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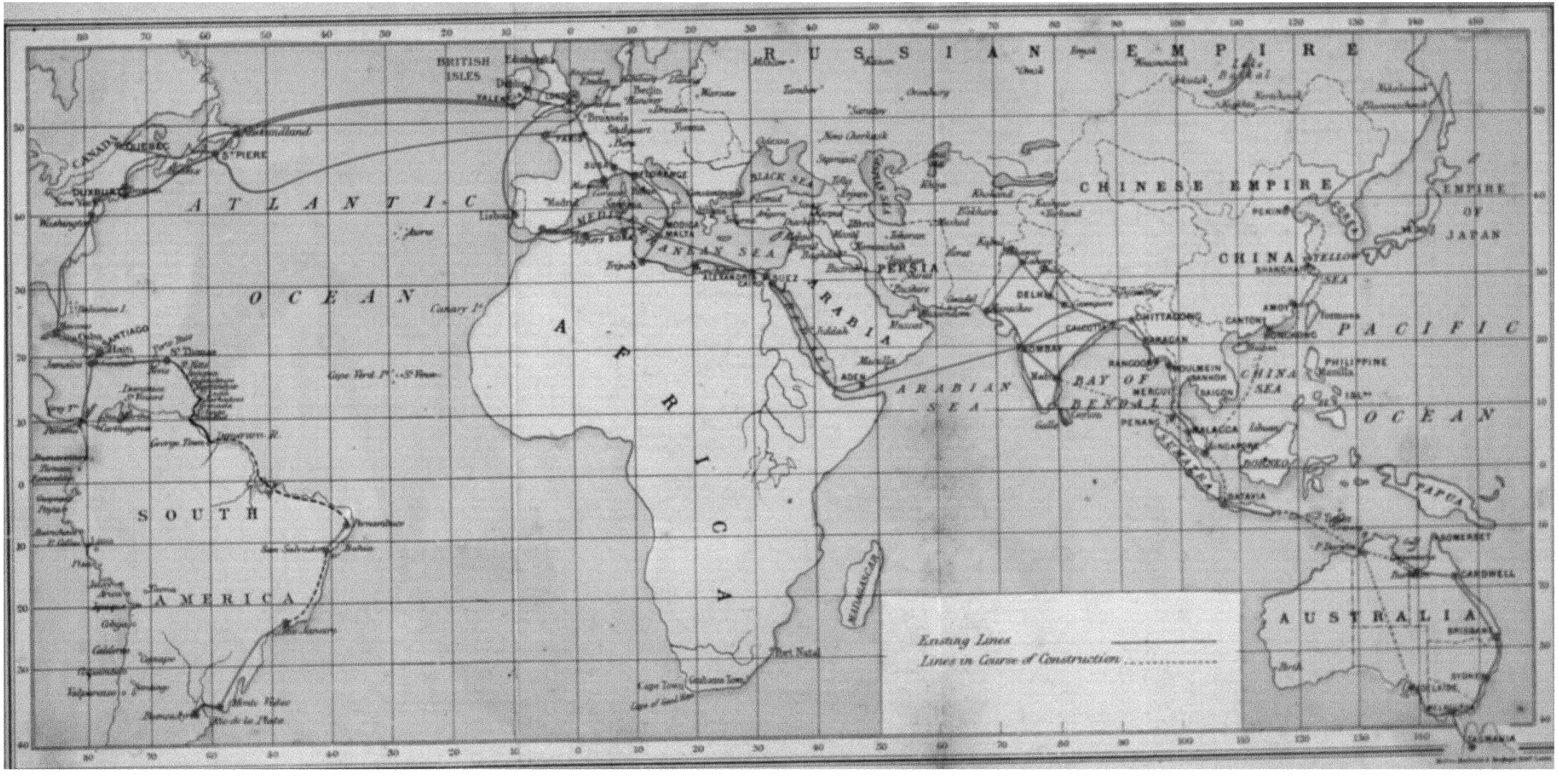
RUSSIAN EMPIRE
BRITISH ISLES
CANADA
QUEBEC
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CHINA
EMPIRE OF JAPAN
PACIFIC
OCEAN
PERSIA
ARABIA
ARABIAN SEA
BAY OF BENGAL
CHINA SEA
PHILIPPINE
AFRICA
SOUTH
AMERICA
AUSTRALIA
MADAGASCAR
NEW GUINEA
Existing Lines
Lines in Course of Construction

SOUVENIR

OF THE

INAUGURAL FÊTE,

In Commemoration of

THE OPENING

Direct Submarine Telegraph with India,

JUNE 23rd, 1870.

PREFACE.

THE object of this pamphlet is to preserve some record of an event which marks the attainment of a new stage in the annals of Submarine Telegraphy.

Just as the surface of the globe is already scored over with iron lines of rails, uniting nation to nation and land to land, so the bottom of the ocean is rapidly being covered with a network of wires, binding continents together by moral as well as material ties. The task of encircling the earth with a telegraphic cable is not yet completed; but the same restless energy, the same strong will, and the same dauntless perseverance which have now made Trans-Oceanic Telegraphy an accomplished fact, will not be found wanting till the great enterprise has been carried out to a successful end.

It was only fitting that the completion of the second and the most important stage in the work of laying a cable round the world should be marked by some distinct ceremonial; and there was no one by whom this duty could have been accepted more freely or accomplished more worthily than by the Chairman of the British Indian Submarine Company. From the day—now fifteen years ago—when this grand idea was first brought before the world, to the present hour, Mr. JOHN PENDER has been one of the most energetic promoters of Submarine Telegraphy. As the earliest supporter of Mr. CYRUS FIELD; as a Director of the old Atlantic Telegraph Company; as Chairman of the Telegraph Construction and Maintenance Company, from the days when the possibility of connecting the Old World with the New was regarded as an idle dream, till the time when the dream had become a sober reality; as the chief promoter of every one of the various commercial undertakings by means of which China and Australia are shortly to be placed within momentary reach of Europe, America, and Africa,—Mr. PENDER was acknowledged to be the worthiest representative of Submarine Telegraphic enterprise. Under these circumstances, Mr. PENDER was the one person who could freely claim the honour of celebrating, at his own residence, the completion of the Submarine Cable between England and

India. Assuredly for such a celebration no fitter theatre could have been found than the house in Arlington Street —few more adapted for the display of some of those marvellous results towards whose realisation Mr. PENDER himself had contributed so large a share.

At the entertainment, the record of which is contained in these pages, messages were sent to India and the answers received under five minutes; and it was shown that even this interval, short as it is, could be materially curtailed by further practice. Long messages of fifty words and upwards were transmitted to the agents of the Company in Calcutta and Bombay, and acknowledged in a quarter of an hour, while a congratulatory telegram graciously forwarded by H.R.H. the PRINCE OF WALES to the GOVERNOR GENERAL was replied to by LORD MAYO at Simla, the acknowledgment from the Company's Agent at Bombay reaching Arlington Street in eleven minutes from the time at which the original message commenced leaving London.

The full details of this extraordinary gathering will be found recorded in the following pages. The concourse of men of eminence, in every walk of science, which assembled at Arlington Street on the night in question, and the active interest they evinced in the proceedings of the evening, are in themselves the highest tributes to the sense of

mutual obligation existing between the host and his distinguished guests. Without the aid of science, Submarine Telegraphy could never have become an accomplished fact. But, on the other hand, science alone would have been powerless to carry out its grand conception for many a long year to come, had it not been for the energy, the resources, and the practical ability of Mr. PENDER, and the colleagues whom he gathered around him to share his risks and labours in the cause of Submarine Telegraphy.

LIST OF GUESTS.

His Royal Highness the PRINCE OF WALES.
His Royal Highness the DUKE OF CAMBRIDGE.
His Serene Highness the PRINCE OF TECK.
PRINCE EDWARD OF SAXE-WEIMAR.
The Duke and Duchess of SUTHERLAND.
The Duke and Duchess of MANCHESTER.
His Highness the NAWAB OF BENGAL and SONS.
The NAWAB SYUD ASGHAR ALI.
The NAWAB SYUD AHMED ALI.
The MAHARAJAH of KHOLAPORE.

The majority of the FOREIGN AMBASSADORS and MINISTERS PLENIPOTENTIARY accredited to the Court of ST. JAMES'S, including—
His Excellency the AMERICAN MINISTER, Mrs. MOTLEY, and Mrs. IVES.
His Excellency the FRENCH MINISTER.
His Excellency the RUSSIAN MINISTER and Baroness BRUNOW.
His Excellency the SPANISH MINISTER.
His Excellency the ITALIAN MINISTER.
His Excellency the PORTUGUESE MINISTER and Miss SIESAL.
His Excellency the TURKISH MINISTER and Miss MUSURUS.

The Duke de VALLOMBROSA.
The Duchess Dowager of ST. ALBAN'S and Lady DIANA BEAUCLERK.
The Duc and Duchesse de CHARTRES.
The Countess of MAYO.
M. le Vicomte de LESSEPS.
MARIA, Marchioness of WESTMINSTER.
The Marquis of HARTINGTON.
The Marquis of LORN.
The Marquis of BLANDFORD.
The Marquis D'AZEGLIO.
The Marchioness of WATERFORD.
The Marchioness of SALISBURY.
The Countess of CLARENDON.
The Countess of CARYSFORT.
Earl and Countess of PERTH and Lady BLANCHE DRUMMOND.
The Earl of ZETLAND.
Earl and Countess of WILTON.
Earl and Countess LISTOWEL.
Earl and Countess of LEVEN.
Dowager Countess of KINNOULL.
The Earl of ENNISKILLEN and Ladies COLE.
The Right Hon. the CHANCELLOR of the EXCHEQUER and Mrs. LOWE.

