

INSTITUTE OF MARINE ENGINEERS  
INCORPORATED.

SESSION



1894-5

---

REPORT

OF

THE PROCEEDINGS

AT THE

ANNUAL MEETING

HELD AT

*58, Romford Road, Stratford,*

On FRIDAY, MARCH 8th, 1895.

# INSTITUTE OF MARINE ENGINEERS

## INCORPORATED.

SESSION



1894-5.

*President*—SIR THOS. SUTHERLAND, K.C.M.G., M.P.

## ANNUAL MEETING OF MEMBERS

On Friday, March 8th, 1895,

AT

58, ROMFORD ROAD, STRATFORD.

### *Part I.*

- Opening Remarks—The CHAIRMAN.  
Mr. F. W. WYMER, *Vice-President*.
- Appointment of Scrutineers—  
Proposer, Mr. J. T. SMITH.  
Seconder, Mr. J. BLAKE.
- Annual General Report—  
Mr. JAS. ADAMSON, (*Hon. Secretary*).
- Bristol Channel Centre—  
Mr. GEO. SLOGGETT, (*Hon. Local Sec.*)
- Southampton Centre—  
Mr. JOHN GRIFFITHS, (*Hon. Local Sec.*)
- The Financial Report—  
Mr. ROBT. LESLIE, (*Hon. Treasurer*).
- Adoption of Reports—  
Proposer, Mr. J. R. RUTHVEN.  
Seconder, Mr. W. GARDNER.
- General Remarks—  
Mr. J. D. CHURCHILL.  
Mr. J. M. GRAY.
- ADJOURNMENT AND INTERVAL.

### *Part II.*

- Declaration of Voting Papers by the  
Scrutineers—  
Messrs. H. HAMMET & A. ROBERTSON.
- Vote of Thanks to the Retiring President—  
Proposer, Mr. W. C. ROBERTS.  
Seconder, Mr. C. A. CROOK.
- Vote of Thanks to Office-Bearers and  
Council—  
Proposer, Mr. J. P. HALKETT.  
Seconder, Mr. JAS. STARK.  
Responder, Mr. JAS. ADAMSON  
(*Hon. Secretary*).
- Vote of Thanks to Auditors—  
Messrs. J. BLAKE and T. G. MARTIN.  
Proposer, Mr. W. C. WALKER.  
Seconder, Mr. H. C. WILSON.
- Appointment of Auditors for 1895-6.  
Proposer, Mr. J. T. SMITH.  
Seconder, Mr. J. JOHNSTON.
- Vote of Thanks to Chairman—  
Proposer, Mr. W. WHITE.

## AUTHORS OF PAPERS.

---

Mr. S. W. Allan	..	..	..	No. LI.
Mr. M. W. Aisbitt	.	..	..	„ LII.
Mr. J. D. Young	..	..	..	„ LIII.
Mr. T. W. Wailes	..	..	..	„ LIV.

## ERRATUM.

---

Page 44, line 3, “the brothers Rennie” should be  
“the Rennies, father and son.”

VOLUME VI.

**TABLE OF CONTENTS.**

---

---

1. Proceedings at Annual Meeting—  
Annual Reports and Financial Statement.  
Catalogues.
2. Mechanical Appliances for the Ship-  
ment of Coal .. .. Paper No. LI.  
(By Mr. S. W. ALLAN, Member).
3. Damage Surveys .. .. „ LI.  
(By Mr. M. W. AISBITT, Member).
4. Annual Dinner Report.  
(Sir THOS. SUTHERLAND, President).
5. President's Address.  
(Sir THOS. SUTHERLAND, K.C.M.G., M.P.)
6. Commercial Speed of Steamships .. „ LIII.  
(By Mr. J. D. YOUNG, Member).
7. Raising Wrecks and Sunken Vessels „ LIV.  
(By Mr. T. W. WAILES (Member).
8. List of Members.
9. Obituary.

# INSTITUTE OF MARINE ENGINEERS INCORPORATED.

SESSION



1894-5.

*President*—SIR THOS. SUTHERLAND, K.C.M.G., M.P.

