post of legal adviser to the British Embassy and Consulate at Madrid, he became acquainted with the Marconi system of Wireless Telegraphy, and on the formation of La Compañia Nacional de Telegrafia sin Hilos, sixteen months ago, he was elected Director and Legal Adviser, and very soon afterwards he was appointed Managing Director. So absorbed did Señor Comyn become in the Marconi system of Wireless Telegraphy, and so zealous was he for the promotion of its interests, that practically the whole of his time and efforts have been devoted to the development and extension of the Marconi System in Spanish territory, with results that are alike creditable to himself and to his eminent coadjutors on the Spanish Board.

Spanish Internal Communication

Opening of a Central Wireless Station at Aranjuez

Notable Royal Messages

THE opening on Saturday, January 27th, of the Marconi wireless station at Aranjuez near Madrid was described in some of the Spanish papers under the heading "*UNA FECHA HISTORICA.*" In the light of subsequent events, the occasion has fully merited the great importance attached to it in high official circles and by the general public, whose varying shades of opinion were so admirably reflected in the capable Press of the country. During the closing days of January, Spain added an eminent chapter to her glorious history when she placed herself in the forefront among the great nations in the matter of telegraphic communication, and the sagacity of her councillors and business men in perceiving the important benefit to be derived from Mr. Marconi's epoch-making discovery, and adapting it on an elaborate scale to the requirements of their country has stamped them as worthy descendants of the immortals who made Spain the intellectual light she was during the dark ages. What more fitting than that the Royal head of the State should show his approval of the great enterprise and personally open the station which serves as the great artery for the internal telegraph communications of the country, and binds Spain by invisible electric waves to distant lands.

King and Queen of Spain at the Aranjuez Station

His Majesty King Alfonso, who performed the inaugural act, was accompanied by his gracious Consort, Queen Victoria, by the Princes Maurice and Leopold of Battenberg, prominent members of the Government, diplomatic, naval, and military representatives, and leading public officials. The list of distinguished guests present was an imposing one, as the following representative selection testifies: Sir Maurice de Bunsen, British Ambassador, and the Italian Ambassador; Their Excellencies Don A. Barroso, Minister of the Interior; General Luque, Minister of War; General Don José Pidal, Minister of Marine, and Don Bernardo Sagasta, Director General of Posts and Telegraphs. Others present included Don Esteban Diaz, Inspector General of Posts and Telegraphs; Don José Camino, Chief of the Wireless Department; Generals Bascaran, Contreras, and Cabañas, Colonel Figuerola Ferretti, Marquis de Valdeiglesias, etc.

The station was opened amidst most propitious conditions, and numerous messages were exchanged with England, Italy, Canada, and even with the King of England then on board the "Medina" on his way home. But before we describe the station and reproduce some of the historic messages that passed on that eventful Saturday, a word may be devoted to the admirable site chosen for the new station.

Of the many attractive spots used as sites for wireless stations, Aranjuez is one of the most prominent. Situated in a broad valley where two rivers meet—the historic Tagus, and the less renowned Jarama—this enchanting centre has been for centuries the pleasure resort of kings. The origin of the name itself—Ara Jovis—indicates that the Romans had, in their day, erected a temple there. Formerly the abode of the Grand Masters of the Knights of Santiago, Aranjuez became a royal residence in the reign of Philip II., who commissioned the famous architect of the Escurial—Juan de Herrera—to lay the foundations of a royal palace, which was completed and embellished under Philip V., Ferdinand VI., and Charles III. Although the palace teems with valuable works of art, for many, the chief attractions of Aranjuez lie in the beautiful gardens and park

Outside the Aranjuez Station: Second group on left—British Ambassador, Prince of Battenberg, and Italian Ambassador. Third group—Mr. Childs, Mr. P. Eisler, and Lieut. Moreno-Queseda.

laid out on a plan which recall some of the fantastic scenes described in the "Arabian Nights." It was on this enchanting site that the engineers of Marconi's Wireless Telegraph Co., Ltd., erected the central station of the public wireless telegraph service in Spain. When it was found advisable to establish this building in the neighbourhood of the capital, Toledo was at one time thought of as likely to furnish a site for a central station, but its rocky foundations which have so bravely defied the ravages of the ages could not compete with the soil of Aranjuez as a *prise de terre*. The station is erected in a large field compassed by an olive grove on the outskirts of the park. It lies at the foot of a low line of hills about half a mile from the railway station. So much for the site; it now remains to describe the interior of the Aranjuez Station. As we have already explained, this station is intended to communicate with Vigo, Barcelona, and Cadiz, also with Alicante or another suitable site to be selected later, the working ranges being 290, 320, 300, and 265 miles respectively. This is equivalent to a distance of 575 miles over sea, and for a maximum range considerably in excess of this figure. The installation is arranged to work on a 7,000 ft. wave length for communication with the fixed stations. Direct communication has been maintained at all times of the night and day between Poldhu and Aranjuez. Such portions of the installation as the masts and aerials, lend themselves but little to descriptive treatment, and it is sufficient to mention that the former are of the sectional steel type with wooden top masts, the main mast being 257 ft. high for the transmitting aerial, and 265 ft. for the receiving aerial. The aerial system consists of one main two-part six-wire Tee aerial, each limb independently supported, between the centre mast and a triatic connecting the outer pair of masts. A receiving aerial has been erected above the transmitting aerial, consisting of four wires, one to each outer mast. The connections between the operating house and the extensions of these aerials are made by independent conductors.

King and Queen of Spain and Party leaving the tent where they took tea

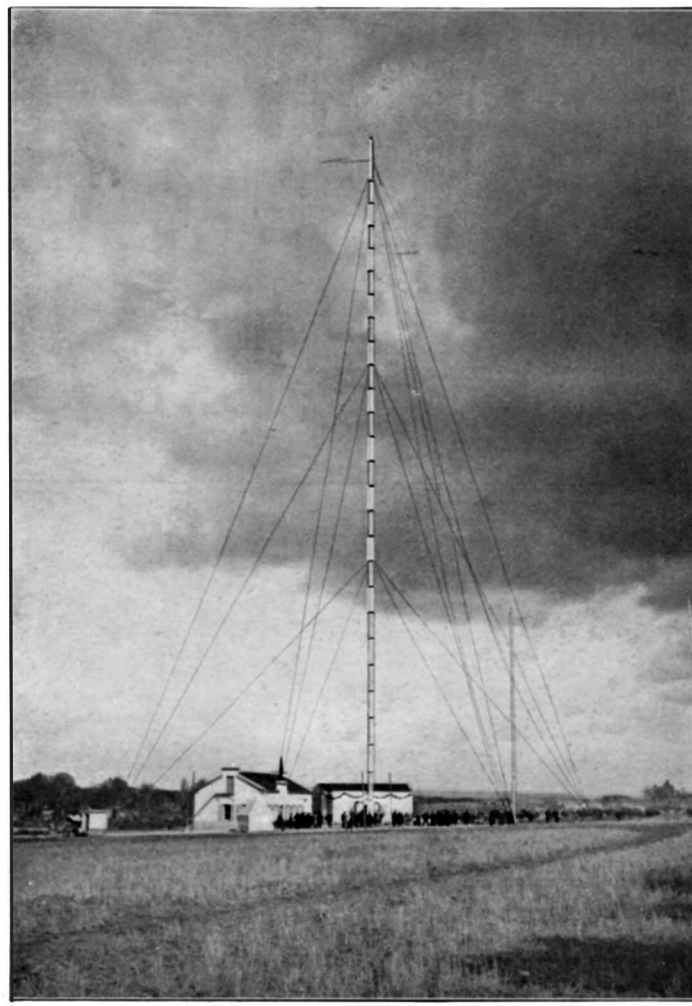
We now pass through the engine house and the room in which the electrical current is

generated. The prime mover consists of an oil engine, which, with its various accessory parts, forms an imposing feature of the installation. The engine is provided with an extended sub-base, and is coupled to the direct current generator, which is mounted on that sub-base. The generator consists of a continuous current dynamo direct coupled with the prime mover supplying continuous current at 110 to 160 volts for motor generator, charging accumulators, or lighting. The dynamo is fitted with a suitable field regulating resistance to vary the supply voltage for the range specified, and is furnished with the necessary foundation bolts and usual accessories. It is protected from high frequency surges by graphite shunting resistance.

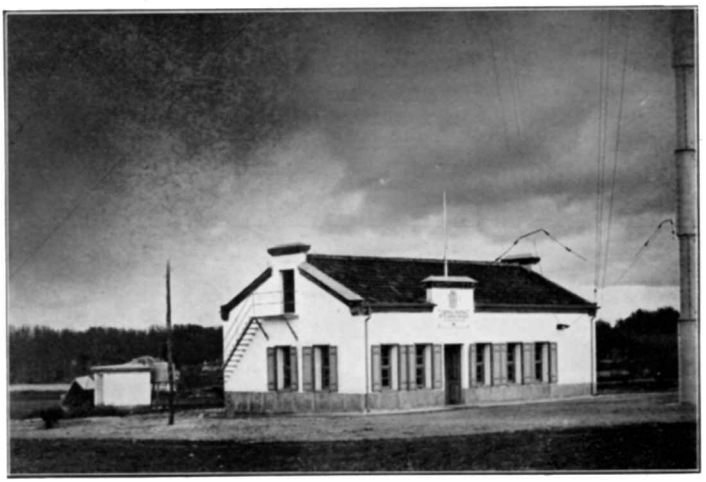
The motor generator combination is arranged for direct driving of a discharger mounted on an extension of the alternator shaft, and on a common bed. The combination is provided with a motor starting resistance with underload and overload release, capable of carrying the full load current continuously on any stop, and a motor field regulating resistance capable of varying the motor speed 16 per cent. on either side of the normal, and alternating field regulating resistance capable of regulating the alternating voltage from normal to 30 per cent. below normal.

The switchboards are of the usual type equipped with the necessary switches and instruments. There are three panels, one for dynamo and battery, one for motor generator, and the third for alternator. All the wiring is carried underground in trenches covered by chequer plates.

Then there is also the battery of accumulator cells, a familiar sight in wireless stations. The transformer is of the single phase core type, and is furnished with external means for altering the voltage as required. The low frequency primary inductance is of the air cooled iron core type, and together with the transformer is protected by two special air core chokes. Besides the condenser battery, there is a discharger, consisting of a copper disc with peripheral studs rotating between multiple electrodes, the disc being direct coupled to the alternator, and provided with an adjustment for the electrodes to bring the instant of discharge into phase with the alternating cycles. The transmitting jigger is of the independent primary and secondary type. The aerial tuning inductance consists of one independent winding of cable similar to that of a jigger secondary. The standard Clifden transmitting apparatus is provided, and the "electric eye," as the receiver has been so aptly named, is of the valve type with intermediate circuit ranged for the reception of waves between 2,500 and 8,000 ft. Of course, a magnetic detector receiver is also provided with multiple tuner.



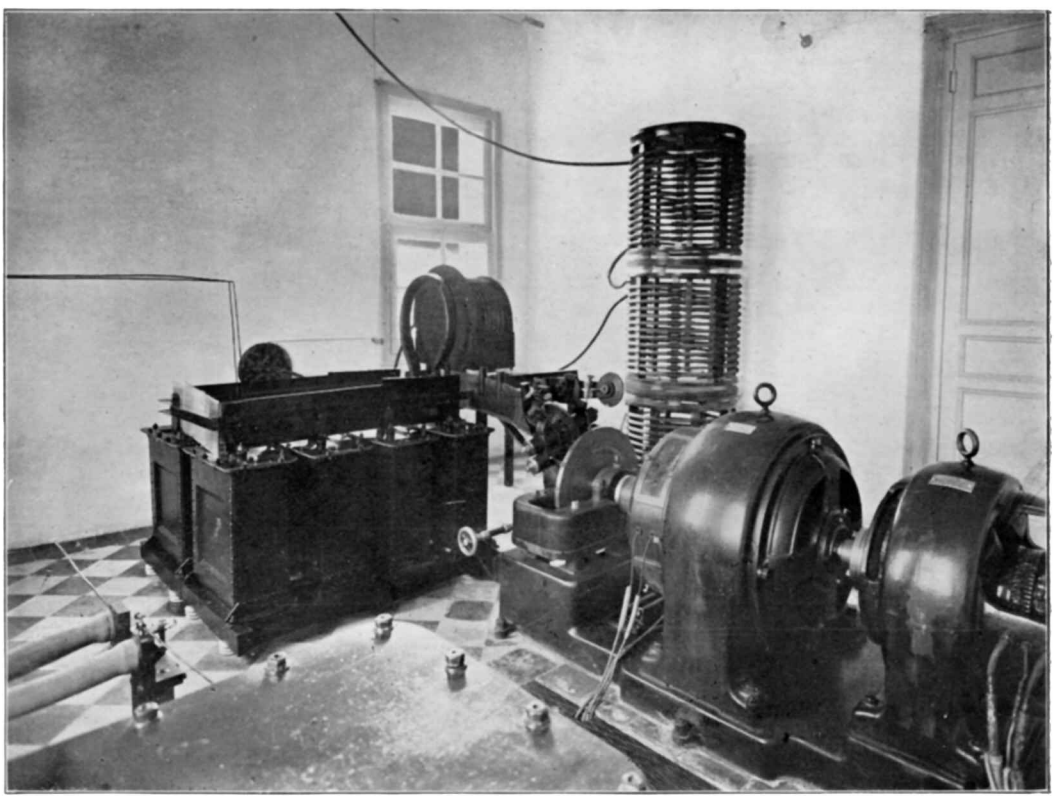
View of Masts and Aerials at Aranjuez



Outside view of the building, Aranjuez Station

The arrival upon the scene of the Royal Party was the signal for a great deal of enthusiasm. Conde de Albiz, the managing director of the Compañia Nacional de Telegrafia sin Hilos, presented Messrs. Fisler and Childs, the engineers of the Marconi Company, to their Majesties, who immediately insisted upon inspecting all there was to be seen at the station; the King asking for information concerning a number of points which aroused his curiosity, and this information was supplied him by Lieutenant Morena Quesada, the chief engineer of the Aranjuez station. The Queen even endured the metallic clang of the spark generator, the first note of which, transmitting the message to the King of Italy, burst out with almost impolite suddenness whilst Her Majesty was examining the copper disc.