Lord LINDSAY.
Lord and Lady ALFRED CHURCHILL.
Lord and Lady EDWARD CHICHESTER.
Lord ELIOT.
Lord CAMPBELL.
Lord WILLIAM HAY.
Lord JOHN HAY.
Lord and Lady HOUGHTON.
Lord and Lady LYVEDEN.
Lord and Lady CAMOYS and Hon. CATHERINE STONOR.
Lord and Lady COLCHESTER.

Lord and Lady HEADLEY and Hon. Misses WYNNE.
Lord H. G. LENNOX, M.P.
Lord SALTOUN.
Lord and Lady BORTHWICK.
Lord and Lady CARBERY.
Lord ALFRED PAGET.
Lord COLONSAY.
Lord HARRISS.
Lord SACKVILLE CECIL.
Lord ALBERT LEVESON GOWER.
Lord HYDE, M.P.
Lord GEORGE HAMILTON.
Lord and Lady LURGAN.

Count LUBERSAC.
Count MAFFEI.

Viscount and Viscountess DILLON.

Lady MILBANK HUSKISSON.
Lady ASHBURTON.
Lady CHARLOTTE LOCKYER.
Lady BISHOPP.
Lady SCOTT and Mr. ALDERSON.
Lady BELPER and Hon. Miss STRUTT.
Lady RUTHVEN.
Lady BEAUMONT.
Lady ELIZABETH ST. AUBYN.

The Right Hon. H. A. BRUCE, M.P., and Mrs. BRUCE.
The Right Hon. Sir WILLIAM and Lady HUTT.
The Right Hon. E. and Mrs. and Miss HAMMOND.
The Right Hon. J. STANSFIELD.
The Right Hon. C. P. VILLIERS, M.P.
The Right Hon. Colonel and Lady LOUISA TIGHE.

The Hon. Mr. and Mrs. HANBURY LENNOX.
The Hon. GERALD and Lady MARIA PONSONBY.
The Hon. Mr. and Mrs. ASHLEY PONSONBY.
The Hon. Mr. and Mrs. ALLAN EGERTON.
The Hon LOFTUS EGERTON.
Hon. Mr. and Mrs. CARDWELL.
Hon. SLINGSBY and Mrs. BETHEL.
Hon. R. and Mrs. DUTTON and Miss DUTTON.
Hon. H. and Mrs. DORMER and Miss DORMER.
Hon. ARTHUR KINNAIRD and Miss KINNAIRD.
Hon. Mrs. VAUGHAN and Miss VAUGHAN.
Hon. WILBRAHAM and Lady MARY EGERTON.
Hon. THOMAS and Mrs. BRUCE.
Captain Hon. FRANCIS and Lady LOUISA EGERTON.
Hon. Mrs. PEREIRA.
Hon. Mrs. FARQUHAR
Hon. Mrs. MAGNIAC.

Baron MEYER DE ROTHSCHILD and Miss DE ROTHSCHILD.

Field-Marshal Sir JOHN BURGOYNE.
General Sir WILLIAM and Lady KNOLLYS and Miss KNOLLYS.
General BEDEAU.
Major-General BAKER.
Major-General Sir FRANCIS and Lady SEYMOUR.
Admiral Sir GEORGE BACK.
Admiral Hon. A. COCHRANE.
Admiral Sir H. DENHAM.
Admiral HILLYAR.
Rear-Admiral Sir H. DAY.
Rear-Admiral and Mrs. INGLEFIELD.
Rear-Admiral and Mrs. MENDS.
Vice-Admiral RICHARDS.

Sir STAFFORD and Lady NORTHCOTE.
Sir JOHN and Lady PAKINGTON.
Sir JOHN and Lady LINDSAY BETHUNE.
Sir BARTLE and Lady FRERE and Miss FRERE.
Sir ARCHIBALD and Lady HOPE.
Sir FREDERICK HALLIDAY, K C.B.
Sir JOHN and Lady ANSON.
Sir F. CURRIE.
Sir WILLIAM and Lady CLAY.
Sir EDWARD and Lady DERING and Miss DERING.
Sir J. and Lady DUCKWORTH and Miss DUCKWORTH.
Sir WILLIAM and Lady DRAKE.
Sir GERALD and Lady FITZGERALD.
Sir JAMES ANDERSON and LADY ANDERSON.
Sir RODERICK MURCHISON, Bart., F.R.G.S.
Sir W. FOTHERGILL COOK.
Sir D. GOOCH, Bart., M.P.
Sir FRANCIS GRANT and Miss GRANT.
Sir GEORGE and Lady LEE.
Sir THOMAS and Lady ERSKINE MAY and Miss LAUGHTON.
Sir GRAHAM MONTGOMERY, Bart.
Sir LEWIS and Lady MALLET.
Sir JOHN and Lady ORDE and Miss ORDE.
Sir LAWRENCE PALK and Lady and Miss PALK.
Sir J. ERSKINE PELLY.
Sir ROBERT and Lady PHILLIMORE and Miss PHILLIMORE.
Sir CHARLES WHEATSTONE.
Sir JOHN VIVIAN, M.P.
Sir JOHN and Lady SEBRIGHT.
Sir JOHN BOWRING.
Sir THOMAS BAZLEY and Lady BAZLEY.
Sir WILLIAM ARMSTRONG.
Sir J. and Lady MATHESON.

Colonel CHALLONER.

Colonel CLARKE, R.E., and Mrs. CLARKE.
Colonel and Mrs. CATHCART.
Colonel and Mrs. COWPER.
Colonel CREALOCK.
Colonel and Lady JANE DUNDAS and Lady C. CHARTERIS.
Colonel and Mrs. GLOVER.
Colonel HALSEY.
Colonel HOPWOOD.
Colonel and Mrs. LEARMOUTH.
Colonel MUNRO.
Lieutenant-Colonel GOODLAKE.
Lieutenant-Colonel and Mrs. FREEMANTLE.
Lieutenant-Colonel REILLY.

CHEVALIER CAVRULA.
Don MANUEL VALENEUVA.
Chevalier and Madame SARMENTO.
The Master of SALTOUN.

Major O. EWING.

Captain BURGOYNE.
Captain BEAUMONT, M.P.
Captain COWPER COLES, R.N.
Captain Hon. H. CARINGTON.
Captain COMMERELL.
Staff Captain EVANS.
Captain HALPIN, of the Great Eastern.
Captain and Mrs. DOUGLAS GALTON.
Captain MILDMAY.
Captain and Mrs. MAXEY.
Captain S. OSBORN, C.B. R.N.
Captain OLDFIELD, R.A.

Dr. and Mrs. PLAYFAIR.

Dr. QUIN.
Dr. PRIESTLEY.
Dr. W. H. RUSSELL.

Professor ANSTED.
Professor FLEMING JENKIN.

Mr. W. A. ARBUTHNOT.
Mr., Mrs., and Miss ANGERSTEIN.
Mr. W. T. ANSELL.

Mr. ALGERNON BORTHWICK.
Mr. ROBERT BROWNING.
Mr. BEAUMONT.
Mr. J. L. BALDWIN.
Mr. BRASSEY, M.P., and Mrs. BRASSEY.
Mr. H. A. BATHURST.
Mr. and Mrs. ALEXANDER BROWN.
Mr. and Mrs. BRANCY.
Mr. BUCHANAN.
Mr., Mrs., and Miss BATEMAN.
Mr. J. T. BURT.
Mr. and Mrs. BIRCH.
Mr. T. BATSON and Miss BATSON.
Mr. DUDLEY BAXTER.
Mr. C. B. BARNES.

Mr. R. W. CRAWFORD, M.P.
Mr. and Mrs. CAMPBELL.
Mr. F. F. COURTENAY.
Mr. COLE, C.B.
Mr. CHAPLIN, M.P.
Mr. and Mrs. CHETWYND.
Mr. J. LATIMER CLARKE.
Mr. CUNLIFFE.

Mr. CLAYTON.
Mr. B. A. CARTER.
Mr. COCKERILL.
Mr. HENRY CLIFFORD.

Mr. GRANT-DUFF, M.P., and Mrs. GRANT-DUFF.
Mr. FITZWILLIAM DICK, M.P.
Mr. PERCY DOYLE.
Mr. and Mrs. DICEY.
Mr. DUNCANSON.

Mr. and Mrs. FORBES.
Mr. HORACE FARQUHAR.
Mr. FARQUHAR.
Mr. and Mrs. FULLER.

Mr. W. H. GREGORY, M.P.
Mr. W. H. GLADSTONE, M.P.
Mr. P. GREEN.
Mr., Mrs., and Miss GODDARD.
Mr. and Mrs. JONES GIBB.
Mr. and Mrs. GRIFFITHS.

Mr. J. A. HART.
Mr. and Mrs. HERTY.
Mr. and Mrs. HALLE.
Mr. and Mrs. D. HEYWOOD.
Mr. HAWKSHAW.

Mr. G. JEFFREYS.

M. DE KARNEBECK.
M. DE KRAUSE.
Mr. J. P. KNIGHT.

Mr. LAW.
Mr. LANGE.
Mr. LECKIE.
Mr. LOCKYER.
Mr. W. E. HARTPOLE LEEKY.
Mr. GEORGE LYONS.

M. MUSURUS BEY.
M. P. M. MUSURUS BEY.
Mr. HERMANN MERIVALE, C.B.
Mr. M'ARTHUR, M.P., and Mrs. M'ARTHUR.
Mr., Mrs., and Miss MURRAY.
Mr. MACLEAN.
Mr. MAGNIAC, M.P.
Mr. H. S. MAYNE.
Mr. and Mrs. MILLAIS.
Mr. and Mrs. F. MILBANK.