---

The SIXTH ANNUAL GENERAL MEETING of the Institute of Marine Engineers was held in the premises of the Institute, on Friday, March 8th, 1895, presided over by Mr. F. W. Wymer (Vice-President).

The Chairman opened the proceedings by a few brief remarks, and then called for the appointment of Scrutineers in accordance with the programme.

Mr. J. T. Smith proposed, and Mr. J. Blake seconded, the appointment of Messrs. H. Hammett and A. Robertson, who were approved.

Mr. J. D. Churchill, supported by Mr. J. McFarlane Gray, moved that the minutes of the adjourned Annual Meeting, held on April 13th, 1894, be read before proceeding with the business. After considerable discussion and comment as to the irregularity of the method of procedure, without due notice, it was resolved that the minutes in question be read at an adjourned meeting, to be held at a date to be appointed by the Council, so that the business of the evening might be proceeded with.

The Chairman then called upon the Hon. Secretary to read the Annual Report, as follows :—

## SIXTH ANNUAL REPORT.

The Office Bearers and Council beg to submit to the members the following Report of the year's work, showing the proceedings and progress of the Institute of Marine Engineers for the session just closed, ending 31st January, 1895.

The gross membership reached a total of 876 at the end of the session, terminating the six years since the Institute was officially founded, being a total increase of 145 during the year; this is largely due to the founding of the *Southampton Centre* at the commencement of the session.

The details of the membership are as follows:—

	Jan. 31st, 1895.	Jan. 31st, 1894.	Increase.
Members	686	575	111
Honorary Members	50	42	8
Associate Members	72	53	19
Associates .. ..	44	44	—
Graduates .. ..	24	17	7
	<hr/>	<hr/>	<hr/>
Totals	876	731	145

It is with regret the obituary for the year is submitted; the percentage of removals by death is, however, less than last year. The names are as follows:—

J. T. AXFORD (Member), died at Catford, Kent, March, 1894.

EDWIN BEER (Associate), died at Torquay, Devon, April, 1894.

THOS. CAMPBELL (Member), died in London, S.E., April, 1894.

A. B. CATER (Associate), drowned on board the S.S. "Lennard," when wrecked, August, 1894.

W. H. EASTWOOD (Member), died at Cardiff, August, 1894.

DAVID PHILLIPS (Vice-President), died at Chipping Sodbury, Gloucestershire, May, 1894.

FRANK POOL (Member), died in November, 1893, but intimation was not received till after last year's report was published.

W. SIMPSON (Member), died suddenly at sea, November, 1894.

G. TIMMIS (Associate Member), died at Southampton, October, 1894

J. B. TREW (Member), died at Hong Kong, September, 1894.

In addition to these removals from the membership roll, six or seven resignations have been received.

The attention of members is directed to the claims which the Merchant Seamen's Orphan Asylum, the Caledonian Asylum, the Scottish Corporation, and kindred institutions have upon us, when we consider the assistance which has been given to the widows and children of deceased members, especially by the three named. Although the funds of the Institute may not be used to support these institutions, each member may do what he can privately.

PAPERS AND DISCUSSIONS.—Considerable delay has occurred in connection with the printing of the discussions on papers read in the course of session 1892-3 (Volume IV. of Transactions). The delay and annoyance in connection with printing has also been suffered by other customers of the firm entrusted with the printing of these papers. The establishment, however, has fallen into the hands of a new proprietor, who has, after much trouble and many searchings, at length found the

missing manuscripts and proofs, so that early delivery is now looked for to complete the volume for binding, uniform with the three already published, at 3s. 6d.; or 15s. complete. It is hoped that members who have been disappointed as to the non delivery of these papers will accept this explanation.

THE DENNY MEDAL for Session 1892-3 has been awarded to Mr. W. W. Wilson (Vice-President), now resident in Bombay, for his paper on "The Treatment of Boilers," No. xxxviii. of Transactions. The medal has been forwarded to Mr. Wilson per favour of the P. & O. Co.

THE discussions on papers read during session 1893-4 are being published; these, with the papers themselves, when completed, will comprise Volume V. of Transactions. During the session 1894-5, only four papers have been read and discussed; these are in course of being printed and published, and will comprise Volume VI. of Transactions. Members are desired to keep in view the fact noted, and the great disadvantages under which the Committee entrusted with this department of the work labour, in the hope that the dearth of papers during 1894-5 may be reversed, and that the new session may be a more prolific one. Mr. S. C. Sage is convener of this Committee.