It is unnecessary to refer in further detail to the opening ceremony, except to pay a tribute to the admirable reports which appeared in the Spanish Press. It would be impossible



Generating Plant at Aranjuez Station

to give a list of the newspapers of Madrid and the provinces which dealt so well with the proceedings, but acknowledgments should be paid to the *Mañana Debate*, *Epoca*, *Pais* and *Heraldo de Madrid*. Many of the papers printed some of the telegrams which were dispatched from Aranjuez at the opening ceremony, and those received shortly after the departure of the Royal Family. In view, however, of the importance of the occasion, and the historical interest which attaches to these communications, we set out below the full texts of the telegrams exchanged.

The telegrams were dispatched in the following order :

KING OF SPAIN TO KING OF ITALY, 3.48 p.m.

Le Roi, Roma.—" Au moment d'inaugurer le service publique de télégraphie sans fil je tiens à saluer en la personne de Votre Majesté l'Italie toute entiere, Patrie du grand inventeur Marconi.—*Alfonso.*"

KING OF SPAIN TO KING OF ENGLAND, 4 p.m.

The King on board the "Medina."—"In inaugurating the wireless Marconi station Aranjuez - Madrid our first thought is for you both and beg to send you our loving best wishes for a happy journey and our kindest regards.—*Ena-Alfonso.*"

KING AND QUEEN OF SPAIN TO QUEEN ALEXANDRA, LONDON, 4.48 p.m.

"One of our first Marconi messages is for you dear Aunt to send you our most affectionate greetings and kind remembrances. Much love.—*Ena-Alfonso.*"

HIS EXCELLENCY SENOR SAGASTA, POSTMASTER-GENERAL, TO MR. MARCONI, LONDON.

"Le Directeur Général des Postes et Télégraphes félicite et adresse ses meilleurs souhaits à Monsieur Marconi et marconigraphistes du monde entier.—*Bernardo Mateo Sagasta.*"

INSPECTOR-GENERAL TELEGRAPHS SPAIN TO INSPECTOR-GENERAL TELEGRAPHS LONDON, 5.5 p.m.

"En nombre del Cuerpo de Telegrafos le felicita y saluda à radiotelegrafistas del mundo entero.—*Esteban Diaz.*"

The following wireless telegrams were received at Aranjuez at the times stated :

MR. MARCONI TO COUNT ALBIZ, 4.30 p.m.

"Kindly convey my respectful homage to His Majesty the King.—*Guglielmo Marconi.*"

MR. MARCONI TO COUNT ALBIZ AND THE COMPAÑIA NACIONAL DE TELEGRAFIA SIN HILOS, 4.30 p.m.

"Upon occasion of inauguration of Aranjuez station I send my sincere congratulations to my colleagues and my best wishes for the success of your company.—*Guglielmo Marconi.*"

MR. GODFREY C. ISAACS, MANAGING DIRECTOR OF MARCONI'S WIRELESS TELEGRAPH CO. LTD., TO COUNT ALBIZ AND COLLEAGUES COMPAÑIA NACIONAL DE TELEGRAFIA SIN HILOS ARANJUEZ, 4.30 p.m.

"I congratulate you upon opening of Aranjuez station and I trust in the near future the arrangements of our respective post offices will allow of the inauguration for Spain of a commercial wireless telegraph service with this country through to New York and Canada and many other parts of the world.—*Godfrey Isaacs.*"

Internal View of the Battery Room

PREMIER CANADA TO PREMIER SPAIN, 4.35 p.m.

Ottawa *via* Marconi's Wireless : "I am glad to have the privilege of extending to the Spanish Government and people the heartiest congratulations and good wishes of my Government and of the people of this dominion on the occasion of the opening of your first long-distance wireless telegraph station.—*Borden, Premier of Canada.*"

MINISTER OF NAVAL SERVICE CANADA TO MINISTER OF AGRICULTURE, TRADE AND COMMERCE OF SPAIN, 4.45 p.m.

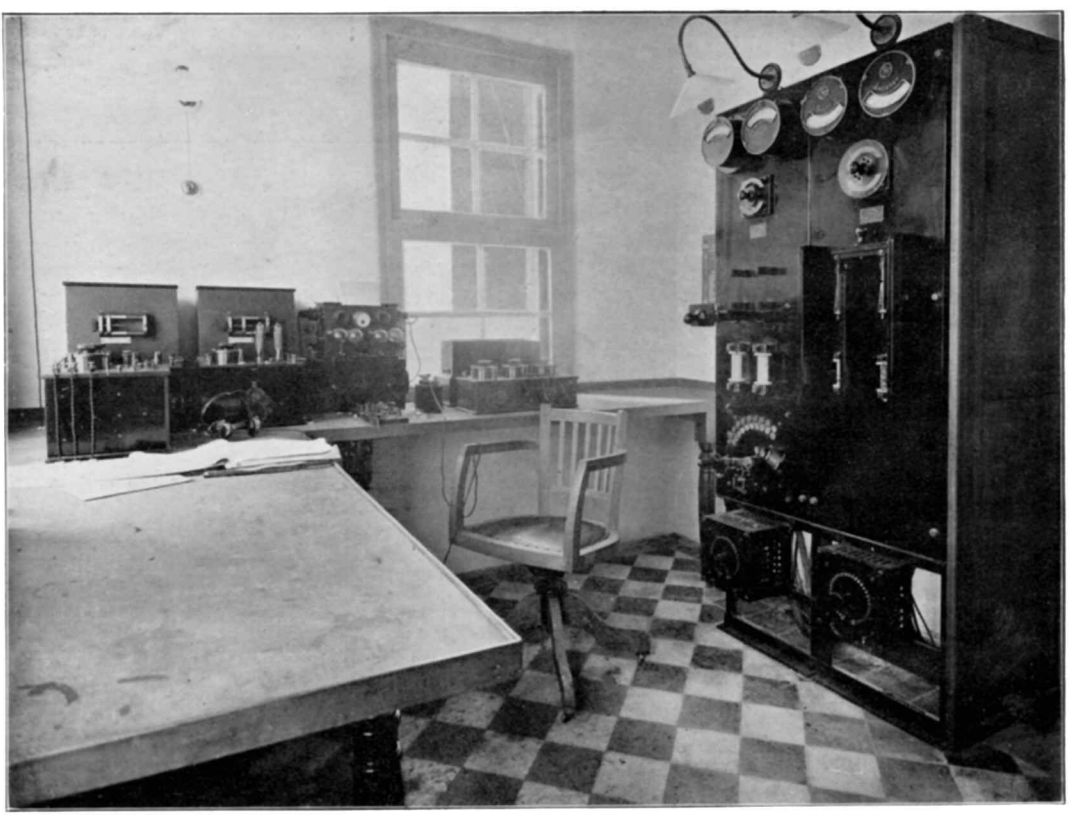
Ottawa *via* Marconi Wireless : " The successful inauguration of radiotelegraphic communication between Spain and the Dominion marks another step forward in the development of scientific accomplishment and it affords me much gratification to be able to extend to you the best wishes of my department by means of one of the first messages transmitted to the Aranjuez Marconi station.—*Hazen, Minister of Naval Service.*"

KING OF ENGLAND TO KING OF SPAIN, 5.5 P.M.

From H.M.S. " Medina " *via* Gibraltar : " Heartily congratulate you on the inauguration of your new Marconi station. May and I greatly appreciate you and Ena sending us the first message and thank you for your kind wishes. We are now on our way to Gibraltar. Our best love to you both.—*George.*"

The following wireless message was dispatched by Señor Cañalejas, the Spanish Premier, to Mr. Borden, Prime Minister of Canada :

" In the name of the Government and the Spanish nation I have pleasure in thanking you for your kind telegram, and reciprocate the cordial congratulations which you expressed in the name of the Government and of the people of the Dominion of Canada on the occasion of the inauguration of the first long-distance wireless station in Spain.—*Canalejas.*



View of the Operating Room

The Minister of Public Works sent the following message through Aranjuez to Mr. Hazen :

" I hasten to give you my thanks for your affectionate salutations on the occasion of the inauguration of the Aranjuez wireless station. It is gratifying to me that my first Marconigram should be an expression to you of my appreciation of such an important

development in radiotelegraph communication, and I trust this may be the means of tightening the bonds of goodwill between our two countries.—*Gasset.*"

Official Tests of Spanish Stations

SEÑOR DON JOSÉ SANDOVAL ESPIGARES, a distinguished officer of telegraphs in Spain, and the special delegate of the Royal Commission appointed to carry out the tests of the stations erected in Spain by Marconi's Wireless Telegraph Co., Ltd., at Madrid (Aranjuez), Barcelona (Prat de Llobregat), Cadiz, Las Palmas, Teneriffe (Canary Islands), Soller (Balearic Islands), and Vigo with the high-power station at Poldhu (England), distance varying from 940 to over 2,000 kilometres, left London on his return to Spain in January. The tests carried out during the forty-eight hours (December 21st and 22nd, 1911) and the forty-eight hours (January 6th and 7th), under all atmospherical conditions, were excellent, especially when account is taken of a heavy storm in the ocean during the latter period.

Señor Sandoval Espigares expressed his admiration and great satisfaction with the results of the tests, and with the precision, celerity and accuracy with which all messages and signals were transmitted and received. Various messages of congratulation were exchanged between the other members of the Royal Commission who were operating at the stations in Spain, referred to above, as well as with Marconi's Wireless Telegraph Co., Ltd., for having given the Spanish Government a range of 1,000 kilometres more than the maximum for which they contracted.

The Concessionaires for the Public Wireless Service in Spain, the Compañia Nacional de Telegrafia sin Hilos of Madrid, are actively negotiating with the Spanish Government with a view to settling the question of tariffs and rates for an international radiotelegraphic service which they trust to inaugurate shortly, enabling Spain to communicate, by the most

Directors of the Compañia Nacional de Telegrafia sin Hilos. Reading from left to right: Señor Rohr, Don Alonso Martinez, Señor Setuain, Don A. Comyn, General Bascaran, Senor Estelat

up-to-date means, with the whole world for the benefit of the commerce and the general progress of the country.

Compulsory Wireless on Spanish Vessels

THERE has been issued by the Minister of Marine at Madrid a circular emphasising the necessity of Spanish mercantile vessels being fitted with wireless telegraph apparatus. Reference is made to the laws and regulations already in force in Austria, Italy, and the United States. The General Association of Shipowners have urged the Government to take action in the matter, their view being that wireless telegraphy is essential to shipping. Accordingly the following order has been issued by Royal Decree :

1.—That from the first day of August, 1912, all Spanish mercantile ships shall be fitted with wireless telegraph apparatus, provided (*a*) they are engaged in carrying passengers or mails, and (*b*) that they carry more than fifty persons on board during a transatlantic voyage, including in this number the crew.