Mr. OPPENHEIM.
Mr. OTWAY, M.P., and Mrs. OTWAY.
Mr. MONTAGU OLIVER.

Mr. PEREIRA.
M. CARLO PELLEGRINI.
Mr. and Mrs. PARKINSON.

Mr. HENRY REEVE and Miss REI
Mr. C. J. REID.

Mr. and Mrs. SASSOON.
Mr. and Mrs. SPOTTISWOODE.
Mr. and Mrs. SCHUSTER.
Mr. WILLIAM SHUTER.
Mr. SMOLLETT.
Mr. ST. AUBYN.

M. Van de Velde.
Mr. Cromwell F. Varley.
Mr. Theo. Varley.

Mr. Weigall.
Mr., Mrs., and Miss Walrond.
Mr. Lewis Wells.

SYNOPSIS

OF

COMPLIMENTARY DESPATCHES

FORWARDED AND RECEIVED

ON THE NIGHT OF THE 23RD JUNE,

From the Residence of MR. PENDER, 18, *Arlington Street.*

ooo

THE proceedings commenced by complimentary Telegrams between the Managing Director in London, and the Manager at Bombay, as follows :—

ANDERSON *to* STACEY.

"How are you all?"

Despatched 9.18. Reply received 9.23. Time occupied 5 minutes.

From STACEY *to* ANDERSON.

"All well."

ANDERSON *to* STACEY.

"Please ask gentlemen of the press, Bombay, to send a message to gentlemen of the press, New York."

Despatched 9.28. Reply received 9.33. Time occupied 5 minutes.

From STACEY *to* ANDERSON.

"Will do so when here."

After the lapse of some little time, during which the company invited were assembling, Sir Bartle Frere despatched a message to the Governor of Bombay :—

Despatched 10.17.
Acknowledgment received 10.21.50.
Time occupied 4 m. 50 s.

SIR BARTLE FRERE *to* SIR SEYMOUR FITZGERALD.

"Sir Bartle Frere wishes health and prosperity to all old friends in Bombay."

This was acknowledged as received by the Company's Superintendent at Bombay, in 4 m. 50 sec. Subsequently the Superintendent at Bombay advised London that Sir Bartle Frere's message had been sent to Gunneshyde, and that His Excellency was not yet up.

The reply from the Governor of Bombay to Sir Bartle Frere reached Arlington Street in 36 minutes, and was as follows :—

GOVERNOR OF BOMBAY *to* SIR BARTLE FRERE.

"Your old friend returns your good wishes."

Then followed a message from Lady Mayo to the Viceroy at Simla :—

From LADY MAYO, *London, to* LORD MAYO, *Simla.*

Despatched 10.34. Acknowledgment received 10.49. Time occupied 15 minutes.

"In availing myself of the Submarine Cable I feel the obligation which science imposes upon the world.

"Not only does it serve political interests, but assists domestic relations in thus enabling me to send you almost instantaneously an affectionate greeting from your wife and family."

The Viceroy's reply was received in 1 hour 37 minutes, as follows :—

From LORD MAYO, *Simla, to* LADY MAYO, 18, *Arlington Street.*

"Thankful for your message. I send you affectionate greeting from your two boys, and all here."

The explanation of delay in the reply from India received on the following day is, that Lord Mayo had arranged to be in his office at 5 a.m., and her Ladyship's message arriving at 4.7 a.m., found his Lordship still in bed.

Then followed a private Telegram from Sir William Mansfield to the Governor at Bombay, of 22 words. The reply from the Governor of Bombay was received in 21 minutes.

Despatched 10.57. Acknowledgment received 11.10. Time occupied 13 minutes.

Sir Charles Forbes then telegraphed to Sir Charles Forbes & Co., in Bombay :—

Despatched 11.3.
Acknowledgment received 11.10.
Time occupied 7 minutes.

"We congratulate you all on the opening of Submarine communication, equally important to the imperial as well as the commercial interest."

Reply received in 12 minutes.

From McDONALD *to* SIR CHARLES FORBES.

"Salaam Sahib. Reciprocate your congratulations heartily."

His Royal Highness the Prince of Wales then telegraphed to the Viceroy of India a message containing 57 words.

From H.R.H. THE PRINCE OF WALES, *to* H.E. THE VICEROY OF INDIA.

Despatched 11.15.
Acknowledgment received 11.26.
Time occupied 11 minutes.

"I congratulate your Excellency on England and India being now connected by a Submarine Cable.

"I feel assured this grand achievement will prove of immense benefit to the welfare of the Empire. Its success is thus matter of imperial interest."

The reply from His Excellency, at Simla, was received in 45 minutes from the time the Prince's message was despatched, His Excellency the Viceroy being in bed.

From H.E. THE VICEROY OF INDIA, *to* H.R.H. THE PRINCE OF WALES.

"Your Royal Highness's message just received. All interested in the welfare of England and India must feel thankful for the great advantage which the completion of this great enterprise has conferred on the Empire."

The following messages were also forwarded in the course of the evening, but were not timed especially for speed :—

From H.R.H. THE PRINCE OF WALES, *to* H.M. THE KING OF PORTUGAL.

"I offer you my congratulations on the completion of direct Telegraphic communication between England and the East, by way of Portugal.

"I thank you for the aid your Majesty's Government has rendered to this great enterprise, and trust that by bringing our two countries nearer together in point of time, we may cement more closely the old bonds which unite England and Portugal."

From H.M. THE KING OF PORTUGAL, *to* H.R.H. THE PRINCE OF WALES.

"Thanks for the good wishes you express me in your telegram. Equally I congratulate myself for the completion of the Telegraph.

"LUIZ."

From H.R.H. THE PRINCE OF WALES, *to* H.H. THE KHEDIVE.

"Allow me to congratulate your Highness on the completion of a new Telegraphic route from England to Egypt.

"By your assistance you have not only promoted commercial relations between Great Britain and Egypt, but you have carried out the traditional policy of your Highness's rule, by facilitating the communication of England with the Eastern Empire."

From THE KHEDIVE *to* S.A. LE PRINCE DE GALLES.

"Je remercie votre Altesse Royale pour les félicitations qu'elle daigne m'adresser à l'occasion de la réussite de la nouvelle ligne Télégraphique ouverte entre l'Angleterre, l'Egpyte et les possessions Orientales de sa Majesté, les relations commerciales desquelles se developpant de plus en plus entre ces pays, ne peuvent que prendre une plus grande extension par la création des nouvelles voies de communication qui sont dues au génie du peuple

Anglais. Dans mon désir de faire progresser mon pays, je considére comme un devoir d'augmenter les relations qui nous unissent et de donner de nouvelles preuves de ma vive sympathie à une œuvre dont l'utilité est si universelle.

"ISMAIL.

"Palais de Rasel-tin, Alexandrie,
le 23 Juin, 1870."

His Royal Highness the Duke of Cambridge also telegraphed to the Governors of Gibraltar, Malta, and Aden, and received replies as follows :—

From H.R.H. THE DUKE OF CAMBRIDGE *to the* GOVERNORS *of Gibraltar, Malta, and Aden.*

"He congratulates them upon the grand facility of intercourse."

From SIR PATRICK GRANT, *Governor, Malta, to* H.R.H. THE DUKE OF CAMBRIDGE.

"I heartily thank your Royal Highness for this and many other kindnesses. Conduct and health of troops most satisfactory."

From G. E. RUSSELL, *Resident, Aden, to* H.R.H. THE DUKE OF CAMBRIDGE.

"Reciprocate your congratulations."

From the CHAIRMAN *of the Falmouth, Gibraltar, and Malta Telegraph Company, to the* GOVERNORS *of Gibraltar and Malta.*

"His Royal Highness the Prince of Wales is at this moment assisting at an entertainment in honour of the Submarine Telegraph between England and the important dependencies under your Excellency's government.

"I take this occasion to congratulate you on the increased facilities of communication, which cannot fail to bind the empire more closely together, to the mutual benefit of this country and her important outlying stations."

From LIEUT.-GEN. SIR RICHARD AIREY *to* MR. PENDER.

"I have the honour to acknowledge the receipt of His Royal Highness's message, and feel the highest satisfaction at the success of this most valuable enterprise and international institution."

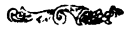
From R. S. BAYNES, *Gibraltar, to* Mr. PENDER.

"His Excellency the Governor not here, expected immediately."

From SIR PATRICK GRANT, *Governor, Malta, to the* CHAIRMAN, *Falmouth and Gibraltar Telegraph Company.*

"I cordially congratulate you on the successful communication between Great Britain and its Mediterranean possessions.

"His Royal Highness's interest in what is so important to the welfare of Malta is most gratifying to its people."



From the CHAIRMAN *of the Falmouth, Gibraltar, and Malta Telegraph Company, to* COLONEL STANTON, *Her Majesty's Consul-General in Egypt.*

"His Royal Highness the Prince of Wales is at this moment assisting at an entertainment in honour of the Submarine Telegraph between England and India, through the important and rising country in which you represent the interests of this nation.

"I take this occasion to thank you for your valuable assistance, and the interest you have manifested in bringing this grand achievement to a successful issue."

From STANTON *to* PENDER.

"Pray convey my dutiful respects to His Royal Highness. I thank you most sincerely for your very kind message."

From the CHAIRMAN *of the Falmouth, Gibraltar, and Malta Telegraph Company, to the* GOVERNOR *of Madras and Bombay.*

"His Royal Highness the Prince of Wales is at this moment assisting at an entertainment in honour of the Submarine Telegraph between England and your Presidency.

"I take this occasion to congratulate you on the increased facilities of communication, which cannot fail to bind the empire more closely together, to the mutual benefit of the mother country and her dependencies."