THE DRAWING CLASSES, conducted by Mr. G. W. Newall, have been well attended throughout the session, and a marked improvement can be seen in the work of those attending the classes on Tuesdays and Thursdays. A prize consisting of books, contributed for the purpose by Mr. R. Leslie (Honorary Treasurer), along with a framed certificate, was presented by the President—on the occasion of his visit to open the Extension of Premises—to Mr. A. Robertson (Graduate), for exemplary progress while attending the drawing class during session 1893-4.



THE PREMISES have been greatly improved and extended in the course of the past year. Two of the rooms in the wing of the building having been thrown into one, the roof at the same time being raised to make one good lecture hall for the accommodation of members at the various meetings on Monday evenings and the drawing classes on Tuesdays and Thursdays; on the other evenings it is available as a reading room. Above the lecture hall a large additional room has been constructed; this is used as a billiard room, where the billiard table—kindly lent to the Institute by Mr. F. W. Shorey (Member of Council), until paid for by those who use it—has been placed, leaving sufficient space for another table of the same dimensions. The alterations and additions were carried out by Mr. Maddison, the contractor, under the supervision of the Extension of Premises Committee, Mr. A. W. Robertson, convener.

The extended premises were formally opened on Wednesday, 24th October, 1894, when Sir Thomas Sutherland delivered the inaugural address; a report of the proceedings on this occasion is published under a separate cover.

THE READING ROOM has been kept well supplied with papers and periodicals, which have been largely contributed by the kindness of Mr. T. A. Fisher (Honorary Member). It is open every day and evening for the use of members.

THE LIBRARY, including the loan collection (Malcolm Campbell Memorial), is also open at the same time for the use of members. A few additions have been made, and as several volumes have been out on loan to members beyond the allotted time, the Convener of the Library Committee, Mr. W. White, trusts that the books thus out may be at once returned for stock taking.

THE BILLIARD ROOM is also open for the use of members every evening.

Several drawings, models, and specimens have been presented to the Institute in the course of the year and have been duly acknowledged.

COAL TESTING EXPERIMENTS are conducted from time to time as may be arranged with Mr. J. H. Thomson, Convener, Property Committee.

THE ANNUAL DINNER was held at the Holborn Restaurant, on Wednesday, 13th June, 1894; a report of the proceedings has already been published.

THE CONVERSAZIONE was held in the Town Hall, Stratford, on Friday, January 4th, 1895; a report of the proceedings is appended. These two events were carried out under the supervision of the Recreation Committee, Mr. J. G. Latta, Convener.

\* As authorised at the adjourned Annual Meeting from March, 1894, when the Honorary Solicitor, Mr. John Neely, was present, the Council appointed an assistant secretary to keep the books of the Institute and attend to the general clerical routine of the work under the instructions of the Office Bearers and Council and the various Conveners. Mr. C. G. Newby, who had been acting as Honorary Minute Secretary, now discharges the duties of this appointment.

The following are the reports received from the local secretaries at Cardiff and Southampton, also the list of meetings held during the session at London, Cardiff and Southampton.

---

\* Paragraph objected to by some members in the course of the meeting.

It is appropriate before closing this Report to welcome the fact that with the increased accommodation now afforded, the Annual Meeting of Members can be held in the Institute premises without the unpleasant experiences of former meetings in respect to ventilation and inconvenient crowding. It is well also to remind ourselves on this occasion that the cost involved in making the alterations and improvements has amounted to a good deal, thus lessening our cash in hand, although placing it to the Capital Account.