2. The wireless telegraph apparatus shall have the necessary efficacy and be erected according to the instructions contained in the regulations issued by the Ministry of the Interior and the General Direction of Posts and Telegraphs, in order to put into force the Royal Decree of January 24th, 1908, and as a consequence of the International Congress of Berlin signed by the representative of Spain on November 3rd, 1906.

3.—This Royal Decree shall be communicated to the shipping companies, pointing out that wireless telegraph stations on board have to be approved by the Department.

4. The shipping companies shall communicate with this centre through the harbour authorities when the installation has been completed and is in a position to work efficiently, so that a technical commission may recognise and test it in order to issue a complete report of same, and to add the said report to the action with a view to finally sanctioning the service, according to previous permission of the War Office and of the Home Office.

The *Heraldo de Madrid* publishes the text of the Bill which Marquis de Cortina, a member of the Spanish Cortes, has submitted :

Commencing from January 1st, 1913, no passenger shall embark in Spanish ports on any ship which has not been provided with wireless apparatus, the maritime authorities only granting the necessary authorisation after ascertaining the good working order of the apparatus.

Uruguay and Wireless

WE referred in our last issue to a decree issued by the Uruguayan Government, making it compulsory for ships carrying passengers between the harbours of the Republic and those of foreign countries to be fitted with radiotelegraph installations. The following is a translation of the main clauses of the decree issued by the Minister of War and Marine :

Considering that wireless telegraphy is not only a useful service to shipping, but is especially a very important means of precaution and assistance in case of accidents, etc., the President of the Republic resolves and decrees :

Clause 1.—Commencing from May 1st of the present year all the ships carrying passengers between the harbours of the Republic and those of foreign countries shall be fitted with radiotelegraph installations.

Clause 2.—The said installations shall be designed to receive and transmit telegrams up to a distance of not less than one hundred kilometres on the ships of river navigation, and four hundred kilometres on those of the oceanic navigation.

Clause 3.—The installations shall be permanently kept in good conditions of working, and capable of intercommunicating with the stations of the Republic.

Clause 4.—The stations shall be in charge of persons well acquainted with the use of radiotelegraph apparatus.

Clause 5.—The service of the stations shall be entirely in accordance with the provisions of the International Radiotelegraph Convention of Berlin.

Clause 6.—The agents of the companies will inform, before expiration of the time fixed, the General Inspector of the National Services of Wireless Telegraphy of the characteristics, system, power, etc., of the radiotelegraph apparatus to be fitted on the ships of their companies.

Clause 7.—The ships which after expiration of the time fixed by Article 1 have not complied with the provisions of this Decree, shall not be authorised to carry passengers in the harbours of the Republic.

Wireless communication is to be maintained with Dr. Mawson's expedition to the South Pole by means of intermediate stations between the exploring party and Hobart.

A wireless station, comprising operating and power building and a dwelling-house, is to be erected in the Isle of Wight, on the drying green attached to Lloyd's Signal Station at St. Catherine's Point.

Wireless Tuition in Paris

THE Committee of the International Society of Electricians have decided to institute at their school a special section for practical and theoretical instruction in wireless telegraphy. This section will be quite distinct from the regular instruction of the school, which does not undergo any change. The number of pupils to be admitted has been fixed at the maximum figure of twenty. Admission will be allowed by order of merit, and will be decided by the Board of Improvement of the school. The candidates must possess general knowledge of sufficient extent to follow with success the new course of instruction. In particular, the engineers of the high school and of the important schools will be admitted according to the number of vacancies available.

The instruction will be given on the same plan as the regular instruction of the school. It will consist of :

1. A course of about twenty lessons in practical radio-telegraphy conducted by Commandant Ferrie.

2. A course of about ten lessons on the theory of radio-telegraphy, by Naval Lieut. Tissot.

3. Practical work in theoretical and practical radio-telegraphy (Commandant Ferrie, Director of Practical Works; Captain Brenot, Chief of the Works; M. Jegou, qualified engineer of the Electrical High School, Assistant).

4. A series of preparatory lectures on :

(*a*) Motors (M. Bochet).

(*b*) Electricity (M. P. Janet)

(*c*) Usual electric metres (M. Chaumat).

5. Preparatory practical work on usual metres and the principal machine experiments (M. Millien, qualified engineer of the Electrical High School, Chief of the Works).

The following series of lectures will be delivered on special subjects having relation to wireless telegraphy :—Wireless telephony, by M. Jeance, Naval Lieutenant, qualified engineer of the Electrical High School; Administration regulations relating to wireless telegraphy by M. Bouthillon, Telegraph Engineer; Buildings and masts by Captain Becque; Electric discharges in gases by M. Villard, member of the Institute, and M. Abraham, lecturer of the Normal High School; General ideas of meteorology by M. Angot, director of the Electrical Meteorological Office, etc.

A French Exhibition

La Compagnie français Maritime et Coloniale de Télégraphie sans fil (the French Marconi Co.) recently exhibited, at the "Grand Palais," Paris, two wireless apparatus for intercommunication, the action of which keenly interested specialists as well as the public. The illustration shown here represents one of these apparatus (type 1½ kw.). On the left of the stand is shown a reduced model of a liner, loaned for the purpose of the exhibition by the Compagnie Générale Transatlantique, this fitted with an antenna which greatly facilitated the demonstrations of MM. Vivien, chief engineer, and Taulera, the second engineer, when they were explaining to visitors the practical working of wireless telegraphy at sea. Near the apparatus one of these visitors is seen reading, with interest, the *Atlantic Daily News*. At the transmitting key is M. Drevelle, an operator and chief fitter in the employ of the Company.

Marconi Apparatus at an Exhibition in Paris.

This is the first time wireless telegraphic apparatus has been exhibited in use at Paris, and it aroused much interest. The attendance of the public was considerable, and great success was achieved, several orders being placed by State engineers.

Professor G. W. Osborn Howe delivered a lecture entitled "Recent Progress in Radio-Telegraphy" before the Royal Society of Arts, on January 31st. An abstract of this lecture will appear in our next issue.

Long-Distance Radio-telegraphy.

Day Currents Over Salt Water. Effects of the Sun's Rays.

SOME time ago Dr. L. W. Austin carried out a series of long-distance wireless experiments, which were described in a bulletin issued by the Department of Commerce and Labour, Bureau of Standards, Washington, U.S.A. In order to determine the law of the degrees of the intensity of a signal with the distance, a smooth curve was drawn through observed day readings, and points on this were taken as the approved values for purposes of calculations. It was assumed from the results of Duddell, Taylor, and Tissott that the received currents would be inversely proportional to the distance provided no absorption existed. The observed curve indicated that this was approximately true up to a point between 100 and 200 miles, but beyond this point the currents evidently dropped much more rapidly. The simplest assumption in regard to absorption is that it is proportional to the distance. Adding this to the Duddell and Taylor law, Dr. Austin has found the following expression for the received current :

$$I_R = \frac{K}{d} e^{-Ad}$$

where d is the distance, K the received current at unit distance, e the base of the natural logarithms, and A a constant.

Dr. Louis Cohen, while testing the validity of this formula, made the discovery that A was inversely proportional to the square root of the wave length within the limits of accuracy of the observations. Then writing $A = \frac{a}{\sqrt{\lambda}}$ the expression becomes

$$I_R = \frac{K}{d} e^{-\frac{ad}{\sqrt{\lambda}}}$$

a is the absorption co-efficient, and in these experiments equals 0·0015, the distance and wave length being expressed in kilometres. The curves in Figs. 1 to 5 give the results in graphic form. The dotted line gives the strength of signal which would have been received if the K/d law had obtained ; that is, if there had been no absorption. The continuous curve gives the theoretical day values as calculated from equation 2, while the individual observations are represented by crosses. Observations taken by the deflection method are indicated by circles around the crosses, while night observations are accompanied by the letter N. It is seen that the day observations correspond approximately to the values of the calculated curve, but that the night signals are entirely irregular, being in general stronger than day signals, as was first observed by Mr. Marconi. Sometimes they lie close to the K/d curve, indicating that the absorption has disappeared, while at others they are practically of the same strength as the day readings. In a very few cases night signals were observed considerably stronger than the calculated value for zero absorption, but these may very

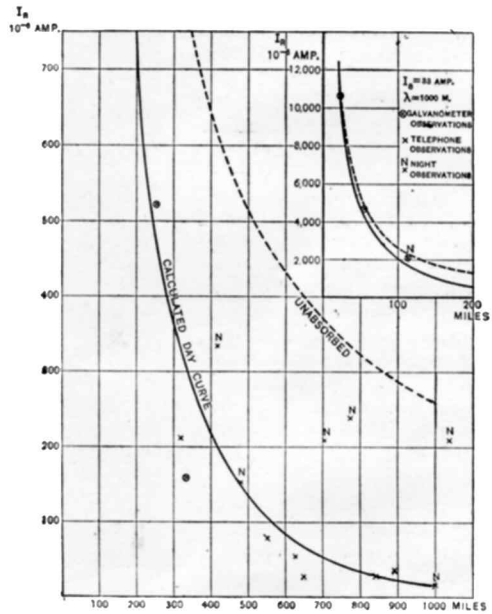


Fig. 1.

probably be due to errors of observation, since it is not observed that the remarkable strength of signal is reciprocal between the two stations. If the observations are genuine, however, it would perhaps indicate some kind of reflection from the upper layers of the atmosphere.

According to the calculations of Zenneck, the conductivity of air at moderate heights cannot explain the magnitude of the observed absorption, neither can the sea-water absorption be of the proper magnitude, according to the same author. But, as the wave front at any

considerable distance from the sending station must extend far into the upper layers of the atmosphere, it does not seem improbable that

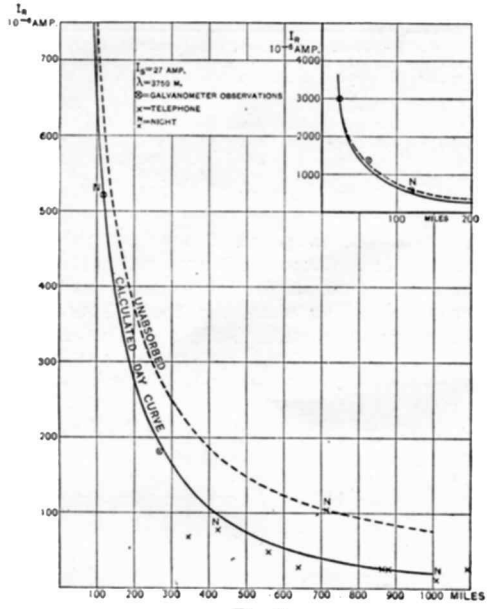


Fig. 2.

this is the region of absorption. If the conductivity is increased by the sun's rays at these heights, this would also explain the differences in the strength of the day and night signals. The observations would indicate, if this explanation is true, that the excessive ionisation may, especially in summer, persist through many nights. The general experience of wireless telegraphy would indicate that during the colder months the absorption dies out more uniformly at night. The day absorption appears from the data obtainable to be fairly uniform throughout the year, at least in the portion of the ocean covered by Dr. Austin's observations, although there are undoubtedly variations at times. With regard to receiving, Dr. Austin has obtained experimental data to furnish an equation which will cover the normal day received current over salt-water through 25 ohms for two stations with flat-topped antennæ of any height with any value of sending current and any wave-length, provided the sending station is so coupled as to give but one wave-length. This equation he writes as follows :

$$I_R = 4{\cdot}25 \frac{Is\ h_1\ h_2}{\lambda d} e^{-\frac{ad}{\sqrt{\lambda}}}$$

where I_R represents the current received through 25 ohms resistance, Is the sending current, $h1$ the height of one antenna, $h2$ that of the other, d the distance between the stations, and λ the wave length, where all the lengths are taken in kilometres and the currents in ampères; a is the absorption co-efficient, which in Dr. Austin's experiments was found to be equal to 0·00015. This disregarding the absorption term $e^{-\frac{ad}{\sqrt{\lambda}}}$ corresponds in form to the Herzian equation for the electromotive force in a vertical resonator at a distance from the oscillator.

TABLE I.

CALCULATED RELATION BETWEEN ANTENNA CURRENT AND DISTANCE FOR TWO SHIPS WITH ANTENNA HEIGHTS OF 130 FT.