From the GOVERNOR, *Bombay, to the* CHAIRMAN.

"We are indebted to you for the will and energy with which your enterprise has been carried out. It cannot fail to produce the happy result you anticipate, and merits the appreciation His Royal Highness is pleased to manifest."

From LORD NAPIER *to the* CHAIRMAN, *British Indian Submarine Telegraph Company, London.*

"I beg to offer my respects to His Royal Highness the Prince, and to thank you for the part you have taken in securing for Madras, in common with the rest of India, the invaluable benefit of telegraphic communication with England."

From the SECRETARY, *Bombay Chamber of Commerce, to* Mr. PENDER.

"Bombay Chamber, which has taken deep interest in the great undertaking connecting England and India by Submarine Telegraph, congratulates Mr. Pender on its complete success."

From RANCES, *London, to* SIR CHARLES FORBES & Co., *Bombay.*

"Je vous prie de saluer en mon nom Lord et Lady Napier."

From CAPTAIN PHILLIMORE *to* CAPTAIN OSBORN.

"Congratulate you on the complete success."

From LORD NAPIER *to the* CHAIRMAN *of the Telegraph Construction and Maintenance Company, London.*

"I beg to offer my respects to His Royal Highness the Prince, and to thank you for the part you have taken in securing for Madras, in common with the rest of India, the invaluable benefit of telegraphic communication with England."

From the Press of India to the Press of America.

"The Press of India sends salaam to the Press of America. Reply quick."

Private telegrams were also forwarded from the Honourable R. Sassoon to the Honourable Albert Sassoon, and from Mr. George Forbes to Sir Charles Forbes.

Sir Hastings Doyle telegraphed to His Excellency at Simla; as did Le Vicomte de Lesseps, and received reply: –

From VICOMTE FERDINAND DE LESSEPS *to the* VICEROY, SIMLA.

"Me trouvant ici avec le Prince de Galles, je suis heureux de faire mes compliments à Lord Mayo.

From SIMLA *to* Mons. LESSEPS.

"Mille remerciments. Quand viendriez vous me faire une visite dans les Indes?"

Messages were also forwarded to and received from America :—

From ANDERSON, *London, to* CYRUS W. FIELD, Esq., *New York.*

"Company now assembling. Your message six hours' old. Give us a cheer and reply to this."

From CYRUS W. FIELD, Esq., *Washington, to* SIR JAMES ANDERSON, *at* Mr. JOHN PENDER'S, 18, *Arlington Street, London.*

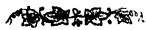
"Your message of this evening received by me before 5 o'clock this afternoon. I am to dine with some friends this evening, when we will drink your health and wish prosperity to all those who have contributed to add another link in that Telegraph Cable which will soon be completed around the globe, and I hope it will prove a blessing to all the nations of the earth that it will bring into communication with each other."

From CYRUS W. FIELD, Esq., *Washington, to* JOHN PENDER, Esq., 18, *Arlington Street, London.*

"The President of the United States received this morning a telegram from the Viceroy of India, dated this day, and has this afternoon answered the same; I regret that it was not answered at once."

From CYRUS W. FIELD, Esq., *Washington, to* JOHN PENDER, Esq., 18, *Arlington Street, London.*

"Most heartily do I congratulate you and your associates on the completion of the Submarine Cable between England and India, and I trust that within one year the Cables from India to Australia and China will have been successfully submerged, and that in 1872 Submarine Cable will be laid from California to Sandwich Islands, Japan, and China. Thus completing telegraphic communication round the world."



The Viceroy of India telegraphed to the President of the United States, and received a reply which reached him in 7 hours 40 minutes :—

From the VICEROY OF INDIA *to the* PRESIDENT OF THE UNITED STATES.

"The Viceroy of India for the first time speaks direct by telegraph with the President of the United States. May the completion of the long line of uninterrupted communication be the emblem of lasting union between the Eastern and Western World."

From the PRESIDENT OF THE UNITED STATES *to the* VICEROY OF INDIA, SIMLA.

"Your despatch of this date is received. I congratulate you upon the successful connection of your country with

the balance of the world by telegraph, and join you in the wish for a lasting union between the Eastern and Western Hemispheres."

This reply was detained in Washington for some time, for which an apology was received in the evening. The message was also delayed 40 minutes in London, during the transfer of the instruments from the City to Arlington Street.

The Viceroy's message was read in the American Congress at Washington the same evening.

At 1.30 a.m. of the 24th the traffic of the line became pressing, and all complimentary messages ceased with the receipt of the following. Received at 1.3 a.m.

From BOMBAY *to* LONDON.

"Sun just risen; delightfully cool; raining."

Received at 1.4 a.m.

From the VICEROY OF INDIA, *Simla, to the* SECRETARY OF STATE, *London.*

(A private official despatch.)

From VICEROY, *Simla, to* H.R.H. THE PRINCE OF WALES.

"Cool morning; been up since 4. I wish your Royal Highness good night."

From VICEROY *to* Mr. PENDER.

"What time did you send your message? I congratulate you most sincerely. Answer to my message of last night to President, United States, received in 7 hours 40 minutes."

DESCRIPTION OF THE APPARATUS

EXHIBITED TO

DEMONSTRATE THE SUCCESSIVE DEVELOPMENTS OF ELECTRIC SCIENCE, WHICH HAS CULMINATED IN THE PRESENT TELEGRAPHIC SYSTEMS.

ON one side of the entrance to Mr. Pender's house were erected two tables, on which were fixed the Telegraph instruments, communicating with India and America. On the other side of the door a table was improvised, on which Professor F. Jenkin, of Edinburgh, and Mr. White, of Glasgow, exhibited in action Sir William Thomson's Submarine Cable *recording* instrument.

The two former instruments were the ordinary Digné ink writers: 80 cells of sawdust, Daniel's battery, were used upon the Penzance circuit (for India), and 100 cells on the Brest circuit for America.

The batteries were placed in the basement of the building, the power being conveyed to the instruments by fine wires, insulated with gutta percha.

The water-pipes were used to connect the two Telegraph wires with the earth—the great reservoir of electricity, from which the batteries pump their electric fluid.

On the left-hand side of the great hall were exhibited Lord Lindsay's large electro-magnet, and Mr. Spottiswoode's large induction coil—the largest but one in the world, and other apparatus.

In Mr. Pender's library were shown, in actual operation, by Mr. Willoughby Smith, two of Sir William Thomson's reflecting galvanometers. In this room were also exhibited a very large Aurora Borealis glass, a series of Geissler's tubes, arranged on a large rotating disc, moved by electro-magnetism; and, finally, an elaborately worked coronet, made of glass tubes of various materials, and bent so as to form one long channel for the electric current.

This coronet carried the Turkish crescent, which was highly appropriate for the occasion, as the only portion of the London Bombay circuit passing through foreign territory is the line from Alexandria to Suez.

Mr. Cromwell Fleetwood Varley, who had undertaken to illustrate the developments of Electric science, had collected the above apparatus, and performed numerous experiments.

Lord Lindsay not only lent his large magnet, large Grove's battery, and other apparatus, but also personally exhibited a number of very striking experiments.

Mr. Apps, the well-known maker of large induction coils, manipulated the induction coil of Mr. Spottiswoode, which gave sparks in the air 18 inches in length. The power of that mysterious force—electricity, was exhibited

by passing the current from the large Grove's battery between metallic wires.

Between copper wires a flame half-an-inch long between pole and pole was produced. This flame ascended an inch or more into the air, emitting colours peculiar to the metals forming the poles.

With copper wires a dazzling green light was produced, and the copper melted down like wax.

With silver a still brighter and purer green flame was the result.

With platinum a brilliant white light was given off, and the molten metal fell in globules of exceeding brilliancy.

With iron the well-known corruscations were beautifully exhibited, the boiling iron vapour flying and burning in all directions.

A platinum wire, three feet in length, was melted into thousands of minute globules in less than two seconds of time.

Having exhibited the power of the electric current to produce heat when a resistance is opposed to its passage, and having shown that different metals offer different amounts of resistance to the electric current—the power of electricity to produce magnetism was strikingly demonstrated by Lord Lindsay's large electro-magnet.

On passing the current from the great Grove's battery through the copper helices surrounding the iron horse shoe it became powerfully magnetised, so long only as the current continued to flow.

It is this power of making a piece of iron a magnet or not at pleasure upon which depends the action of the Morse and Digné instruments—the apparatus generally

employed upon inland circuits, both in the Old and New World.

In the Digné instruments actually employed to speak to Penzance for India on the one hand, and to Brest for America on the other hand, the electro-magnets consisted of a round iron rod in the form of a horse shoe, each side or leg being $2\frac{1}{2}$ inches long and $\frac{3}{10}$ of an inch in diameter.

These magnets are wrapped with a very large number of convolutions of copper wire insulated with silk. The copper wire being only $\frac{8}{1000}$ of an inch in thickness.

In the large electro magnet the iron horse shoe consists of an iron rod 4 inches in diameter and 7 feet in length.

The two copper helices are of copper wire, nearly a quarter of an inch in thickness, and so long and heavy that two men are required to lift each of them; while the former magnets will lift but a pound or two, the latter will carry tons.

In the former small magnets but $\frac{1}{20}$ part of a second is necessary to magnetise them; the latter requires many seconds.

With this magnet were shown many very interesting experiments.

1st. That when a straight copper wire was laid between its poles it fell through the magnetic rays, which were streaming from pole to pole, unimpeded by them. On passing a powerful electric current through this wire, it was thrown up several feet into the air.