JAS. ADAMSON,

*Honorary Secretary.*



## MEETINGS HELD

DATE.	NO. OF PAPER.	SUBJECT.
1894.		
February 24	51	Mechanical Appliances for Shipment of Coal ...
Do. 24	52	Damage Surveys ... ..
March 12	51	Discussion on Mechanical Appliances for Shipment of Coal
Do. 16	„	Annual Meeting ... ..
April 9	51	Adjourned Discussion on Mechanical Appliances for Shipment of Coal
Do. 13	—	Adjourned Annual Meeting ... ..
June 13	—	Fourth Annual Dinner ... ..
October 24	—	Formal Opening of the New Premises, and the President's Address
November 12	53	Commercial Speed of Steamships ... ..
Do. 26	—	Discussion do. ... ..
December 10	54	Raising Wrecks and Sunken Vessels ... ..
1895.		
January 4	—	Conversazione ... ..
Do. 14	54	Discussion—Raising Wrecks and Sunken Vessels

## DURING 1894-5.

AUTHOR.	CHAIRMAN.	WHERE HELD.
Mr. S. W. ALLEN ... (Member)	Dr. W. H. White, C.B. (Past President)	Gresham College, Basing- hall Street, London, E.C
Mr. M. W. AISBITT ... (Member)	Do. do.	Do. do.
Mr. S. W. ALLEN ... (Member)	Mr. J. H. Thomson ... (Chairman of Council)	Institute Premises, 58, Romford Road
... ..	Mr. F. W. Wymer ... (Vice-President)	Do. do.
... ..	Mr. J. H. Thomson ... (Chairman of Council)	Do. do.
... ..	Mr. F. W. Wymer ... (Vice-President)	Do. do.
Mr. J. G. LATTA ... .. (Convener Recreation Committee)	Sir Thos. Sutherland ... (President)	Holborn Restaurant
Mr. A. W. ROBERTSON (Convener Extension of Premises Committee)	Sir Thos. Sutherland ... (President)	Institute Premises, 58, Romford Road
Mr. J. DENHOLM YOUNG ... (Member)	Mr. S. C. Sage ... (Member of Council)	Do. do.
Do. do.	Do. do.	Do. do.
Mr. T. W. WAILES ... (Member)	Mr. T. F. Aukland ... (Honorary Member)	Do. do.
Mr. J. G. LATTA ... .. (Convener Recreation Committee)	... ..	Town Hall, Stratford
... ..	Mr. J. H. Thomson ... (Chairman of Council)	Institute Premises, 58, Romford Road

In consequence of the unavoidable absence of Mr. George Sloggett, on account of illness, the Hon. Secretary read the Annual Report of the Bristol Channel Centre, as follows:—

# INSTITUTE OF MARINE ENGINEERS

## INCORPORATED.

---

### BRISTOL CHANNEL CENTRE.

---

*President*—PROFESSOR A. C. ELLIOTT, D.Sc.

---

## ANNUAL REPORT.

---

SESSION 1894-5.

---

The progress made by the Bristol Channel Centre in the Session 1894-5 cannot be regarded as other than satisfactory.

There has been a substantial increase in membership, while an additional interest has been taken in the meetings, at which the average proportional attendance has undoubtedly been greater than hitherto.

Neither has the Centre been behind-hand in its literary contributions to the Institute, four of the papers

read having been sent in by local members, viz., Messrs. S. W. Allen, M. W. Aisbitt, T. W. Wailes and John McCallum. Also on the occasion of the visit of the members to Chepstow, Prof. A. C. Elliott, D.Sc. (President) read a most interesting paper, "Brunel, Railway and Marine Engineer," and again, at the time of the Channel trip to Porlock and visit to Exmoor, Mr. John McCallum produced an able essay on "Marine Engineering."

These occasional excursions of the members have been regarded with much favour, and have tended to promote a feeling of fellowship, which it is very desirable should exist; at the same time, the practice of reading a scientific paper at such gatherings has prevented the main objects of the Institute from being lost sight of.

The Fourth Annual Dinner, which was the principal social function of the session, was held at Cardiff, on Saturday, 13th October, 1894. The president, Professor A. C. Elliott, D.Sc., occupied the chair, the vice-chairman being Mr. David Gibson (Vice-President). London was represented by Mr. James Adamson (Hon. Secretary). In point of numbers and other respects this dinner was the most successful that has yet been held by the Bristol Channel Centre. A more extended report of it, and also of the above-mentioned excursions, is appended hereto. The Centre has suffered loss by the death of Mr. F. Pool and of Mr. W. H. Eastwood. Formerly Mr. Eastwood was a member of the Committee and took a warm interest in the affairs of the Institute.