Antenna Current Is	Working Distance, 40·10—6 amps.		Extreme Distance of Audibility, 10·10—6 amp.	
	Day.	Night (zero absorption).	Day.	Night (zero absorption).
amp.	miles.	miles.	miles.	miles.
1	75	90	200	360
2	135	180	300	720
3	180	270	375	1,080
5	235	450	475	1,800
7	280	630	550	2,520
10	345	900	630	3,600
15	420	1,350	725	5,400
20	475	1,800	790	7,200
25	525	2,250	840	9,000
30	565	2,700	900	10,800
40	630	3,600	970	14,400
50	685	4,500	1,025	18,000
60	725	5,400	1,150	21,600

In Dr. Austin's formula the constant 4·25 applies strictly only to ship antennæ with the

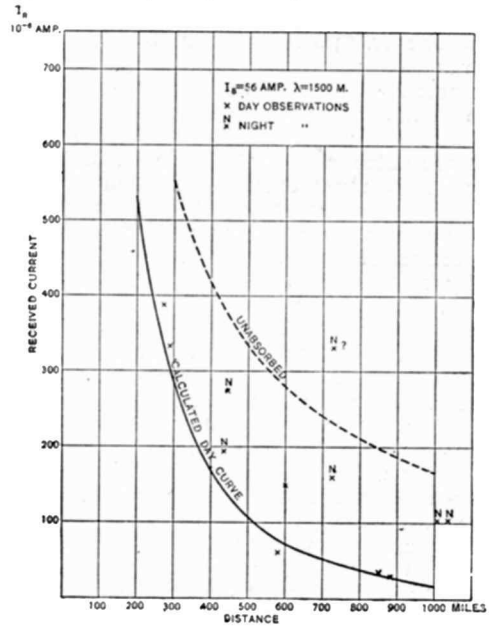


Fig. 3.

same losses due to masts, rigging, etc., both in sending and receiving, as found on the Scout cruisers. On other ships the value of the

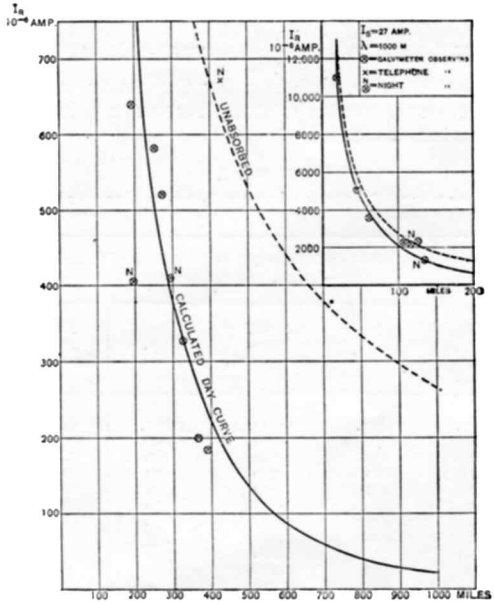


Fig. 4.

constant might probably differ by as much as 30 per cent. under ordinary conditions. This difference in the value of the constant does not, however, make a very great difference in the range of communication, although for short distances it would make a considerable difference in the loudness of signal. To show the variation in range of communication with different antenna currents Table II. is given, showing the range of communication between two flat top antennas 130 ft. high at a wave length of 1,000 metres for various values of the sending antenna current, assuming that 40 by 10^{-6} amperes assures good communication. A quarter of the indicated current would produce audible signals under favourable conditions. The table shows how very slowly the range increases with increasing sending current. Increasing the current from 30 to 60 ampères increases the distance only from 565 miles to about 725 miles, while even with 10 ampères, corresponding to a moderately efficient 2 kw. set, 345 miles is easily reached.

In columns 3 and 5 are given the distances attainable for regular communication and audibility, on the assumption that there is no atmospheric absorption ; that is, the extreme range of night communication.

TABLE II.

GOOD WORKING DISTANCE AND SENDING CURRENT FOR TWO STATIONS WITH FLAT TOP ANTENNAS 450 FT. HIGH.

Nautical Miles.	λ=1,000 m.	λ=2,500 m.	λ=3,750 m.	λ=6,000 m
	amp.	amp.	amp.	amp.
1,000	15	13·5	15	17
1,250	38	27	27	30
1,500	91	49	44	46
1,750	200	95	77	74
2,000	490	155	122	105
2,250	—	245	314	160
2,500	—	470	314	235
2,750	—	—	500	335
3,000	—	—	775	500

In Table II. is given the estimated day range of two large stations with flat-top antennas 450 ft. high for various antenna currents, and four wave lengths. The table shows the great advantage of long wave lengths

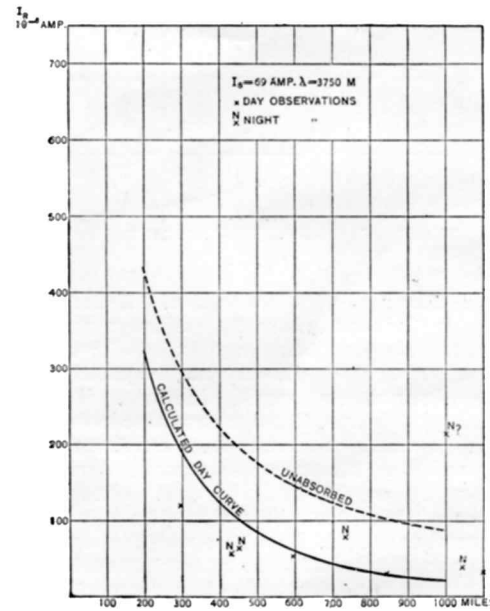


Fig. 5.

for very distant stations. It is seen that for good communication at a distance of 2,500 miles not less than 240 ampères must be used at a wave length of 6,000 metres, though one-fourth of this would be audible.

The Blackpool Tower, which is 500 ft. high, is to be made a wireless telegraphy station during the encampment of the West Lancashire Division of Territorials near Blackpool in August. The officer in charge will provide a powerful installation, and it is hoped to keep in touch with liners leaving Liverpool over a range of 1,000 miles.

Australasian News

(From Our Correspondent).

Sydney, *January 8th.*

Ship Installations.—During the past few months a considerable increase has taken place in the business among ships trading in Australasian waters, and it is a noteworthy fact that all new ships arriving here with wireless telegraph installations are equipped with the "Marconi" system. Among the leading Colonial steamship lines the Union Steamship Company of New Zealand is well known as one of the largest; they have a large fleet of ships trading from Australian and New Zealand ports. Of the numerous routes served by the Union Steamship Company their Trans-Pacific, Inter-Colonial and Pacific Islands services are the most important.

Recent Orders.—Up to the time of writing the following ships have been equipped with Marconi 1½-k.w. ship installations for the Union Steamship Line: "Makura," "Marama" and "Zealandia," trading between Sydney, Auckland, N.Z., Suva, Honolulu and Vancouver (Canada). The "Tahiti," "Aorangi" and "Maitai" trade between Sydney and San Francisco. The "Tofua," which trades between the Fiji Islands, Samoa, Friendly Islands and New Zealand, has also been equipped with Marconi apparatus. In addition to the foregoing, the Marconi Company have received orders from the Union Steamship Company to equip the following, and the work will be completed shortly: "Maunganui," new ship; "Navua," Wellington and Auckland, N.Z., to Suva, Fiji; "Talune," Auckland, N.Z., to Raratonga, Cook Islands, Raiatea to Society Islands, Papeete to Tahiti; and three others. Messrs. Burns, Philp & Co., of Sydney, have placed an order for a Marconi set for the "Montoro" before she leaves England. The "Montoro" is due to sail from Sydney to Queensland ports on March 2nd, Port Darwin, Sourabaya, Samarang, Batavia and Singapore, calling at Port Moresby (New Guinea) en route. The Royal Packet Steam Navigation Company (Kon. Paketvoart Maatschappij) have ordered Marconi installations for their two new ships, "Van Cloon" and "Van Ostermeyer," which will shortly arrive from Europe to take up their sailing between Sydney, Melbourne and Papua, Java and Singapore.

Lack of Coast Stations.—Considerable additions have lately been made to the fleets of lines trading between here and Europe. The new Orient liner "Orama," the Shaw Saville "Zealandic" and the new P. & O. branch liner "Ballarat" have arrived here during the past few weeks, and all are, of course, equipped with Marconi installations. Notwithstanding the fact that the majority of passenger steamers trading in Australian waters are equipped with wireless telegraphy, Australia is still in the background so far as coast stations are concerned. At the time of writing there is but one station working commercially in the Commonwealth, and that is a temporary station at the Hotel Australia, Sydney. As this station closes at 11 p.m., no communication with shore can be obtained after that hour until the station reopens at 8 a.m.

New Offices.—Offices have recently been opened at Challis House, Martin Place, Sydney, N.S.W., by Marconi's Wireless Telegraph Co., Ltd., and the Marconi International Marine Communication Co., Ltd., and during the absence of the Australian representative, Mr. J. W. Ormsby Hamilton, Mr. E. T. Fisk is acting in his stead. Challis House is one of the finest and most important buildings in Sydney. It is situated in the centre of the city, opposite the General Post Office. The telephone number is "City 4,255."

Diary of Events.

1897.

March 8th.—Beginning of series of demonstrations by Mr. Marconi on Salisbury Plain before representatives of various Government departments, communication being established over a distance of four miles.

1899.

March 3rd.—The s.s. "R. F. Matthews" ran into the East Goodwin Lightship. The accident was reported by wireless telegraphy to the South Foreland Lighthouse and lifeboats were promptly sent to the rescue.

March 27th.—Communication was established across the Straits of Dover between Chalet d'Artois, Wimereux, near Boulogne, and the South Foreland Lighthouse.

1900.

March 10th.—Marconi apparatus installed on the Borkum Riff Lightship and Borkum Lighthouse, and on several German steamers.

1901.

March 1st.—Public Marconi telegraph service inaugurated between five of the principal islands of the Hawaiian group.

1902.

March 17th.—Agreement entered into by the Marconi Companies with the Government of the Dominion of Canada for the establishment of a station in Canada for wireless telegraphic communication between Canada and the United Kingdom, provision also being made for the erection and working of wireless stations in other parts of the Dominion.

THE MARCONIGRAPH

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

CONTENTS

"The Marconigraph"

The present issue completes the first volume of THE MARCONIGRAPH, and we take this opportunity of thanking our numerous readers for the many expressions of encouragement and congratulation that have been addressed to us during the year.

The aim of THE MARCONIGRAPH has been to set forth in detail month by month all interesting happenings incidental to the development of wireless telegraphy, and to illustrate the growth of the Marconi service in different parts of the world. The extent of the fulfilment of our aim is perhaps best illustrated by a comparison of the present number of THE MARCONIGRAPH with the first number of the volume. In the April number of 1911, which was the first of the volume, the total number of pages was sixteen. In the course of the intervening months the number has nearly trebled itself, and we close the first volume with an issue of forty-four pages, thirty of which are devoted exclusively to literary matter, and fourteen to manufacturers' and other announcements. Finality has by no means been reached, either in the size of the magazine, or in the subject matter with which it deals. In the new volume, which commences next month, we hope to add several attractive features, which will enable THE MARCONIGRAPH to keep pace with, and adequately reflect, the remarkable developments in wireless telegraphy, whilst arrangements are being made for the treatment in a much more complete manner than has hitherto been possible of the scientific and popular aspects of this subject. Those whose subscriptions expire with the present number, will find in this copy, a renewal subscription order form, which we should be glad if they would fill in and return to the publisher, together with a remittance for 3s. 6d. It will be noticed that the subscription rate has been slightly increased, in order to cover the extra postage necessitated by the larger number of pages of the magazine.

The Share Market

Since our last issue the principal business in the industrial market has been in Marconi Wireless Shares, buying in both large and small quantities coming from all parts of the world. A " Spanish and General Wireless Trust Company " was formed to hold wireless shares, particularly those of the Spanish Wireless Company, and a large number of Spanish shareholders have already exchanged their shares for those of the Trust Company, these latter being marketable shares on the London Stock Exchange. No issue was made by the Marconi Parent Company, but a firm having secured some of the exchanged shares

introduced them on the London market on February 16th at $1\frac{7}{16}$; there was a large demand, and the price rose sharply to $1\frac{3}{16}$, eased off to $1\frac{1}{8}$, and on February 22nd closed $1\frac{1}{16}$, dealings every day being active.

The market in all Marconi issues has been a free and active one, investment buying being very much in evidence.

Prices on February 22nd closed:

Ordinary, $4\frac{5}{8}$-$\frac{1}{16}$.
Preference, $4\frac{1}{8}$-$\frac{1}{16}$.
New shares, $2\frac{5}{8}$-$1\frac{1}{16}$, for £2 paid.
Canadian, 19s.
Spanish and General Trust, $1\frac{1}{16}$.