2nd. Lord Lindsay exhibited his *half-crown* experiment —when a half-crown was placed betwen the poles, which were square and two inches across, the half-crown was four seconds in falling through the two inches.

A piece of sheet copper, on being passed between the poles, was as difficult to move as if it were sticking in cheese.

Mr. Varley modified this experiment to show that the magnetic rays do not hold up the half-crown, but generate electric currents which support it. For this purpose Lord Lindsay had prepared a number of copper wires bent into rings and soldered together; the wire was $\frac{1}{16}$ of an inch in diameter and the ring $1\frac{1}{4}$ inches.

These rings were seven seconds in falling through the two inches of magnetism, but on breaking the soldered junction, and thus preventing the well-known formation of electric currents therein, the ring fell through as rapidly as if there had been no magnetism there at all.

This experiment showed that *a current of electricity is as solid and material to a magnetic field, as is a plate of iron to a bar of copper.*

These experiments illustrated how Sir William Thomson has been enabled to construct an instrument capable of recording the very feeble currents which are received through long cables.

By the same means was explained how, in Mr. Apps's large induction coil, a current of large volume in one wire of *some sensible* duration, but low tension, is made to produce a *momentary* current in another wire of enormous potential, capable of leaping through eighteen inches of atmospheric air. The *vis viva* of the magnetism in the iron core forming a close analogy with the momentum of a fly wheel, or a steam hammer.

This large induction coil was used to illustrate in a brilliant manner the greatest of all the obstacles expe-

rienced when attempting to work rapidly through long submarine cables, viz., electro-static induction.

A large glass jar, capable of holding ten gallons, had been coated both inside and outside with perforated squares of tin foil, nearly but not quite touching each other; the upper four inches of the jar were uncoated for insulation.

The two ends of the large induction coil were connected, the one with the inside of the jar, the other with the outside of the jar.

The moment the coil was put in action, the inductive action of the one surface of the glass upon the other was shown by the production of tens of thousands of brilliant sparks, which produced so much noise as to completely drown the voices of the speakers.

The glass is a nonconductor of—is opaque to—electric currents. Yet inductively one surface acts upon the other, producing different kinds of phenomena, which it is impossible to attempt to describe fully in this brief notice.

The induction coil itself illustrates the second cause of retardation of signals, viz., electro-magnetic induction. The electric currents, in flowing into a cable, magnetise the iron envelope; this consumes power, and retards the flow of the current.

Notwithstanding all these drawbacks, science, in the hands of Sir William Thomson and Mr. Cromwell F. Varley, has taught the world how to expedite the signals through long submerged circuits, to such an extent that a speed of transmission through the Atlantic and other long cables is now obtained sixteen times greater than is possible with the ordinary Morse instruments, if attached thereto.

This result is effected by compensating the electric currents, an invention of Mr. Cromwell F. Varley, patented in 1856, further developed by Sir W. Thomson in 1858, and still further by Varley and Thomson, in 1865. These compensations could not be carried to a very high degree, were it not that Thomson's galvanometer, invented in 1858, indicates distinctly very feeble currents of electricity, varying in power and direction with great rapidity; but even this instrument would have been almost useless on long lines, because the earth is constantly discharging itself by the aurora borealis into the upper rarified strata of the atmosphere—these aurora produce currents of electricity all over the earth.

Mr. Cromwell F. Varley has devised means by which the disturbance arising from these terrestrial currents are almost entirely cut off. This is effected through the agency of electro-static induction: the cable is not connected to the receiving instrument at all, but to a large plate of metal insulated from but very near to another similar plate; this second plate is connected to the receiving instrument, and it is by this means that the rapid signals, or small electric ripples, on the back of the great earth current waves, are detached therefrom, and alone rendered visible to the operator.

The aurora was illustrated by a long large exhausted tube, through which a brilliant crimson streamer, ten feet in length, three inches in diameter, was produced by means of an induction coil, kindly lent by Lord Lindsay.

The rotary board, carrying tubes of glass, containing various highly rarified gasses, as also the eastern coronet

of exhausted glass tubes, illustrated the phenomena of fluorescence, than which there is no more charming, more promising field for investigation.

The interest of the telegraphic world was, however, centred in two things—one, how fast would it be possible to get a message to and an answer back from India.

This was actually accomplished in four minutes and twenty-two seconds.

Doubtless a second trial of this experiment would yield a more rapid result, especially when we are assured that from Malta to Bombay and back, the portion of the line which has been for some time in daily practice, "The message and answer back were completed in one and a quarter minute." When, however, it is recollected that the message had to be transmitted over six independent circuits one after the other, and the answer to be transmitted back again over the six, making twelve transmissions in all, it must be admitted that the rate was rapid enough for all practical purposes.

The other great object of interest was Thomson's recorder.

This instrument has been in actual operation for some time at St. Pierre, transmitting the American messages from Duxbury.

It consists of a light moveable coil of copper wire, placed in a field of magnetism, highly concentrated by an invention of Mr. C. F. Varley's, in 1856.

This coil is made to put in motion a capillary siphon hung upon a torsion wire. One end of the siphon dips into a vessel containing ink—the other is near to a moving strip of paper.

The ink and siphon are kept charged with static electricity by an electro-static self-charging induction machine, invented by Mr. C. F. Varley in 1860.

This latter machine causes the ink to fly off in minute globules (luminous in the dark) on to the moving strip of paper; and thus in this very ingenious and highly scientific manner Sir W. Thomson has succeeded in producing a perfect record of the varying strengths of extremely feeble currents through his instruments, a feat never before accomplished. The whole weight of this moveable coil of copper wires, its framework glass siphon, 3 inches in length, and connecting fibres, only amounts to $5\frac{1}{2}$ grains.

This instrument, as well as the ring experiment shown with Lord Lindsay's magnet, have never before been exhibited in public.

CROMWELL F. VARLEY, M.I.C.E.

EXTRACTS

FROM SOME OF THE LEADING ARTICLES IN THE LONDON, LIVERPOOL, GLASGOW, AND NEW YORK PAPERS ON THE EVENT.

The "TIMES."

"THE BRITISH-INDIAN SUBMARINE TELEGRAPH.

"LAST night an entertainment of great novelty and interest was given by Mr. Pender, Chairman of the British Indian Submarine Telegraph Company, at his house in Arlington-street, to celebrate the completion of the system of deep-sea cables stretching from Falmouth to Bombay, the last section of which has just been successfully laid. In addition to the usual preparations for a reception, one corner of the room in which the guests were received was fitted up as a telegraph office, and shortly after 10 o'clock a numerous and distinguished company assembled to witness what was nominally the first transmission of messages by this new *route*, the entire length of which, with the exception of the Egyptian portion, is secure from

foreign interference, and secure also from those mistakes, mis-spellings, and omissions of the Continental lines which render a large percentage of Indian messages no better than so much 'pie' by the time they have got to the end of their journey.

"The Prince of Wales, whose interest in all scientific undertakings is well known, had signified his intention of being present, and arrived at 10 minutes past 11. The Duke of Cambridge and Prince Teck were also among the guests. We cannot pretend to give the list of names, but among the scientific men, some of whom assisted at the experiments, were Sir William Cook, Sir Daniel Gooch, Sir James Anderson, Mr. Latimer Clarke, Professor Varley, Professor Jenkins, and Captain Halpin, of the Great Eastern. Early in the evening the telegraphing began, Sir James Anderson presiding at the instruments.

"The Viceroy of India's message to the President of the United States took, owing to delays by the French Cable, 20 minutes longer going from London to Washington than it did coming from Simla to London. Lady Mayo's message was only nine minutes on its way. One sent by Sir Bartle Frere to Sir Seymour Fitzgerald, at Bombay, was acknowledged in five minutes, with the promise of an answer to follow as soon as Sir Seymour, who was in bed, should be called up. Messages also passed between the Viceroy of Egypt and M. de Lesseps, Mr. Pender and Mr. Cyrus Field, and various other persons.

"We must not omit to notice that Sir William Thomson's siphon-recording instrument was last night exhibited for the first time in England. This remarkable instru-

ment writes down in ordinary ink every fluctuation of the electric current received at the end of a submarine cable, and is likely to displace everywhere the mirror galvanometer, by which, hitherto, all messages through long cables have been received. The older instrument shows every change by the waving backwards and forwards of a little spot of light, leaving no trace of its wayward motions. It is almost incredible that men should acquire the skill required to disentangle at the moment the complex motions of this little spot, distinguishing the effects of earth currents, old signals, induction, and what not from the true signal; even with the greatest skill many repetitions are required, and some uncertainty often hangs on the interpretation of a word. The new instrument receives and indicates everything indicated by Sir William's earlier invention, and writes it indelibly; this is accomplished without any sacrifice in the sensitiveness of the instrument. A very fine glass siphon waves to and fro over a running strip of paper without touching it, and from this siphon ink is spurted on to the paper by a series of electric sparks, these sparks being generated by a peculiar induction machine. This fine rain of ink leaves a trace of the position of the siphon at every instant, in a fine continuous line. The siphon follows faithfully the rise and fall of the received current, and these alternations are arranged so as to form an alphabet, as in the usual single needle instruments. The rain of ink opposes not the slightest resistance to the free motion of the siphon. The instrument has been doing commercial work on the French Atlantic Cable for a couple of months in the island of St. Pierre, and its use on the Indian lines will

be followed by increased speed and accuracy. Its wonderful delicacy is indicated by the fact that it recorded messages at St. Pierre sent by a rival company's line, although no metallic connexion existed between the two lines, which nowhere approached one another within a quarter of a mile. Tapping a rival line in war is a common incident enough, but to tap it without ever going within a quarter of a mile of it is indeed a novelty."

"DAILY TELEGRAPH.