The meetings are still held in the Engineering Department of the University College of South Wales and Monmouthshire by kind permission of the Council.

Professor A. C. Elliott, D.Sc. (President) has endeavoured to promote the welfare of the Institute in every possible way, and he has been assisted in a

similarly enthusiastic spirit by Mr. David Gibson (Vice-President), Mr. Chas. L. Ryder (Hon. Treasurer), and by Messrs. H. Cambridge, R. Davison, Jas. Ferrier, R. J. Field, E. John, John McCallum, and Jos. Williams (Members of Committee).

Finally, the present condition of the Bristol Channel Centre is a healthful one, and by the expenditure of a reasonable amount of energy in the future its continued prosperity may be assured.

GEORGE SLOGGETT,

*Hon. Secretary, Bristol Channel Centre.*





# INSTITUTE OF MARINE ENGINEERS. BRISTOL CHANNEL CENTRE.

MEETINGS HELD DURING THE SESSION 1894-5.

DATE.	SUBJECT.	AUTHOR.	CHAIRMAN.	PLACE OF MEETING.
1894				
Mar. 13	"Mechanical Appliances for the Shipment of Coal"	Mr. S. W. Allen ...	Prof. A. C. Elliott, D.Sc. (President)	University College, Cardiff.
April 3	"Damage Surveys" ... ..	Mr. M. W. Aisbitt	Mr. David Gibson (Vice-President)	" "
June 2	Visit to Chepstow and Tintern. Paper on "Brunel, Railway and Marine Engineer"	Prof. A. C. Elliott, (President) [D.Sc.	" "	" "
July 7	Channel Trip to Porlock. Paper on "Marine Engineering"	Mr. John McCallum	Prof. A. C. Elliott, D.Sc. (President)	" "
Oct. 13	Fourth Annual Dinner ... ..	... ..	" "	Royal Hotel, Cardiff.
Nov. 16	"Raising Wrecks and Sunken Vessels"	Mr. T. W. Wailes...	" "	University College, Cardiff.
Dec. 12	Discussion on ditto ... ..	... ..	" "	" "
„ 18	Business Meeting ... ..	... ..	" "	" "
1895				
Jan. 16	"The Commercial Speed of Steamships"	Mr. J. D. Young ...	" "	" "
Feb. 13	"The Structural Weakness of Steamers"	Mr. John McCallum	" "	" "
„ 27	Discussion on ditto ... ..	... ..	" "	" "

Mr. GRIFFITHS (Honorary Local Secretary) having been unable to attend the meeting, the First Annual Report of the Southampton Centre was also read as follows:—

## INSTITUTE OF MARINE ENGINEERS INCORPORATED.

---

### SOUTHAMPTON CENTRE.

*President* — MR. C. S. DUSAUTOY, R.N.R.

## FIRST ANNUAL REPORT.

This centre was formally opened by a dinner on May 12th, 1894, held in the Masonic Hall, Albion Place, when W. H. White, Esq., C.B., occupied the Chair. A full report of the proceedings at same is attached hereto.

The first meeting for the reading and discussion of papers was held on May 24th, and the second on June 7th, in the Hartley Council Chamber, after which the session was adjourned till November. During the interval, the negotiations which had been going on for the use of the Art Society's Rooms, in Maryland Place, were, through the assistance of Mr. John Dixon, brought to a satisfactory termination; arrangements were then made for the Southampton Centre of the Institute to have the use of these rooms, situated in the most central part of the town, for a period of six months, from November to May in each year, at a reasonable rent.

The rooms were furnished and opened for the use of the Centre on November 23rd, and meetings have been held there regularly since that date. The Committee are now busily engaged in the founding of a Scientific

Reference Library, a fund having been started for that purpose. Mr. L. Steele, Hon. Treasurer of the fund, has already collected nearly £20, and the first instalment of books will shortly be purchased, after which the rooms will be opened each evening for the convenience of members.

Mr. J. R. Cowell, the Hon. Treasurer of the Centre, having on May 23rd resigned—on account of his leaving Southampton—Mr. R. Mackintosh was, on June 7th, elected by the Committee to fill that position, and at the same time Mr. F. S. Boothroyd was elected to fill the place on Committee, vacated by Mr. McIntosh.