The Spanish and General Wireless Trust, Limited

Some of the shares in affiliated Marconi companies abroad are of high denomination, representing many different values according to the currency of the country in question and the varying rates of exchange. A "holding" company has therefore been formed, entitled "The Spanish and General Wireless Trust, Limited." The capital of this new company is £350,000 in 350,000 Ordinary Shares of £1 each. The Directors are: Mr. Godfrey C. Isaacs (Managing Director), Mr. Alfonso Marconi, Captain H. Riall Sankey, Major S. Flood Page, and Mr. Henry S. Saunders. The Secretary is Mr. Henry W. Allen, F.C.I.S., with offices at Watergate House, York Buildings, Adelphi, London, W.C.

The object of the Company is to acquire shares in some of the subsidiary Marconi companies, and that of the Compañia Nacional de Telegrafia sin Hilos in particular at the present moment.

It is the intention of Marconi's Wireless Telegraph Company to so arrange in the course of time that the shares of each of its subsidiary companies shall be negotiable and have a free market in this country. When all the arrangements to this end will have been completed, shareholders of the Parent Company will have no difficulty in appreciating the value of the Company's holdings in its affiliated companies.

The "Debeg" Report

Although it has only been in existence for a little over one year, the Deutsche Betriebsgesellschaft für Drahtlose Telegraphie, M.B.H., who work the system of wireless telegraphy known as the "Debeg" system, by arrangement with the Marconi companies, and the various German companies interested in the Telefunken Company, have achieved a highly successful record. The formation of the company was due to exceptional circumstances prevailing in Germany, and the business of the company is limited to the German mercantile marine only. All German mercantile vessels flying the German flag and fitted with apparatus for wireless telegraphy were transferred to the new company, on whose board sit Mr. G. Marconi, Mr. Godfrey C. Isaacs, Colonel Thys and Mr. M. Travailleur, the two last-named gentlemen representing the Compagnie de Telegraphie sans Fil, Brussels (the Belgian Marconi Co.), who have a considerable holding in the new undertaking. The report of the latter covering the first nine months of 1911, is just to hand, and this discloses a satisfactory state of affairs.

Seventy-eight existing ship stations were transferred to the "Debeg" upon its formation, and during the past few months an additional fifty-two stations have been added, making a total at September 30th, 1911, of 130 ship-stations, distributed amongst the following shipping lines: Hamburg-Amerika, 45; Norddeutscher Lloyd, 43; Hamburg Südamerikanische Damfschiffarts-Gesellschaft, 10; Woermann and Deutsche Ostafrika-Linie, 13; Kosmos-Linie, 7; Roland-Linie, 7; Miscellaneous, 5. Of these stations, 119 are operated by the wireless company, with a subsidy from the shipping companies, the contracts having several years to run. The remaining eleven are loaned to shipping companies. The "Debeg" Company (which we shall use in this article to describe the Deutsche Betriebsgesellschaft für Drahtlose Telegraphie) have entered into an arrangement with the Norddeutscher Lloyd to acquire the shore station at Bremerhaven belonging to that company. This station is not open for public service. The arrangement will provide the means of finding occupation for wireless telegraphists while on land. About 200 telegraphists are employed by the "Debeg" Co. The relations of the company with shipowners have been generally good, but it is curious to note that a certain amount of prejudice still exists amongst the smaller owners against wireless telegraphy, partly on personal and partly on financial grounds. But this prejudice is not of sufficient magnitude or importance to interfere with the business of the company, as an examination of the accounts convincingly proves. The report contains several appendices, one of which gives an exhaustive analysis of the operations of the company. From this it is seen that 36,248 telegrams were transmitted, the number of words being 506,421; the telegrams received amounting to 19,173, representing 305,249 words. The receipts amounted to 496,071.23 marks. So successful has been the business during the past year that the trading shows a profit of 50,014.50 marks, out of which a dividend at the rate of 4 per cent. has been paid, and a substantial sum put aside for reserve. Ample provision has been made for depreciation of the stations and apparatus.

Mr. Marconi on the Latest Problems of Wireless Telegraphy.

THE annual dinner of the Junior Institution of Engineers on Saturday, January 17th, was presided over by Mr. G. Marconi, who, in the course of a brief speech, gave an interesting account of the development of wireless telegraphy. A graceful compliment was paid to the President by the inclusion in the loyal toast of His Majesty the King of Italy, which was proposed by Vice-Admiral Sir Henry B. Jackson, K.C.B., K.C.V.O., commanding the Royal Naval War College, Portsmouth. It fell to the lot of Professor John Perry to submit a toast to Electrical Intercommunication. Professor J. Perry has the happy faculty of combining sound erudition with native humour, and the effort of the distinguished mathematician on this occasion was decidedly effective. He commenced by disclaiming any more knowledge of the subject than that ambiguous personality, "the man in the street," but he sought relief in the fact that the toast would be responded to by one who knew not only all there was to be known about wave-telegraphy, but all its latest developments. Professor Perry was struck with admiration of the effectiveness of wireless telegraphy. Waves emitted from a small cabin crept eerily all over the earth and the ocean until the message they had to deliver was received; then came the answer by the same invisible means.

The Poetry of Engineering

He thought it a pity that the poets knew nothing of engineering, for in some engineering conquests we had great romances. The thing that would appeal to Professor Perry most, if he were a poet, was the fact that ships battling through the stress and turmoil of the raging storm could receive messages by means of wireless telegraphy from other ships and from the shore. Professor Perry recalled the interesting fact that thirteen years ago he presided over a meeting of the members of the Institution of Electrical Engineers in London, before which Mr. Marconi delivered one of the first lectures on wireless telegraphy in this country. Since that time he had taken a great interest in Mr. Marconi and his work.

Mr. Marconi, whose rising to respond to the toast was the signal for an enthusiastic welcome, reminded those present that since the time referred to by Professor Perry, thirteen years ago, wireless telegraphy had travelled a long way—not merely in the distance covered, but in practicability, reliability, and efficiency. High-speed apparatus was being introduced which would enable radiotelegraphy to compete, and, he believed, to more than successfully compete, in the matter of speed with the long-distance cables. The speed of wireless being more or less a mere mechanical problem, there was not existing, as in the use of cables, any K.R. law in the ether. Mr. Marconi thought that Professor Perry was somewhat impressed with the difficulty in wireless telegraphy caused by atmospheric electricity but he was glad to be able to inform Professor Perry that this difficulty was being gradually but surely overcome. There had been improvements in the receiver and the effective utilisation of a larger amount of energy in the transmitters. The impulse at the receiving station was so much stronger than it used to be at a given distance that the natural effects did not have the same pull as they used to have. Interference in ship work, due to atmospheric conditions, was now reduced almost to a negligible quantity, whilst at long-distance stations, although the trouble was more prevalent on account of the larger aerials, it was small enough not to materially affect the commercial operation of the stations. Even in tropical stations, such as at Massaua and Mogadiscio, East Africa, there was being successfully carried out constant communication between overland stations for a distance of 1,000 miles.

Mutual Interference

With regard to mutual interference between high-power transatlantic stations, Mr. Marconi remarked that the facility with which interference had lately been prevented had to some extent exceeded his anticipations. At a receiving station situated at a distance of only eight miles from the powerful station at Clifden, messages could be received from Glace Bay, in Canada, without interference from Clifden, even when the latter station was sending with a full power on a wave-length differing only 25 per cent. from the wave radiated from Glace Bay, the ratio between the maximum recorded range of Clifden and eight miles being in the proportion of 750 to 1. This result proved that it was practicable to operate together a great number of long-distance stations on slightly different wave-lengths situated in England and Ireland without danger of mutual interference. He agreed with Professor Perry that the extended use of wireless telegraphy was principally dependent upon the ease with which a number

of stations could be worked efficiently in the vicinity of each other. Some interference did, without doubt, take place between ships, in consequence of the fact that the wave-lengths adopted in accordance with the rules laid down by the International Convention were not sufficient. In Mr. Marconi's opinion, a considerable advantage would be obtained by the utilisation of a third and longer wave. However, interference was not at all serious, as the following facts would show. Three years ago comparatively few ships carried wireless telegraph installations, the number now equipped was very large, the receipts per ship from messages showed a much greater increase compared with three years ago. That result would not have been obtained if interference had increased with the additional equipment of vessels. Considering that the wave-lengths at present available, so far as Mr. Marconi's practical experience went, ranged from 6 inches to 30,000 feet ; and, moreover, that wave-group tuning and directive systems were now available, all tending to overcome mutual interference, it was not difficult for him to feel convinced that this comparatively new method of communication was destined to fill a place of the greatest importance in facilitating communication throughout the world.

Wireless Stories

The final toast, that of the President, was proposed by Mr. S. Bylander, a vice-chairman of the institution, who commented upon the remarkable development of wireless telegraphy within the past few years. Some eight years ago Mr. Bylander crossed the Atlantic on a vessel equipped with wireless apparatus. The vessel, however, was only in communication with another vessel for about two hours during the greater part of the journey, and did not get into communication again until the English shores were reached. Some little distance off the Irish coast the passengers were overjoyed to receive the latest news from Europe by means of wireless telegraphy, and once he spent half the night in the cabin watching with admiration the receipt of messages. Mr. Marconi's work was appreciated all over the world, and he (Mr. Bylander) was proud to think that Sweden should have awarded him the Nobel prize.

Mr. Marconi, in response, said that everybody who had had anything to do with wireless telegraphy could tell a story about it. He was glad to have met Sir H. B. Jackson that evening, for Sir Henry was the first Admiralty representative to meet him (Mr. Marconi) when he first came to England. He concluded by expressing thanks for the warmth of his reception that evening, which had far exceeded his expectations.

Brevities.

An example of the easy-going methods of the people of Brazil was related at Liverpool on the arrival from South America of the Pacific liner " Oropesa." A passenger sent a message by wireless informing a friend in Brazil that he would breakfast with him at his house four days later. The Marconigram was transmitted to the mainland, 1,000 miles away, in two seconds, but the land communications were so slow that the message had not reached its destination 60 miles inland when the passenger arrived at his friend's house. He was able to open his own message as he sat at breakfast.

* * *

A genial correspondent of the *Pall Mall Gazette* is grieved to learn that Mr. Marconi and wireless telegraphy bid fair to kill the pigeon-post. It was a picturesque and useful form of communication, and at French race meetings—Longchamps, Auteuil, and the rest —the pigeons brought the " results " to the offices of the evening newspapers in Paris promptly and reliably. Now they are to be done away with and wireless telegraphy introduced. A lady who was watching the despatch of the pigeons from the course once said to a friend, " I shall never be able to eat roast pigeon again. I should feel as though I were dining off a postman ! "

* * *

Science thwarting man-made laws has proved its inestimable value to a valorous " sea-dog " of the United States Navy, when a Lieutenant hurrying from the Government's Asiatic Station to Washington sent a wireless message from the s.s. " Mongolia," several hundreds of miles at sea, that kept the marriage licence clerk's office open for some hours after the regular closing time. The Lieutenant had arranged to marry on a certain day, but the wedding bells would not have chimed for the couple on that day, and perhaps not for several weeks, if wireless telegraphy had not come to the rescue.

* * *

One hears occasionally of judicial decisions that are delivered from other places than a bench or a judge's chambers. According to a contemporary, the Supreme Court of the United States is about to decide upon the validity of a decision communicated by wireless telegraphy. Judge Rodey, of the District Court of Porto Rico, had before him a suit concerning land in the island. He directed an extension of time in which a bill of exceptions could be filed. But the direction was sent by a wireless message while the judge was on his way from Porto Rico to New York, and on thi account its validity has been challenged.

Reviews of Books

"ARITHMETIC OF ELECTRICAL ENGINEERING." (London : Whittaker & Co., 1s. net.)

This small book on the arithmetic of electrical engineering is an excellent companion volume to the numerous works on electrical engineering, and should prove a valuable aid to the student who desires to acquire the ability to calculate quickly and accurately. The requisite skill to do this can only be obtained by close application and extensive practice in solving numerical examples. It is well known that young students encounter many difficulties when they first endeavour to apply their theoretical knowledge to practical problems, and the plan adopted in this book is first to give very briefly the fundamental quantitative relationships and laws, and then numerous worked-out typical examples illustrating the principles of the subject, as a guide to the student to the methods of tackling practical problems. In addition there are added 300 examples for the student to work himself. These have been carefully graduated, and include most of the numerical questions set at the City and Guilds of London Institute examinations in Electric Lighting and Power Transmission, and Telegraphy and Telephony, as well as a large number of questions taken from the Board of Education examination papers in Electricity and Magnetism. This collection of exercises thus gives an indication of the line of study to follow, as regards theoretical training, which our foremost teachers consider to be essential.

"ELEMENTARY ELECTRICAL ENGINEERING," by J. H. Alexander. (London : Crosby Lockwood & Son, 7 Stationers' Hall Court, 3s. 6d. net.)