"The Greeks used to affirm that Delphi was the terrestrial centre; but on Thursday night the 'middle of the world,' beyond all cavil, was Number 18, Arlington-street, Piccadilly. The guests who attended the telegraphic *soirée* given by Mr. John Pender were, for the first time during human history, in a position to comply with Dr. Johnson's rather premature demand, and to 'survey mankind from China to Peru.' The ends of the earth met under their very eyes; the girdle which the tricksy spirit Puck was to put 'round about the earth in forty minutes' might be seen then and there, buckled complete, and buttoned with a little blue electric diamond; for the host had invited his guests 'to meet the two hemispheres,' and to celebrate an experimental conversazione in which the East and West joined, at their ease, across a trifle of fourteen thousand miles of space. 'Space!' what is space now-a-days? A ditch which we bridge with a string, and from that moment annihilate. Archimedes, were he alive among us, and could he have made one at Mr. Pender's electrical *assemblée*,

would sigh no longer merely for a fulcrum, and speculate upon moving the earth. He would want somebody or something to carry a cable for him to the sun; and then he would ask information, in the name of Mr. Huggins, touching the spots and the photosphere—requesting the Helionites to be kind enough to pass the line on to Sirius, with extensions to the Milky Way. As for Aladdin, had he gone that night to Arlington-street, he must have dropped his wonderful lamp in sheer amazement and neglect, and sold his magic ring on the spot for old gold. Yet the tent erected by the host of the evening was not at all like a sorcerer's cave, and contained no instruments of witchcraft beyond a cluster of gilded hooks hanging over the door, holding a coil of rope decorated with laurels; while in one corner were batteries, retorts, wires, and certain telegraphic dials. But what a meaning attached to those same gilded grapnels! for they were none other than the identical irons which went down into the abysses of the Atlantic, and fished up from its bottom the broken ocean cable of 1865; demonstrating for ever, along with the successful laying of the sister-line, that deep-sea telegraphy had become a practical science and a secure investment. The coils of rope suspended by those gilded hooks, and wreathed with victorious laurels, were none other than portions of the line thus drawn up from the deep dark bed of the main; and the wires which entered at the corner of the tent from this side and from that were —one the American line communicating with New York and San Francisco, the other the triumphantly completed direct cable to India, which has been deposited by way of Falmouth, Gibraltar, Malta, and the Red Sea, linking

England with her Oriental Empire by an unbroken anc independent submarine chain. Turn the globe, and plac one finger upon the Californian sierras, another upon th ridges of the Indian Alps—they are two hundred degree apart. More than half the sphere divides those points yet on Thursday night, at the word of the Prince of Wales Mr. Pender made Siamese twins of the Rocky Mountain and the Himalayas, and there was a 'general conversa tion' between our Heir Apparent, the King of Portugal the Khedive of Egypt, and the Viceroy of India; Cair confabulating at leisure with Piccadilly, and Lisbon chim ing in—while California chatted across the shoulder o New York, and made compliments to Simla.

"Lady Mayo, most politely and properly, of course, ha the first word, and sent to her lord and master, unde four seas and two continents, a wifely message. Hi Royal Highness next telegraphs congratulations, whic the Viceroy returns in the space of four minutes and tw seconds. His Royal Highness then drops in, electrically upon his Majesty of Portugal, and congratulates Ismai Pasha upon the electrical link 'between' Egypt an England. President Grant was the next to be thu amiably assailed with the new 'electric shock.' He trans mitted a characteristic message to Lord Mayo, in whic he spoke lightly of the Hemisphere, with genuine Ameri can coolness, as 'the balance of the world;' and reall these developments make the little planet strangely com pact and small. Then Gibraltar broke in, and Sir Bartl Frere had a 'chat' with Sir Seymour Fitzgerald a

the longitudes, the talkers being M. de Lesseps, Mr. Pender, Mr. Cyrus Field, the Viceroy of Egypt, the British Consul-General at Alexandria, and others. After all this exchange of greetings, the Spirit of the Wire was allowed to sleep—only to enter this day into the service of humanity, a willing, wonderful, beautiful, and beneficent slave.

"How marvellous she is, this Electra!—this new Angel or Messenger of the Human Race! Have any of us—even those to whose skilful knowledge she submits, and in obedience to whose subtle spells she so faithfully works—have any, we ask, yet realised the mystery and capacity of this fairy-like power? Are we not, as Aladdin was, holding a magic lamp lighted by an invisible fire, rubbing a ring which we use without comprehending its might? Professor Tyndall, lecturing lately upon electricity, told his audience that nobody could yet explain it; the fluidic view, he said, was 'merely a convenient theory;' the thrill of diverse metals stirred to action by accidulated waters generates this metallic whisper—this long-drawn pulse—and, presto! there is no more distance! Like a sweet, wise mother, Nature gives us the miracle for our use, and only smiles while we question her about it, saying, 'By and by!' It is as humble, too, as it is mighty and mysterious! By its agency, Mrs. Jones may know for a shilling that Jones is going to bring a friend to dinner; yet it can preserve our empire by warning us of mutiny, or outstrip the passage of the storm and save whole navies and flotillas. Every morning it brings to our breakfast-table news from all the regions of the earth—news which has passed under the seas, over the deserts, by mountain

ranges, unpeopled coasts, dark rivers, and endless plains; the messenger, after all, being no other than a soft spasm shot into a thread—a something which has a spark for its manifestation, so ethereal, so exquisitely near to spirit is this rare sprite, this silent, fine, and delicate Electra. Hitherto, her messages through these long ocean cables have been taken with a mirror, so placed that its faint movements flashed changing specks of light, forming a language as difficult to learn as Assyrian arrow-heads, since the operator has need to know every tiny sign of earth currents, old signals oozing out, inductions, and many other interruptions, and to read the dancing dot clear of all these. On Thursday evening, the instrument employed to write the messages was the 'siphon-recorder' of Sir William Thompson, which can only be described as a glass mouth and a tongue of ink, furnished to the electric fairy, that her messages may be made swifter, easier, and more accurate. We are, in truth, on the threshold of new times, when time itself, as we have hitherto understood it, is telegraphed out of existence, and when To-day communicates on one hand with Yesterday, on the other, with To-morrow."

The "OBSERVER."

"The telegraphic *soirée* at Mr. John Pender's last Thursday, will be quoted henceforth as one of the greatest social successes of the season of 1870. The presence of the Prince of Wales, and other royal personages, as well as of the many leading members of the aristocracy who attended Arlington-street Mansion, gave to the gathering the hall-mark of rank and fashion, while the great number

of people celebrated in science and art who were assembled there showed that the selection of guests had been well managed. The assembly was representative in the best sense, and to pass through the crowded rooms was to meet some man whose name was great in story, or whose face has been made familiar to the general public by photography, at every few yards. Elements which were incongruous in themselves were welded together harmoniously by the greatness of the occasion; and the formal opening of the direct submarine line to India will be long remembered by those who assisted at the social ceremonial attending it. Why the President of the United States should speak of either hemisphere as 'the balance of the world,' as if he had just worked a sum in arithmetic, was a question which was not unfrequently asked by those who were unaware how generally this colloquialism is employed on the other side of the Atlantic. Why Sir Seymour Fitzgerald and Lord Mayo went to bed when it was known in India that this particular *soirée* was about to take place, was another question which agitated the female mind; while Mr. Pender's good fortune in having made the affair so brilliantly successful, and in having entertained the right sort of people in the right sort of way, gave rise to nearly as much congratulation as the marvellous celerity with which messages were interchanged. No necessary arrangement or preparation seemed to have been forgotten, and from the beautifully blended hues of the pavilion, to the less æsthetic ministrations in the mansion beyond it, the care taken to provide for the comfort of the guests was agreeably perceptible. Perhaps Lord Mayo's message to America through Arlington-street, and the announce-

ment that four minutes had sufficed to communicate with Bombay, were the two greatest hits of the evening; while the continuous click click of the instruments, combined with the knowledge that they were talking with the uttermost ends of the earth, and of the difficulties which they had surmounted, sounded like a chorus of scientific mockery against human limits to progress."

The "LIVERPOOL COURIER."

"THE ENDS OF THE EARTH.

"There is something strange and wonderful in the carnival held by Mr. John Pender at his house in London. We do not refer to the splendour of the entertainment, the richness of the viands, or the exalted rank of the guests—though it is an evidence of the cosmopolitan spirit of the age that a commoner should play the host to the heir to the Crown. The marvel was not in gastronomy or social politics, but in science in its newest and most remarkable development. There were things done on Thursday night which our grandfathers would have ridiculed as the fantasy of an idle brain, not to be seriously debated by reasonable men; and even much later, nobody would have dared to predicate that telegraphy could attain the perfection it has already reached.

"Never did a science unfold itself so rapidly and so profitably as electricity. Its practical application to the affairs of life is only of yesterday, but how universal has its use become. The wires cover the land and lie at the bottom of every sea; the ends of the earth are drawn together, and time and distance are of no account in the

world's work. Places thousands of miles apart are linked together by a slender thread, through which words travel with lightning speed. The sun has become a laggard in men's sight; they cannot delay for his magnificent course, but anticipate his rays by the electric flash. This mysterious force exerts its power in the air, the sea, or the earth; it is all the same whether the wire is swayed by the gentle wind, or sunk deep into the bowels of mountains, or lies quietly in the unfathomed depths of ocean. Lay down the simple strand of copper wire, and you have established a line of communication between the remotest regions, more expeditious and infallible than the ear or the tongue of man. Sound is slow and fainting, but electricity knows no limit of speed, and is as distinct over a thousand miles as the sensitive ear of the present lover. This marvellous agency has existed in all time, and when it has disclosed itself so rapidly to this generation, he is a bold man who will say that the ultimate perfection has been reached. When the wires were set up, barely five-and-twenty years ago, and the public looked incredulous when London and Liverpool held laborious converse, who would have said that Liverpool and New York would already be tied in closer and stronger bonds? Or that the same generation should see London stretch out its arms to Calcutta on the east, and San Francisco on the west.