The total membership specially attached to the Centre is now 93, composed as follows:—

Members .. ..	67	Hon. Members	4
Associate Members	21	Associates ..	1

The Local Committee is composed of the following gentlemen:—

*President* : C. S. DUSAUTOY, ESQ., R.N.R.

*Vice-President* : A. J. DAY, ESQ.

*Hon. Treasurer* : MR. R. MACKINTOSH.

*Hon. Secretary* : MR. J. GRIFFITHS.

*Hon. Treasurer, Library Fund* : MR. L. STEELE, R.N.

*Members of Committee :*

Messrs. F. S. BOOTHROYD, A. BROWN, R. W. COOMBER,  
and C. W. MURRAY.

JNO. GRIFFITHS,

*Hon. Secretary, Southampton Centre.*

# INSTITUTE OF MARINE ENGINEERS. SOUTHAMPTON CENTRE.

MEETINGS HELD DURING SESSION 1894—5.

DATE.	PLACE OF MEETING.	SUBJECT.	AUTHOR.	CHAIRMAN.
1894				
May 12	Masonic Hall.. ..	Inaugural Dinner .. ..	.. .. .	W. H. White, Esq., C.B., LL.D. (Past President)
,, 24	Hartley Institute (Council Room)	Mechanical Shipment of Coal ..	Mr. S. W. Allen (Member)	C. S. Dusautoy, Esq., R.N.R. (Local President)
June 7	Hartley Institute (Council Room)	Damage Surveys .. ..	Mr. M. W. Aisbitt (Member)	,,
Nov. 23	Art Society's Gallery	Stability (Part 1) .. ..	Mr. J. A. Rowe (Vice-President)	,,
Dec. 6	,, .. ..	,, (Part 2) .. ..	,,	,,
,, 13	,, .. ..	Commercial Speed of Steamships	Mr. J. D. Young (Member)	,,
1895				
Jan. 10	,, .. ..	Raising Sunken Vessels .. ..	Mr. T. W. Wailes (Member)	,,
,, 24	,, .. ..	Discussion—Sunken Vessels ..	,,	,,

JNO. GRIFFITHS, *Hon. Local Secretary.*

Mr. R. LESLIE (Hon. Treasurer) having been called upon, said, that in submitting the Financial Statement and Balance Sheet, he believed that the manner in which the details of the expenditure had been shown, would meet with the views of the members, especially as the ordinary income showed an excess over the ordinary expenditure.

The outlay on the Premises had led to a draw upon the bank, but, considering the improvements which had been made in the building, the cost was well compensated for, and he had no doubt that the extra outlay would very soon be more than met by contributions from those who saw what had been done to the Premises.

The Accountants had checked the books, and had seen that the entries were properly made every quarter, and had also checked the Accounts and prepared the Balance Sheet now in the hands of the meeting.

The Auditors, Messrs. Blake and Martin, had also checked the vouchers on behalf of the members.