We have on several occasions drawn attention to the importance of a thorough knowledge of the principles of electrical engineering to anyone who intends to take up the operating side of wireless telegraphy as a career. There can be no excuse for neglecting to study this subject on the ground of lack of facilities, for not merely are technical classes established in every centre of note in the kingdom, but by means of correspondence courses and suitable text-books a knowledge of the principles of the subject is brought within easy reach of every person, no matter how distant he may be from any big centre. Text-books on the subject are almost too numerous to mention. Mr. Alexander's book on electrical engineering will, in our opinion, be found extremely useful, especially to young artisans. In this book all complicated mathematical formulæ which might tend to confuse beginners or those not well up in mathematics have been omitted. But a cook might just as well attempt to prepare a dish without the essential ingredients as an author to try to write a text-book on electrical engineering which is not on a mathematical foundation. When we say that the student not familiar with mathematics will not be confused by this book we do not suggest that Mr. Alexander's book is on that account less valuable, for he has given some mathematical exercises worked out at full length which ought to assist the student by showing him something of the kind of problems to be met with in practice. The ground covered by this book is extensive. The absolute beginner may find it advantageous to omit, or merely read over, the chapters on alternating currents, alternating current motors, and the generation and distribution of electrical power, confining his attention in the first instance mainly to the remaining portion of the book which explains the fundamental principles of electricity and magnetism, with examples of their use.

"THE RADIO-TELEGRAPHIST'S GUIDE AND LOG-BOOK," by W. H. Marchant. (London : Whittaker & Co., 2 White Hart Street, Paternoster Square, E.C., 4s. 6d. net.)

This book is described as a Manual of wireless telegraphy for the use of operators, and will be found exceedingly useful. The book is not intended for that class of person who through curiosity desires to know something of wireless telegraphy. On the contrary, the aim of the author has been to produce a book which would be of service to those engaged in the practical manipulation of radio-telegraphic apparatus, and who already possess some knowledge of electrical science. The first portion of the book is devoted to a description of the various apparatus which make up a radio-telegraphic installation, and to the principles which guide in their construction and erection. This is followed by a description of many of the so-called systems of wireless telegraphy, and the author has selected the Marconi system as being representative of the spark method of generating electrical oscillations. At the back of the book will be found an entirely novel feature in the form of log sheets, which should enable the operator conveniently to keep a record of his voyages and working. We have no doubt that this feature will meet a need and will be appreciated. The book is well illustrated.

"PRACTICAL ELECTRICIAN'S POCKET-BOOK AND DIARY, 1912." (London : S. Rentell & Co. ; cloth 1s., rexine 1s. 6d. net.)

This hardy annual is particularly noted for the novel features which have been incor-

(*Continued on page 29.*)

porated, in addition to the usual revision of existing sections. Progress in electrical matters is indicated by the expansion of the list of central stations, and accompanying names of the engineers-in-charge. This list has grown during the twelve months by little short of three pages. The section dealing with the Diesel engine has been re-written, and now includes some excellent diagrams showing the relative efficiencies of steam, gas, and Diesel oil engines. Another important section, that relating to producer gas, has also been revised and enlarged. Other sections which have undergone special revision and modification are those dealing with petrol engines; comparative costs of electric light and power (the latter now including load and factor tables); motor controllers; electricity meters (additional diagrams of connections); wiring systems, which now include such modern innovations as Woodhouse casing, Henley's new system, Stannos revised instructions, etc.; and measuring instruments, embodying particulars of the "Ducter" and "Ampall." Among the entirely new sections of the 1912 pocket-book is one which alone justifies the moderate price at which this pocket encyclopædia is published—viz., a complete and practical treatment of the subject of bioscope working, illustrated by clear diagrams. Commercial users of the pocket-book are catered for in the new section on depreciation, which embodies a useful table of depreciation allowances. There is a long section dealing with telegraphy, but wireless telegraphy is only casually referred to. This is the one weak feature of an otherwise excellent annual, which should prove extremely valuable to engineers in charge of plant.

"DYNAMO AND MOTOR ATTENDANTS AND THEIR MACHINES," by Frank Broadbent, M.I.E.E. (London: S. Rentell & Co., 1s. 6d. net).

This popular handbook has now reached a sixth edition, which in itself is no unmerited tribute to its value. The earlier issues which we have seen impressed us very much as just the kind of book that was required by engineers who have charge of electrical apparatus, and the new edition right worthily upholds the traditions of the earlier issues. Amidst the text the reviser's hand is seen, and the result is a notable improvement, more especially in the chapters dealing with starting-up and the fundamental principles of the machines which the installation attendant has to deal with. The chapters dealing with parallel running, synchronising, and starting switches, as well as speed control, have been revised, and a new test dealing with brake tests and horse-power calculations has been added. Many alterations and extensions have been made in the chapter devoted to alternating current motors, with the result that the work is brought thoroughly up to date. We cannot too strongly urge upon telegraphists and, more particularly, telegraph engineers, the importance of being thoroughly familiar with faults and causes of breakdown common to electrical machinery. The book under review not only serves this purpose, but what is of greater importance, it explains how to deal with them, and as such it can be confidently recommended as the *vade mecum* of the engineer-in-charge. It is produced in the handy and convenient size which characterises the publications of the well-known house of S. Rentell & Co., and author and publisher are alike to be complimented upon their product.

The recent number of the *Post Office Electrical Engineers' Journal*, published by H. Alabaster, Gatehouse & Co., maintains the high standard which this useful publication has established. It contains a number of interesting articles, including one on the inductance of telegraph apparatus and another on fast speed working on underground cable circuits.

Naval and Commercial Stations

THE *Electrical World* of New York recently published a comprehensive outline of the wireless telegraphic development on the United States Atlantic coastline. The author of the article, Mr. James L. Charlton, showed that rather more than half of the coast stations belonged to the Government, and were operated primarily for military purposes, the remainder being operated primarily for commercial purposes. Nevertheless, it must not be forgotten that the Government stations exert a most important influence in support of the mercantile interests, not only by remaining constantly on the watch for alarm calls in cases of disaster at sea, but also in sending out storm warnings to vessels within receiving range. The requirements of a military or naval station are not the same as those of a commercial wireless station. Commercial stations seek to conform as nearly as possible to a standard, so that there may be a maximum degree of security and the minimum amount of delay in the handling of their traffic. On the other hand, naval stations have to cover the maximum possible range, and to control with ease and certainty a wide range in frequencies, so as to be able to change the frequency promptly. In time of war, the advantage possessed by the Navy that has the best drilled and equipped wireless communication system is likely to be enormous. There is a statement in the article by Mr. Charlton to the effect that the intensity of the long-distance signals received on receding vessels is considerable at a distance of about 300 miles, and then falls off rapidly. This statement would have great importance if it were definitely reproducible under all meteorological conditions. Day and night conditions differ so remarkably in regard to intensity of received signals, that exact measurements lose part of their significance. Moreover, the difference in the daylight intensity at different times of the same day, or on different days is very large, and this is even more noticeable in night-time intensity. Nevertheless, the statement suggests the influence of reflection of electro-magnetic waves from the upper layers of the atmosphere, perhaps 40 or 50 kilometres high. It has already been pointed out in the columns of our contemporary, the *Electrical World*, that the atmosphere at a certain elevation must possess a tenuity which in laboratory vacuum tubes is found to be more highly conducting than salt water. If such a layer is conducting to low electric intensities, and the conductivity is developed suddenly at a transition layer, then the sky becomes, electrically speaking, an inverted ocean which would prevent the dissipation of wireless wave energy in three dimensions, or inversely as the square of the distance, and would, except for losses at the ocean surfaces, confine the dissipation to losses in two dimensions, or inversely as the distance. If, however, the layer of electrical conductivity is disturbed so that the conductivity is diffused over a large range of elevation, instead of being confined to a sudden transition surface, then not only will there be no reflection from the upper layers, but the loss through dimensional dissipation will be exaggerated. Long-distance wireless telegraphy seems destined to accumulate a considerable amount of information concerning the upper layers of the atmosphere in regard to their disturbances by winds or solar ionisation.

Until recently, it was possible for a business man to escape completely from the toils of his affairs by taking an ocean voyage, and for the purpose of such recuperation a ship became an emblem of refuge. To-day, however, thanks to the influence of wireless telegraphy, the Atlantic Ocean routes are but extensions of City streets over the water, so far as relates to isolation and repose of the business soul. The business man's ocean steamer life is becoming engrossed in ascertaining how his messages with the shore may be received or dispatched. It seems to be only a question of time when the regular ocean passenger routes will be equally patrolled, and when the great oceans will virtually be reduced to canals as far as relates to communications. This is the future, as sketched by the *Electrical World*, which hastens to assure us that the advantages gained by the new order far exceed the advantages of the old order; yet the change is none the less revolutionary.

American Notes

It is proposed to establish two new wireless stations on the southern coast of Alaska, one at Unialaska, and the other at Kodiax. The erection of a wireless station on the Hawaiian Island of Oahu is also contemplated. An effort will then be made to establish wireless communication between Unialaska and the Hawaiian Islands.

The following is extracted from *Syren and Shipping*:

"We note, dear Major, your remark that 'evidently in spite of the triumph of "wireless" the day of the submarine cable is not yet over.' The statement, of course, is perfectly correct, but you must remember, Major, that 'wireless' has its advantages, after all. It would be diabolically awkward, don't you know, if a big passenger liner had to stop and grope about for the nearest submarine cable whenever she wanted to communicate with the shore!"

An Australian Review

THE annual supplement to the shipping newspapers of Australia contains a very comprehensive review of the shipping and commerce of the Commonwealth. A feature of interest in reviewing these annual retrospects of trade which invariably strikes us is the appearance from year to year of new branches of industry and new commercial activities. It can hardly be said that wireless telegraphy is either a new industry or a new commercial activity, yet in regarding its growth we cannot but note the fact that it is just at present becoming generally recognised not merely as an indispensable force, but as an industry of very great importance and unbounded potentialities. The article in our contemporary describes the year's developments in wireless telegraphy under the sub-heading of " Innovations," and points out that in the equipment of the newer ships commissioned for the Australian trade, as well as of the older ships, wireless telegraphy has made greater strides than any other device introduced into the maritime world. We are interested to note the striking growth in the use of wireless telegraphy on board the steamers, as evidenced by the supplement before us with that of its predecessor. Last year very few of the steamers running to Australia were equipped for the transmission or reception of wireless messages, as little progress had then been made with the erection of land stations, but the matter has since been taken in hand in earnest, and now almost every company trading with the Commonwealth is having its steamers fitted.

In Case of Shipwreck

Comment is made upon the fact that although wireless has been in existence for the short space of 15 years it has already proved its value in numerous cases of shipwreck and other marine disasters. A ship at sea which has a wireless station on board becomes as much a part of the world's telegraphic system as any town on shore; thus shipowners are enabled to keep in touch with the commanders of their vessels, which is especially valuable in cases of delay or for cargo steamers, where great expense and inconvenience are often prevented by issuing instructions or obtaining information before a ship reaches port. The travelling public are fully alive to the advantages of wireless communication, both as a safeguard against disaster and as a social or commercial convenience, and they invariably prefer to travel by the ship which carries a wireless installation. The realisation of its numerous advantages has caused wireless telegraphy to be adopted by shipping companies throughout the world.

Wherever wireless telegraphy is spoken of the name of Mr. Marconi becomes unconsciously associated, and our contemporary remarks that it is a well-recognised fact that the present position of wireless telegraphy is due to the efforts of the Marconi Company. The rapid development of maritime wireless telegraphy in recent years is aptly illustrated by the fact that the number of merchant ships carrying Marconi installations in the early part of 1910 was no more than 200, while at the time the supplement was prepared, viz. November 1st, 1911, there were over 570 ships of the world's mercantile marine equipped with the Marconi system.

Where Wireless is Employed

During the last two years all passenger ships of the P. & O., Orient, White Star, and Aberdeen lines have been fitted with Marconi apparatus. The new Blue Funnel liners have been similarly equipped, and the Union Steamship Co. have ordered Marconi installations for their trans-Pacific and other ships. The New Zealand Shipping and Shaw, Savill Companies are having their ships equipped with Marconi apparatus, while M'Ilwraith, M'Eacharn & Co. have a similar plant on their s.s. " Karoola," and the Adelaide Steamship Co. have Marconi apparatus on their s.s. " Grantala " and " Koombana."

Many countries have passed laws making it compulsory for passenger-carrying ships to carry wireless installations, and a clause to that effect is being contemplated by the Federal Parliament in connection with the new Navigation Bill. Our contemporary believes that the coming year will see all passenger ships in the Australian trade equipped with wireless telegraphy, and if any doubts are felt as to the best procedure to follow they cannot be far wrong in saying that the example of the larger lines constitutes a valuable guide.