"Yet these things have come about, and Mr. Pender's entertainment is the evidence of their achievement. There, sitting in Arlington-street, the Prince of Wales despatched a message to the British Viceroy in India, who, having been left in darkness by the sun in his westward journey, was then in bed asleep. The message was

no sooner despatched than it was delivered at Simla; within a few minutes the somnolent state of her Majesty's representative was known to the pleasure seekers in Arlington-street, and before the revelry had ceased the message had travelled to the confines of the empire, Lord Mayo had been aroused out of bed, and his good-natured reply was delivered into the hands of his royal interrogator. It occupied just four minutes and two seconds for the message to travel from India to England; indeed, the only delay was in awakening the viceregal sleeper, and but for this unexpected interlude, the question and answer might have been completed in a quarter of an hour. There were other feats in telegraphy, such as messages being sent to the Pasha of Egypt, the King of Portugal, the Governor of Bombay, and other potentates and dignitaries in Europe, Asia, and Africa. Finally, the Old World and the New were placed in communication, and the electric current carried its coherent symbols from the banks of the Ganges, through the depths of the Indian ocean, the Mediterranean, and the Atlantic, across the western hemisphere to remote San Francisco.

These feats are not the manifestation of some grand new scheme. The ceremony was not to afford evidence of the completion of a magic spell thrown round the globe. The Atlantic cables have been at work some time, so, too, have those to the east of Egypt. But there was an awkward gap in the chain, and it is the filling of this gap that rendered possible the wonders that Mr. Pender set forth at his house in Arlington-street. The continuity of the line has been established by the laying of the Falmouth, Gibraltar, and Malta cable, which joins the British Indian

system, and links together the telegraph wires of the whole world, rendering it possible for Calcutta to talk with Cairo, London, Liverpool, or New York. This cable, which is free from the perils inseparable from land lines, and the delays and inconveniences of halting stations for the transmission of messages, opens up instantaneous and direct connection between Great Britain and her Indian possessions, and soon the Liverpool merchant will find it as easy to order tea at Shanghai as cotton at New Orleans or whitebait at Greenwich. It is a 'fabric wonderful of absolute perfection,' a miracle in science, and full of usefulness to man. What other wonders are still hidden in the electric current cannot be guessed, but within the last generation so many new sciences, unnamed and unthought of, have sprung into existence, that there seems no limit to knowledge. Each new triumph opens wider and nobler prospects, and Bacon's forecast of the advance of science is being realised day by day more fully than the great philosopher dreamed."

The Glasgow "DAILY EXPRESS."

"Mr. John Pender must have been a proud man on Thursday evening last, when in his magnificent London mansion, and in the presence of the Prince of Wales and a vast and brilliant assembly, he inaugurated the opening of what may be called the *English* line of telegraphic communication with India. The wires of the two great companies, of which Mr. Pender is chairman, convey messages from this country to our Indian possessions, under ocean, without crossing pathless deserts or through foreign countries, and without the necessity of translation and

retranslation into foreign languages, and in an unbroken chain of English 'pure and undefiled.' The result of this great improvement is already seen in the accuracy and certainty with which messages to and from India are now delivered. The event in Arlington Street was the culmination at once royal, fashionable, and scientific, of a long series of efforts which made the greatest and most wonderful achievement of the times in which we live. Mr. Pender may justly congratulate himself on having been the leading spirit of submarine telegraphy, and on having associated his name indelibly with the men of science, navigators, and mechanicians, who have rendered themselves illustrious by the skill, the ingenuity, the unwearied thought and contrivance, and the knowledge and art almost magical by which they have placed the most subtle forces of nature at the service of man in the most surprising and beneficial of all forms. At the outset of the great work of the Atlantic cable Mr. Pender put his shoulder to the wheel, and through all the failures and difficulties which seemed to many to forbid the success of that great undertaking, he never desponded or wearied, but, as if gathering fresh resolution and energy from disappointment, cheered on all to new attempts, till these were at length crowned with triumph, and the Old and New Worlds awakened to find themselves united by the closest and most mysterious of all material bonds. The completion of the British India telegraph line is a noble sequel to that first great work. The farthest East and the farthest West are brought into one vast conversational circle by the electric girdle, which has now at last been carried 'round and round the world.' Everything connected with this marvellous work is fraught

with the deepest interest to the human mind, and happy are the men who have been instrumental in carrying it forward to its consummation. Mr. Pender is one of the foremost of these; and well might the Prince of Wales the Duke of Cambridge, Prince Teck, foreign Ambassadors and Indian Princes, and the fashionable world of London together with so many heroes of science throng the saloons of one who had given this latest and brightest demonstration of what the subtle brain and the cunning hand of man can achieve. Never before has such a scene been witnessed in a London drawing-room. It would appear that Mr. Pender's house, which, by the way, can boast of many historical reminiscences, of which this is certainly not the least honourable, had been converted for the night into a world-central telegraph office, with a staff of manipulators as busy and far more accomplished than any in Telegraph Street, and a telegraphic museum and exhibition room, where the whole telegraphic apparatus was shown in working order, and lightning was drawn out under the eye, and the magnetic current was made to flash and sparkle through glass tubes in the most brilliant colours, like the *aurora borealis* in the heavens. One little trophy of submarine telegraphy, hung over one of the doors of the great saloon in Arlington Street, and now affectionately preserved in gold leaf, we confess we should like to have seen. This is the grapnel with which the Captain of the Great Eastern picked up the lost Atlantic Cable from the depths of the great ocean, after a winter's storms had swept away the buoys, and left no trace of the vanished end of the cable but such as latitude and longitude and the navigator's skill could find out. This incident of the

undertaking has always appeared to us as wonderful as anything connected with the whole history of submarine telegraphy, and the identical grapnel of the feat is most worthy of lasting and gilded preservation. Sir William Thomson's 'Syphon Recorder,' the latest product of our distinguished professor's exhaustless patience of thought, marvellous knowledge, and most cunning art of fabricating apparatus and appliances through which the electric current seems to do whatever it is wanted to do, was also shown on this occasion for the first time in England. The electric indications at the end of submarine cables have hitherto been received by little spots of light waving backwards and forwards on a mirror galvanometer, and of course required the most minute and careful attention on the part of the translator, with frequent necessity of repetitions and signals to the transmitter, which were as much as to say, 'Eh! what's that? Please say that again!' What does Sir William's 'Syphon Recorder' now do? Why, it makes the electricity write out its own message in black and white, in very ink! One cannot talk or write about this in language known among men. It is more like fairyland than anything else. To put lightning into 'pot-hooks,' and learn it to write in good English, must surely seem a vain imagination. But this has been done, and has succeeded. The electric current, having taken very kindly to the 'Syphon Recorder,' has been writing its messages in ink quite ably away in the Island of St. Pierre for some months past, and will now be asked to do the same on the British India Telegraph, and doubtless on all the submarine cables in the world. It is well for Sir William Thomson that his lot has been

cast in the present age, for if he had tried these exploits a hundred years ago he would assuredly have been burned as a wizard, and been the innocent cause besides of causing a great revival of the laws against witchcraft, and sending many others to the stake and the faggot. As it is, Sir William, while blessing mankind by his discoveries and inventions, is reaping an immortal and ever-increasing fame and love among all classes of his fellow-beings. It is great pride to us, as it must be to all citizens of Glasgow, that we can claim so distinguished a man as our fellow-townsman, and that the scientific genius of Scotland is so prominent and so unrivalled all through the marvellous work of submarine telegraphy. In Mr. John Pender also we may humbly claim to have some share of honour. That a man born and bred among us, and rising from our mercantile life into wealth and world-wide commerce, should, regardless of gain and regardless of loss and expense, have thrown himself with large mind and heart into such a work as this, and been the valiant encourager of the men of science through all their perplexities and discomfitures, is an honour to Glasgow, and to Scotland, as well as to Manchester, and a bright example of the course, in which it is desirable that our country's sons, however blessed by wealth and fortune, may always be found marching on in the van of progress and distinction."

The "SUN."

THE TELEGRAPHIC SOIREE.