## REVENUE

Dr.	1st February, 1894, to		£ s. d.	£ s. d.
<b>To General Expenses—</b>				
Bank Charges ... ..	0	17	11	
Postages ... ..	18	2	5½	
Telegraph Address ... ..	1	1	0	
Billiard Table (taking down and refixing) ... ..	2	9	0	
Travelling Expenses... ..	2	0	6	
Medal Die, and Inscription ... ..	7	12	0	
Clerical Work ... ..	1	1	0	
Stationery and General Printing... ..	25	8	1	
Assistant Secretary's Salary ... ..	100	0	0	
Chartered Accountants' Fees ... ..	10	10	0	
				169 1 11½
<b>„ Rates, Taxes, Gas, &amp;c.—</b>				
Rates, Taxes ... ..	21	17	11	
Gas ... ..	11	17	11	
Water ... ..	4	2	0	
				37 17 10
<b>„ House Account—</b>				
Caretaker's Wages ... ..	54	12	0	
Coals ... ..	6	15	6	
Sundries ... ..	5	16	5	
				67 3 11
<b>„ Insurance ... ..</b>				1 7 3
<b>„ Advertisements ... ..</b>				17 6 0
<b>„ Depreciations—</b>				
On Furniture ... ..	12	10	8	
On Additions to Building ... ..	9	6	6	
				21 17 2
<b>„ Expenses Reading Room ... ..</b>				8 10 8
<b>„ Papers and Discussions—</b>				
Printing and Lithography ... ..	213	7	4	
Reporting ... ..	17	13	0	
Postages ... ..	22	8	2½	
Lantern and Screen ... ..	1	13	0	
				255 1 6½
<b>„ Drawing Class—</b>				
Expenses ... ..	11	8	6½	
Less Fees received ... ..	5	4	0	
				6 4 6½
<b>„ Recreation Section—</b>				
Expenses—Dinner ... ..	101	8	1½	
„ Conversatione ... ..	73	7	11½	
„ Annual Meeting ... ..	1	11	6	
„ Opening Extension ... ..	3	0	1½	
				179 7 8½
<b>„ Interest—</b>				
Denny Gold Medal ... ..	10	0	0	
On Bank Advance ... ..	1	13	11	
				11 13 11
<b>„ Bristol Channel Centre ... ..</b>				5 2 6
<b>„ Southampton Centre ... ..</b>				38 1 6
<b>„ Balance, excess of income ... ..</b>				214 12 10½
				£1,033 9 4½

We have examined and compared the Cash Books and Vouchers kept by the Honorary Treasurer, and find them to agree with the cash balance.

## ACCOUNT.

31st January, 1895.

Cr.

	£ s. d.	£ s. d.
By <b>Entrance Fees</b> —		
Members ... ..	124 5 0	
Associate Members ... ..	23 0 0	
Associates ... ..	6 5 0	
Graduates ... ..	4 0 0	
		157 10 0
„ <b>Subscriptions</b> —		
Members ... ..	696 1 5	
Associate Members ... ..	43 13 7	
Associates ... ..	21 7 5	
Graduates ... ..	6 3 1	
	767 5 6	
LESS <b>Subscriptions in Advance</b> —		
Members ... ..	£117 10 10	
Associate Members ... ..	6 3 9	
Associates ... ..	3 4 2	
Graduates ... ..	1 2 11	
	128 1 8	
By <b>General Revenue</b> —		639 3 10
Sale of Bye-Laws ... ..		0 4 0
„ <b>Donations</b> —		
Hon. Members ... ..	30 18 0	
Building Fund ... ..	26 16 0	
Library ... ..	2 10 4	
		60 4 4
„ <b>Transactions Section</b> —		
Sale of Papers (Bound Volumes)...		5 14 8½
„ <b>Recreation Section</b> —		
Sale Dinner Tickets ... ..	68 0 0	
„ Conversazione Tickets ... ..	94 5 6	
Donations—Conversazione... ..	8 1 0	
„ Opening Extension of Premises ... ..	0 6 0	
		170 12 6

---



---

 £1,033 9 4½

JAMES BLAKE, }  
 T. G. MARTIN, } *Auditors.*  
 ROBT. LESLIE, *Honorary Treasurer.*

THE INSTITUTE OF MARINE ENGINEERS. (SESSION 1894-5.)

Balance Sheet, 31st January, 1895.

Liabilities.			Assets.		
	£	s. d.		£	s. d.
To Sundry Creditors	89	2 3	By Petty Cash in hand	0	4 0½
„ Denny Gold Medal, and Interest to date	271	13 4	„ Sundry Debtors	0	12 6
„ Subscriptions in advance, for Session 1895-6	128	1 8	„ Freehold of Institute Buildings, 58, Romford Road, at cost	1050	0 0
„ Bank Advance	182	5 8	„ Furniture, &c., at Institute—	£	s. d.
„ Revenue Account—Balance			Balance February 1st, 1894	247	3 7
February 1st, 1894	1160	17 11	Additions	3	10 3
ADD Excess of Income, 1894-5	214	12 10½			
	1375	10 9½		250	13 10
			LESS Depreciation 5 %	12	10 8
				238	3 2
			ADD Recent Additions	25	9 2
					263 12 4
			By Additions, Alterations, and Repairs to Institute Buildings—Balance Feb. 1st, 1894	111	6 11
			LESS Contingent Liability	17	17 0
				93	9 11
			LESS Depreciation, 10 %	9	6 6
				84	3 5
			ADD paid for Building Extension, &c.	647	1 7
					731 5 0
			By Insurance unexpired		0 19 10
					£2,046 13 8½
	£2046	13 8½			

We have examined the above Balance Sheet with the Books and Vouchers, and certify it to agree therewith. The Subscriptions in arrear have not been taken into credit in the above account. The recent additions to Furniture and to Institute Buildings have not been subjected to usual depreciation; but are taken into account at cost.