Councillor Kareis and Captain Schimek were the guests of the Association representing the interests of Austrian Posts and Telephones at a recent meeting. Councillor Kareis delivered an interesting address on " The Development of Telegraphy and Telephony." His mind went back to the early days when distance communications were carried out by means of fire signals. This was the case in Greece when Troja fell. Optic telegraphy was first used in connection with electricity after the chemical experiments of Soemmering. With regard to telephony, Councillor Kareis referred to the achievement of Dr. Bell of Boston, the inventor of the telephone, who, being a son of a deaf and dumb teacher, studied the organs of hearing, and succeeded in constructing the first telephone. Captain Schimek referred to the development of wireless telegraphy, and to Mr. Marconi's practical inventions.

Advances in Field Telegraphy.

The Sultan of Turkey's Interest.

NO modern military system can now be considered complete without a wireless telegraph equipment, and a well-organised system of communication has been created by Marconi's Wireless Telegraph Company in connection with military telegraphy. So much depends on the continuance of wireless telegraphy during war that it is important to study closely the practical development of the art, concurrent with which much scientific investigation has been conducted. Turkey is one of the latest countries to take up field wireless telegraphy, but it has done so only after exhaustive trials, during which the advantages were clearly demonstrated. The trials with wireless field sets carried out in Turkey were described in THE MARCONIGRAPH for September of last year. These created a considerable amount of public interest and attracted the attention of His Majesty the Sultan of Turkey, who evinced an intelligent interest in the operations. He paid a visit to Selimieh Barracks at Scutari and inspected a cavalry station which was erected in the courtyard, and which was in communication with another similar station in the naval barracks at Constantinople. At the Selimieh Barracks he engaged for some time in conversation with the officer commanding the engineer company in charge of wireless—Captain Salaheddin. It is not surprising that the Sultan should have displayed such a keen interest in the subject, for, as is well known, this enlightened monarch combines

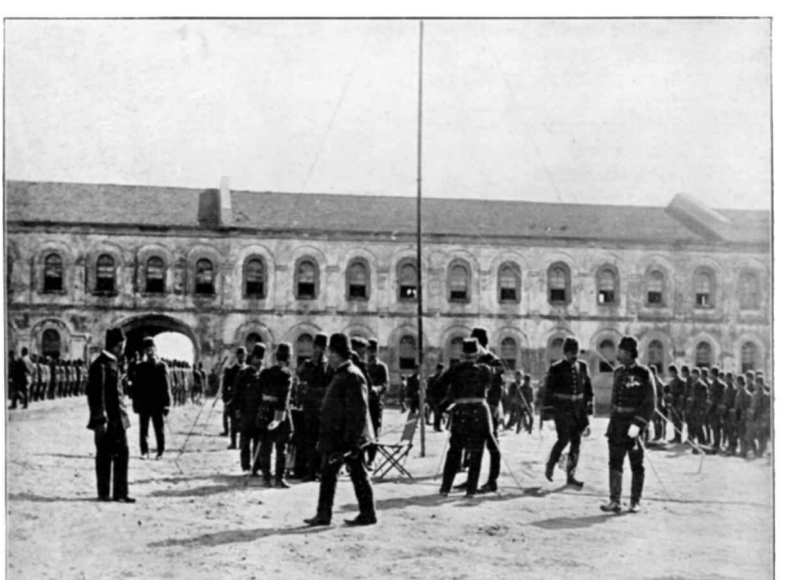
Awaiting the arrival of the Sultan at Selimieh Barracks.

H.M. The Sultan arriving at the Gate of Selimieh Barracks.

The Sultan conversing with Officer Commanding Company in Charge of Wireless

a high degree of culture with zeal for the welfare of his people, and the British nation at all events, are not likely to forget his acts of friendship towards them, first of all in sending a prominent member of his family to welcome the King and Queen of England on their passage through Turkish waters while on their way to England, and later in conferring a high order upon King George. Wireless telegraphy has developed into an implement of immense importance in naval and military operations, and no gifted mind can fail to be impressed by a medium which has so far altered the conditions of ocean travel that great passenger liners, separated by vast distances on stormy seas, speak to each other through the ether with far-reaching voices, and are never out of touch with land during the whole of their voyage from port to port.

The trials with cavalry and infantry field stations which were witnessed by the Sultan were highly successful. A Government Commission, consisting of six members, chosen from the army, navy and posts and telegraphs, sat to select the best system of wireless for military purposes. The Commission were from the commencement favourably impressed with the portability, speed of erection and ease of manipulation of the Marconi stations. At first it was necessary to teach the soldiers how to erect and work the stations, the essentials of which they quickly grasped, in spite of the difficulty of explaining them through an interpreter. Later, one of the stations was moved to the Naval Barracks at Kassim Pacha, and another was erected at the Military Barracks at Selimieh, the stations being respectively worked by the sailors and soldiers. The installation was then removed from Kassim Pacha to Guebseh in Anatolia, 45 kilometres from Selimieh, where the other station remained. Communication was at once established, the signals being very strong. The intervening country was undulating and largely cultivated, the greatest height being 1,000 ft. Two other systems were tried in addition to the Marconi,



Inspection of Cavalry Station in Courtyard, Selimieh Barracks.

Turkish Sailors at the Naval Barracks, Constantinople, transcribing messages received from Selimieh Barracks.

but they had great difficulty in communicating with their stations at Selimieh, one being unable to get messages through for two days, and the other being unable to get any through at all. The members of the Commission were highly impressed by the success of the Marconi system. In the cavalry sets the limit of weight per horse is fixed at 185 lb., and the actual weight a little less. The whole outfit is carried by four horses, and there are four more carrying riders in attendance. No. 1 horse carries the aerial and various odds and ends arranged in two boxes, which simply hook on to the special saddle used. No. 2 horse carries the high-tension equipment on one side and the low-frequency plant on the other. The high-tension portion is sealed into an hermetically closed box, and is therefore weather proof.

The low-frequency instrument box opens out, leaving all necessary parts accessible to the operator. Both valve and crystal receivers are used. The third horse carries the petrol-engine and the dynamo used for generating the primary current and also the requisite supplies of petrol. The saddle itself can be lifted off by four men and rested on the ground, and them forms the framework supporting the engine and dynamo. These are connected by a flexible shaft, which is removed when the saddle is replaced on horseback. The fourth horse carries the two masts, each of which consists of ten lengths, each 6 ft. long. These are hollow hexagons in section, so as to be light, strong, and capable of being closely packed. The earth used is a mat of copper gauze. The aerial is stretched between the two masts as a horizontal conductor, 350 ft. long. The sending apparatus is connected at one end of this, and a directed wave is obtained, the strength of wave being much greater in one direction than elsewhere.

Admiral Williams (centre) and group of Turkish Naval Officers.

This plan has great advantages for military equipments. The saddle framings are all constructed out of bicycle tubing, padded to fit the horse, and each saddle will stand when rested on the ground. With skilled men the time needed to erect the plant ready for working is 9 minutes, and to dismantle and pack it again 6 minutes. With unskilled hands in Turkey the equipment, at the first time of asking, was erected in 21 minutes.

One infantry set is identically the same equipment, but carried in two carts. The power needed is 400 watts, and the range, even in mountainous regions, is 20 miles. Over moderately hilly country it is 75 km., and over sea 100 miles. A more powerful equipment with a generator yielding 1½-kw. is also supplied, and this has a range of 200 miles. In this case the height of the masts is 80 ft. instead of 60 ft. The generator supplies 300 sparks per second. This equipment is all carried on a single motor-car.

Exhibition Award

We are informed by our Rome agency that they have received official intimation that three Grands Prix have been awarded for the Marconi exhibits at the recent Turin Exhibition. One Grand Prix is for Marconi's Wireless Telegraph Company, another for Mr. Marconi and the Rome Office, and the other for Mr. Marconi of Bologna and London.

A New Admiralty Station

The new wireless telegraphy station which the Admiralty have erected at Portpatrick is practically completed, and the necessary apparatus is now being fitted. The station is situated on the North Cliff, some distance from the town, and when it is ready for service it will be one of the most important on the Admiralty list, as it will command a wide area of sea on which naval manœuvres will be carried on, and it will be in touch with naval and mercantile shipping on practically all the North Atlantic.

The New Marconi Works

The contractors for the new works required by Marconi's Wireless Telegraph Company, which are to be erected on the county sports ground in New Street, Chelmsford, have made a beginning by preparing the ground for the foundations. The buildings included in the first contract will cover half the field, but when all the proposed extensions have been carried out they will occupy the entire field, with the exception of the land necessary for a railway siding, etc. The first block to be built will stand on an area 460 ft. long and over 150 ft. wide. In the front and on the north side will be the offices, test rooms, etc., and immediately behind these will be three large main shops and a carpenter's shop, the whole forming one large compact block. As soon as the new works are put up and equipped next summer the company will at once find employment for several hundred additional workmen.

Where Wireless is Wanted

The inhabitants of Tiree, a small island forming one of the Inner Hebrides, have become cognisant of the unreliability of their communications with the mainland in times of storm, owing to the breakage of lines. The result is that 500 of the adult population, which represents 25 per cent. of the total population, have petitioned the Postmaster-General and their Parliamentary representative, directing their attention to the necessity of having a wireless station established in the island. With commendable promptitude the Postmaster-General has replied to the effect that the petition will receive his careful attention, and that no time will be lost in making an effort to meet the needs of the island. Naturally, this intimation has occasioned considerable rejoicing in Tiree. Even in the remotest corners of the world the advantages of wireless communication are appreciated, and we have no doubt that the demands of the inhabitants of Tiree will be followed by like demands from communities whose connection with the mainland is solely dependent upon line wires.

Military Wireless Activity

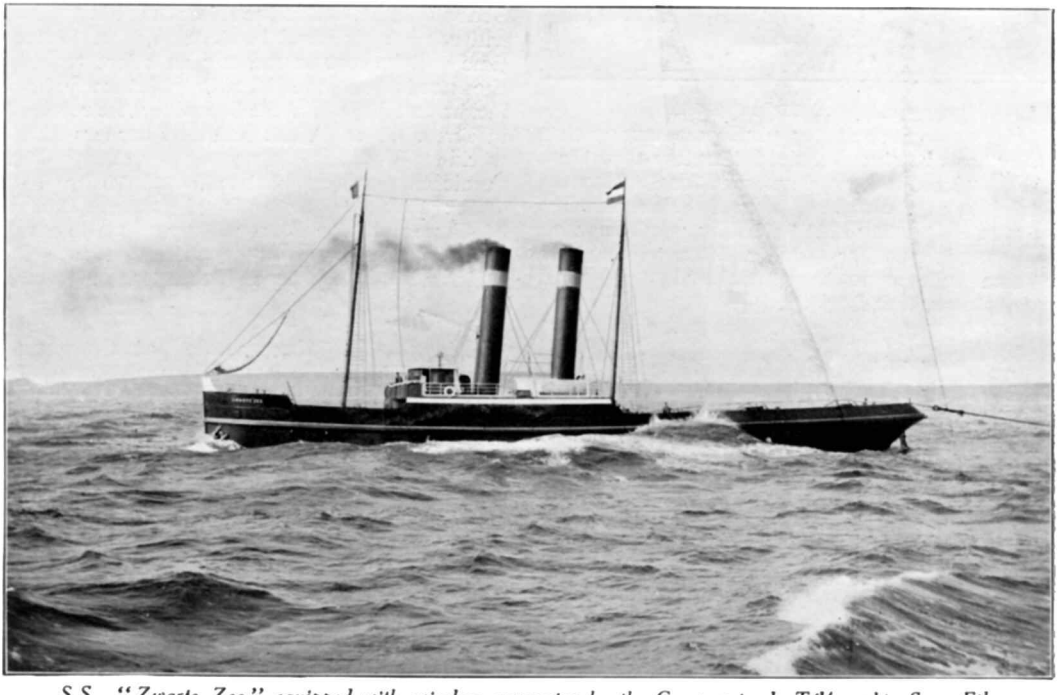
Lieut. A. Handley presided at the annual dinner of the Wireless Telegraph Company, Royal Engineers, at Birmingham recently. In proposing the toast of the company Lieut.-Col. Lister said that the wireless company had not only been without headquarters, but also without gear until this year. They were, therefore, only now in the position in which they ought to have been four years ago. But now they had got one of the best stations, and they had the very latest type of apparatus it was possible for money and skill to produce. General Thorneycroft was keenly interested in the work of the company, and possibly arrangements would be made which would enable the company during the camp on Salisbury Plain to operate over greater distances than on previous occasions. Lieut. Handley, in responding, expressed satisfaction that the company were now equipped with apparatus and ready to take their place in the field. As regarded the prospects, he anticipated that from every point of view the present year would prove the most successful in the history of the company. The drills would be made as interesting as possible, and week-end camps would be arranged, in connection with which it was intended to have the stations operating over a distance of forty or fifty miles.