"The well-known nine wonders of the world have long since been replaced by others far more marvellous, but to these latter a tenth, the most marvellous of them all, has been added. The nine wonders of the world are no longer old world wonders like the Colossus of Rhodes and the Hanging Gardens of Babylon. They are far rather such marvels for admiration as the telescope and the mariner's compass, the steam-engine and the art of the photographer, spectrum analysis and the oxy-hydrogen microscope, the printing press, and the sewing machine, and the electric telegraph. But, beyond all these, there is the tenth, we are now referring to, and which has grown out of the one last mentioned. There is that astounding marvel by which the ends of the earth are brought together, that is, into instantaneous communication with one another, as in the twinkling of an eye, with the speed of light or of thought, at the thrill of an acid, on the wings of the lightning. The globe we inhabit has already its girdle, like that of Puck or Ariel—only that instead of its being a fairy gossamer filament spun from the dreams of a poet's imagination, it takes shape in the form of a substantial and tenacious submarine cable, trailing along the bed of the ocean, knitting continent to continent. From across the Atlantic we have tidings just now of the projection by Mr. Cyrus Field, of the grandest enterprise in this way upon which even his daring genius has as yet adventured. His project is this time to "pay out" a line between China and California, a line that will, by way of the

Sandwich Islands and Japan, enable the Chinese and Americans to converse freely with each other in spite of the intervening Pacific. Scarcely has the programme of this magnificent undertaking come to our knowledge, when, within the four walls of a room in a house in Arlington Street, Piccadilly, as recently as the evening before last, we have brought to view, through a series of startling demonstrations, the like of which has certainly not till now been witnessed, the extraordinary powers brought within the human grasp by the agency of the British-Indian Submarine Telegraph Association. Surrounded by men of science and others interested in the development of this astonishing contrivance, the Prince of Wales was present there, on Thursday night, not merely to witness, but to preside over and personally participate in, this unparalleled series of achievements. Rapidly, one after another, messages of friendly congratulation were flashed by His Royal Highness, from within the four walls of the room in Arlington Street, to the King of Portugal in Lisbon, to the Viceroy of Egypt at Alexandria, to the President of the United States at Washington, to the Viceroy of India at Simla; these congratulations being reciprocated with amazing rapidity by messages flashed back to the Prince, there in Arlington Street, from King Luiz, from the Khedive Ismail, from General Grant, and from Lord Mayo. Intermediately placed here in London, the Prince of Wales and those around him became aware of a message of upwards of forty words being flashed in less than as many minutes, from point to point, about a distance of 8,442 miles from the Indian Viceroy to the American President: in other words, across

two oceans and three continents, from Simla to Washington, the answer being flashed back from Washington to Simla with similar velocity. Lord and Lady Mayo exchanged affectionate greetings to and fro between Simla and London. As if stirred up with a long pole, like the bears in the *Zoo*, the Governor of the Bombay Presidency was roused out of his bed by a very long wire; and so, with a laugh at Sir Seymour Fitzgerald's expense, these astounding demonstrations were brought to a conclusion."

"NEW YORK HERALD," *Friday June 24th.*

"ASIA SPEAKS TO AMERICA—THE VICEROY OF INDIA TO THE PRESIDENT OF THE UNITED STATES.

"Despatches reached Washington yesterday from Asia announcing the complete circuit of telegraphic communication between our country and the continent of the most ancient civilisation—the birthplace of Christianity—the continent upon which the Apostles commenced their labours—the seat from which originated those languages that have made the basis of the purest classic tongues, the Sanscrit and the Hebrew—the country a portion of which since the Apostolic times has fallen into the seductive embraces of Mohammedanism, and the greater part of which counts to-day, as it did thousands of years ago, its million of pagans; worshippers of Vishnu, slaves and victims of Juggernaut, and the more refined and sentimental representatives of paganism, who acknowledge the sun as their god and keep his fires burning everlastingly upon their altars.

"The despatches referred to state that the telegraphic service between India and England is greatly benefited by the completion of the Falmouth, Gibraltar and Malta submarine cable, connecting at the latter island with the cables already established in the Mediterranean, and thence with lines from Suez to Bombay, thus making a direct telegraphic route from India to England, and therefore establishing a complete communication between this country and India by the Atlantic cables. What a grand concession to the power of science and enterprise, and the wonderful progress of the age in which we live. And more is contained in the following despatch, dated in India yesterday and received in Washington the same day:—

"'BOMBAY, India, June 23, 1870.

"*To the* PRESIDENT OF THE UNITED STATES,
Washington:—

"'The Viceroy of India for the first time speaks direct by telegram with the President of the United States. May this long line of uninterrupted communication be the emblem of lasting union between the Eastern and the Western world.

'THE VICEROY OF INDIA.'

"We accept this despatch as an additional evidence of the mighty things which our modern appliances of civilisation are accomplishing in the progress of the world—the electric telegraph, which whispers congratulations and words of kindly hope from ancient India to this young giant of a new hemisphere; the railroad, which unites ocean to ocean, which unites different climates and dif-

ferent populations with an iron band and the master power of steam; the newspaper, which carries the thoughts, the actions, the failings and the virtues, and pictures of the habits and peculiarities of life of distant peoples to and from the furthermost parts of the earth. Truly we are advancing rapidly towards the time when disagreeable distinctions between nations will be obliterated and people will so far understand each other that international quarrels will diminish. Bickerings which formerly took months to settle can be explained in a few moments, and a thousand evils be thus averted. Intelligence quickly transmitted will take the place of lazy and confusing diplomacy. A flash of the electric wire is worth a mile of red tape, and reduces reams of foolscap to the value of a delicate sheet of note paper.

"But we are not to be contented with this new line of communication with India, upon the completion of which a banquet was given in London on Wednesday night. At that banquet a despatch was read from Cyrus W. Field, stating that within one year a cable would be laid from India to China and Australia, and before the end of 1872 a cable would be in operation between California, the Sandwich Islands, Japan and China. We have no reason to doubt it. When that is accomplished we can bid a friendly 'good morning' to all the globe, and receive a brotherly greeting in return before breakfast.

"Surely this is an age worth living in. If the morals of the world were only as good as its enterprise is grand we might dream of a millennium."

General Remarks from other Papers.

"In a spacious and handsome pavilion built for the purpose, and in the presence of some seven hundred of the leading members of the scientific, the political, and the fashionable world, the Heir to the Crown conversed freely with the King of Portugal, the Khedive of Egypt, and the Viceroy of India; sending messages to and receiving answers from Lisbon, Cairo, and India, in the course of a few minutes. The completion of submarine communication between London and Bombay, by the successful laying of the Falmouth, Gibraltar, and Malta, and the British Indian cable lines, was the immediate cause of the remarkable gathering of last night, which was successful throughout, and which will be remembered hereafter as one of the most brilliant and interesting *soirées* of the season of 1870. Mr. John Pender, the chairman of the two lines named, and one of the chief promoters of submarine telegraphy, determined that the opening out of direct communication with India should be celebrated in a way worthy of the occasion."

"The pavilion was erected in, and covered the whole of the court-yard of Mr. Pender's house, and here, beneath delicate draperies of soft colour were the batteries, retorts, and wires, by means of which instantaneous communication was established with the countries named."

"Conservatory, hall, reception-room, gallery, and antechamber were, by extemporised staircases and impromptu

lobbies, thrown into one extensive succession of gaily-lit apartments."

"It would be impossible to imagine a more brilliant or a more animated scene than that which was presented by the assembly of so many representative persons in every section of art, science, and literature, and in the most distinguished political and social ranks."

"Jewelled orders, home and foreign, shone brightly and numerously in the crowd; and the toilets of the ladies were rivalled, if not eclipsed, by the splendour of the many Eastern costumes worn by Indian princes."

"Those who were early in arriving found much to engage their notice in the apparatus, which was entirely under the direction of Mr. Cromwell F. Varley. The largest electro-magnet in London, Lord Lindsay's, was employed, as well as the induction coil of Mr. Apps, which is the largest thing of its kind except that at the Polytechnic Institution. Some strangely suggestive experiments were performed, with a view to demonstrate the materiality of electricity and magnetism. A small ring of copper dropped between the poles of a magnet took six or seven seconds to fall through a space of not more than two inches, and the visitor who tried to move a move a thin oblong piece of copper across the magnetic rays, found the work as difficult as cutting cold plum pudding. The apparatus used in working the long cables last night was that of Sir William Thomson, whose 'Recorder' was brought into service for the first time."

"This remarkable instrument writes down in ordinary ink every fluctuation of the electric current received at the end of a submarine cable, and is likely to displace everywhere the mirror galvanometer, by which, hitherto, all messages through long cables have been received. The older instrument shows every change by the waving backwards and forwards of a little spot of light, leaving no trace of its wayward motions. It is almost incredible that men should acquire the skill required to disentangle at the moment the complex motions of this little spot, distinguishing the effects of earth currents, old signals, induction, and what not from the true signal; even with the greatest skill many repetitions are required, and some uncertainty often hangs on the interpretation of a word. The new instrument receives and indicates everything indicated by Sir William's earlier invention, and writes it indelibly; this is accomplished without any sacrifice in the sensitiveness of the instrument. A very fine glass siphon waves to and fro over a running strip of paper without touching it, and from this siphon ink is spurted on to the paper by a series of electric sparks, these sparks being generated by a peculiar induction machine. This fine rain of ink leaves a trace of the position of the siphon at every instant, in a fine continuous line. The siphon follows faithfully the rise and fall of the received current, and these alterations are arranged so as to form an alphabet, as in the usual single needle instruments. The rain of ink opposes not the slightest resistance to the free motion of the siphon. The instrument has been doing commercial work on the French Atlantic Cable for a couple of months in the island of St. Pierre, and its use

on the Indian lines will be followed by increased speed and accuracy. Its wonderful delicacy is indicated by the fact that it recorded messages at St Pierre sent by a rival company's line, although no metallic connexion existed between the two lines, which nowhere approached one another within a quarter of a mile. Tapping a rival line in war is a common incident enough, but to tap it without ever going within a quarter of a mile of it is indeed a novelty."

"In sending a message to Bombay, the first stage is from London to Penzance, thence it goes to Gibraltar, thence to Malta, thence to Alexandria, thence to Suez, thence to Aden, and finally to Bombay. The American telegraph is from London to Brest, from Brest to St. Pierre—the longest circuit in the world—from St. Pierre to Nova Scotia, and from Nova Scotia to New York. An object of universal remark in the large hall, opposite the gallery in which the band of the Coldstream Guards, under Mr. Fred Godfrey, played a selection of opera and dance music, was the grapnel which had picked up the parted cable of 1865. The implement, with its springs broken or bent, just asthey were when it was hauled up with the lost cable, had been richly gilt; and its appearance as a trophy was rendered the more effective by its being encircled in a coil of the veritable cable."

"The great fact satisfactorily ascertained, by repeated experiments last night, was that communication with India can now be made in less than five minutes."