Maritime Wireless Telegraphy

An Echo of the "Delhi" Wreck

THE official inquiry ordered by the Board of Trade into the circumstances connected with the stranding of the steamship "Delhi" on the coast of Morocco on December 13th, whereby loss of life ensued, recalls a sad episode during the holiday season, brightened only by the gallant aid brought through the timely intervention of wireless telegraphy. It will be remembered that this was the vessel in which the late Duke of Fife with the Princess Royal and their daughters was proceeding to Egypt, and the disaster was the cause of the drowning of three French seamen.

It is common knowledge that fortunately all the passengers and crew of the "Delhi" herself were saved. A picture of the tempestuous scene is obtained from the evidence of the captain of the ill-fated vessel. "The weather," he said, "was overcast and it was raining but not foggy, and he thought the reason he did not see Spartel light was that it was shut out by the mist which comes down from the land in the Straits of Gibraltar; it comes down from the mountains like a blanket. Then breakers were seen ahead. At first he thought they were not breakers, but that it was 'tide rip.' The engines were at once reversed, but the vessel struck almost at once. The weather must have been thick, although it did not appear to be thick at the time in the vicinity of the ship, but he heard no sound signals."



S.S. "Zwarte Zee" equipped with wireless apparatus by the Compagnie de Télégraphie Sans Fil.

The remainder of the story is now too well known to need recapitulation here. Wireless messages were sent *via* the newly-opened Marconi Station at Cadiz to Gibraltar, which in turn communicated with other vessels, and thus brought help to the ship in distress. It was impossible to save the ship, but the human freight, numbering 86 passengers and 235 crew, were brought safely ashore and 3,500 tons of general cargo saved. It is too horrible to contemplate what might have happened had there been no wireless on board. The "Delhi"

experience is a lesson the moral of which should never be lost upon shipowners and the travelling public.

Wireless and Insurance

THE increased security afforded to ships equipped with wireless is bound, sooner or later, to have some effect upon marine insurance rates. The life-saving effect (if we may so term it) of wireless telegraphy has been so convincingly demonstrated that one has scarcely had time to realise the vast saving effected in general cargo and ships themselves, for in many cases the aid summoned from the small wireless cabin of a disabled vessel left to the mercy of a remorseless sea has been the means of bringing the ship safely into port. Doubtless the comparative newness of wireless has retarded recognition of this important fact. In the course of his annual report the United States Commissioner of Navigation points out that besides the vessels equipped under the Wireless Ship Act of 1910 there are already in the United States 142 vessels, including fifteen yachts, voluntarily equipped with wireless. Mr. Chamberlain explains that economies in despatch, in securing pilots and loading berths, as well as the demands of the public travelling by sea on small steamers, have impelled owners to incur the expense involved in equipment. Thus far the marine insurance companies have not made a distinct difference in marine rates on hulls and cargoes on account of wireless, but the subject has been under consideration by insurance companies and underwriters, and the time doubtless is not remote when part at least of the expense of equipment will be offset by recognition in insurance rates. The fact that a vessel at sea which can communicate at will with other vessels or shore stations hundreds of miles distant is in less risk of heavy or total loss than one out of touch with the rest of the world is not now entirely ignored in insurance.

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Mr. William J. Bryan, the famous American publicist, suggests legislation requiring the assignment of two wireless operators to each steamer at sea. Mr. Bryan was a passenger on the steamer "Prinz Joachim" which went ashore recently in the West Indies.

How wireless telegraphy may materially assist a great commercial community like Manchester was pointed out by an expert to a *Sunday Chronicle* representative. "I have no doubt in my mind," he said, "that during the next few years all the steamers coming into Manchester will be fitted up with the apparatus. I have been told that on several of the boats belonging to the Manchester Liners, Ltd., the apparatus is being installed. Such an introduction on the Manchester steamers would assuredly prove of great service to the merchants, since it would enable them to get earlier information as to when they might expect their goods. Travellers overseas," he stated, "were more and more inquiring, in booking their passages, whether a steamer was equipped with wireless apparatus. If it is, they seem to feel a greater sense of security."

The successful adoption of wireless telegraphy for submarines has resulted in a considerable extension of this practice. The builders of a submarine for the Portuguese Government have instructed the Marconi Company to fit a 1-kw. set to this vessel.

The s.s. "Nonsuch" before calling at Rotterdam recently met with very bad weather, in the course of which she had a mast broken and suffered other damage which interfered with her proper navigation. The captain had, therefore, to send a wireless message to Rotterdam for a tug-boat. As this message contained certain information as to the whereabouts of the "Nonsuch," the bill for services rendered was only about one-third of what it would otherwise have been, thus saving a considerable sum of money to the owners of the "Nonsuch." This is another instance of the great economies that it is possible to effect by the equipment of vessels of all descriptions with apparatus for wireless telegraphy.

The Compagnie Générale Transatlantique have decided to establish a direct shipping line between France and Canada, and from April 27th two ships with wireless telegraph installations will be ready for this service. The sailings will take place every four weeks.

A contract has recently been signed by the Belgian Government for the delivery of two new turbine steamers for the Dover and Ostend Mail Service. As in the case of all the steamers belonging to this line, these new boats will be fitted with the Marconi system of wireless telegraphy. The internal fittings and decorations will be identical with those of the "Jan Breydel" and the "Pieter de Coninck," but their length—viz., 330 ft.—will be slightly less. The "Frahn" Anti-rolling System will be installed, which will reduce, if not quite abolish, the terrors of sea-sickness. As the Belgian Administration was the first to inaugurate the wireless telegraph system in the cross-Channel service, so it will be the first to provide this anti-rolling system. The boilers will be of the "Babcock & Wilcox" type, and according to the contract the speed must be 24 knots per hour.

Some interesting orders for standard Marconi 1½ kw. and emergency plant were placed during the past month. The cable ship "Ramos" is amongst the boats now being equipped. The "Berwindvale," orders for the equipment of which have just been received from the owners, the Havana Coal Company, will be engaged in carrying coals like its sister ship the "Berwindmoor." The "Irishman," which is being equipped for the White Star line, will be engaged in carrying passengers and cargo in the Australian trade. Equipments have been ordered for three vessels for the Royal Mail Steam Packet Company—namely, "Pardo," "Pataro," and "Parana." The P. & O. vessel, the "Narrung," is intended for the company's new branch line to West Australia. The popularity of wireless telegraphy on the cross-Channel services is further evidenced by the instructions to equip two vessels—the "Normannia" and "Hantonia"—for the London & South Western Railway. These boats will ply between Southampton and Havre. Amongst other orders received is one from the Anglo-American Oil Company for the equipment of seven of their vessels.

Some good instances of the services of Marconi wireless were disclosed on the arrival of the Pacific liner "Oropesa" at Liverpool. On the way the vessel picked up the station at Cadiz from 1,600 miles distant, and from the Bay of Biscay got in touch with Algiers; in this case the sound waves travelled right across Spain, thus overcoming every land obstruction. A message sent from a thousand miles south of Fernando Noronha (in a couple of seconds) took four days to travel over sixty miles by ordinary land transport, and was delivered to the sender after he had reached his distant friend with whom he thought he had communicated.

La Cie Française Maritime et Coloniale de Telegraphie Sans Fil have received instructions to equip the s.s. "Manouba" of the Compagnie de Navigation Mexit, and the s.s. "France," owned by the Compagnie Generale, with Marconi sets.

Athletics

Though little prominence has been given to the doings of the Marconi Athletic Clubs both at the head offices in London and at the offices and works at Chelmsford, the clubs have been progressing steadily, and have worthily maintained their reputation. Twice in the course of the season the football clubs representing the Chelmsford and London office staffs engage each other in a battle royal. The second of these matches this season took place on Saturday, January 27th, too late, unfortunately, to be referred to in the February issue of THE MARCONIGRAPH. The match took place on the ground of the London club at Sydenham, and the Chelmsford team and their supporters, numbering seventy, received a cordial welcome from the supporters of the home club. The match was very interesting, and although the home club played a good game, they were unable to overcome their visitors, who carried off the honours of the day by 3 goals to 1. Victors and vanquished assembled in great spirits after the match to partake of tea at Lipton's Tea Rooms in Kingsway, when over 100 sat down to enjoy an excellent refresher. The day was wound up with a visit to the Coliseum.

Personal

Mr. C. E. Spagnoletti has been elected an Honorary Member of the Institution of Electrical Engineers. Many years ago Mr. Spagnoletti did great and useful work in the development of telegraphy. Nowadays people are apt to think, perhaps, lightly of electrical work which has not a big electrical power at the back of it, but they must remember that work of the very greatest importance was done many years ago in the first commercial application of electricity, *viz.*, the telegraph. Mr. Spagnoletti was a distinguished inventor and worker in the development of the telegraph system.

Movements of Engineers

H. J. Round sailed for Brazil on February 16th to carry out special tests at the wireless stations of the Madeira Mamore Rly. Co.

C. C. Chapman and H. E. Watterson also sailed for Brazil, and on arrival will take charge of the stations at Manaos and Porto Velho.

A. B. Blinkhorn, having satisfactorily completed the tests on the Greek battleship "Averof," left Athens on February 20th for England.

G. H. Magnee arrived back from Borneo on February 2nd.

E. Richards has gone to Poldhu for a course of instruction in High-Power Station Work.

R. H. Strickland is going through the Instructional Course at Broomfield Station.

Movements of Operators

E. G. Hutton, from the "Montezuma" to the "Vectis."

K. W. Page, from the "Mongolia" to the "Danube."

W. H. Knapman, from the "Merion" to the "Montreal."

A. G. Powell, from the "Montreal" to the "Ascania."

C. B. Webb, from the "Ascania" to the "Berwindmoor."

W. H. Monger, from the "Mooltan" to the "Mongolia."

C. E. Masters, from the "Corinthic" to the "Carisbrook Castle."

E. W. Dexter, from the "Columbia" to the "Mongolian."

S. V. Branton, from the "Oceanic" to the "Montfort."

A. C. Arnold, from the Marconi School to the "Baltic."

J. D. Cannon, from the "Carmania" to the "Christopher."

J. B. Stone, from the "Christopher" to the "Carmania."

F. M. Bailey, from the "Empress of Ireland" to the "Corsican."

J. Connell, from the "Empress of Ireland" to the "Empress of Britain."

G. E. Hake, from the Marconi School to the "Empress of Britain."

H. J. Belcher, from the Marconi School to the "Campania."

G. McCormack, from the "Leinster" to the "Munster."

J. McLeod, from the Marconi School to the "Ortega."

C. W. Perkins, from the "Stephen" to the "Campania."

J. R. Thomson, from the "Lanfranc" to the "Cymric."

A. Crofts, from the Marconi School to the "Empress of Ireland."

A. H. Jefferies, from the "Ulster" to the "Leinster."

C. V. Mathieu, from the "Oropesa" to the "Mount Temple."

D. Robertson, from the "Mount Temple" to the "Campanello."

R. Ferguson, from the "Campanello" to the "Tarquah."

C. Peters, from the "Ivernia" to the "Stephen."

J. M. Martin, from the Marconi School to the "Carmania."

H. Cottam, from the "Medic" to the "Carpathia."

C. Searl, from the "Atahualpa" to the "Medic."

J. B. Stone, from the "Carmania" to the "Oropesa."

S. Lemon, from the "Tarquah" to the "Teutonic."

H. E. Solway, from the Marconi School to the "Teutonic."

A. Bayliss, from the Marconi School to the "Celtic."

L. B. Cleary, from the "Bohemian" to the "Ivernia."

S. W. Lewis, from the "Celtic" to the "Lanfranc."

Australasian Branch

W. H. Payne, late officer-in-charge "Karoola," assisting with ship installation work.

J. L. Mulholland, appointed officer-in-charge to the "Koombana."

H. E. Buik, appointed to the "Grantala."

A. O'Kelly, appointed to the "Tofua."

G. F. Chilton, appointed officer-in-charge to the "Karoola."

W. H. C. Phillips, appointed to the "Maitai."

J. F. Wilson (from London), took charge of the "Marama" at Vancouver.

R. Hearle (from London), took charge of the "Zealandia" at Sydney.

E. N. Barnwell arrived from London as officer-in-charge of the "Tahiti."

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