WALTER W. FEAST & Co.,  
6 & 8, Eastcheap, London, E.C.



The Reports having been read, exception was taken to the last clause of the Council's Report, and a lengthy discussion ensued on the subject introduced in the early part of the meeting. This was closed on a motion being passed for adjournment until after the interval noted on the programme, time having more than expired.

On the meeting being resumed, with a much reduced attendance, the controversy was renewed, Mr. J. R. RUTHVEN, seconded by Mr. W. GARDINER, moved that the Reports, as submitted, be adopted, and printed in the transactions. Mr. J. M. GRAY, seconded by Mr. J. D. CHURCHILL, moved an amendment to the effect that the Reports be adopted, with exception of the last clause in the Report read by the Honorary Secretary, and that the following clause be substituted for it:—

That it be stated in the Report, that at the adjourned Annual Meeting held on 13th April, 1894, it was resolved, practically unanimously, that the Council be instructed to carry out in their entirety, the recommendations of the Finance Committee, as amended by the Council, and adopted at that meeting, and that the Report be herewith adopted.

It was protested that the Amendment sought to deal arbitrarily with a matter which traversed the ground to be gone over at the adjourned meeting already decided upon, and such being the case, it was unbusinesslike to force the question now. After further controversy, the Chairman ruled by show of hands that the amendment was carried.

The SCRUTINEERS were then called upon to declare the results of their inspection of the voting

papers, and Mr. H. HAMMETT submitted the following:—

*President* : A. J. DURSTON, Esq., C.B.

*Honorary Treasurer* : MR. ROBERT LESLIE.

*Honorary Secretary* : MR. JAMES ADAMSON.

*Members of Council* :

MR. J. BLAKE.	MR. A. W. ROBERTSON.
„ J. BLELLOCH.	„ J. R. RUTHVEN.
„ A. CAMPBELL.	„ F. W. SHOREY.
„ G. W. NEWALL.	„ J. T. SMITH.

MR. W. WHITE.

*Honorary Minute Secretary* : MR. C. G. NEWBY.

In addition to those not retiring, viz:--

MR. J. M. GRAY.	MR. S. C. SAGE.
„ J. G. LATTA.	„ J. H. THOMSON.

A Vote of Thanks to SIR THOS. SUTHERLAND, the retiring President, proposed by Mr. W. C. ROBERTS, in brief and expressive terms, was seconded by Mr. C. A. CROOK, and carried by acclamation.

A Vote of Thanks to the Office-Bearers and Council was proposed by Mr. J. P. HALKETT, and seconded by Mr JAS. STARK.

The HONORARY SECRETARY responded, and said that the lateness of the hour precluded any further remarks.

Mr. W. C. WALKER proposed, and Mr. H. C. WILSON seconded a Vote of Thanks to the Auditors, MESSRS. J. BLAKE and T. G. MARTIN, who duly acknowledged the compliment.

Mr. J. T. SMITH proposed, and Mr. J. B. JOHNSTON seconded the appointment of two auditors for the following session, 1895-6.

The proceedings closed with a Vote of Thanks to the Chairman, proposed by Mr. W. WHITE.

On behalf of the Council,

JAS. ADAMSON,

*Hon. Secretary.*

# INSTITUTE OF MARINE ENGINEERS INCORPORATED.

SESSION



1895-6.

*President*: A. J. DURSTON, Esq., C.B.

---

At a Meeting of the New Council, held subsequently, the following appointments were made, to fill up vacancies created by Members who found themselves unable to accept or continue in office:—

Mr. JOHN ADAMSON.

Mr. C. L. E. MELSOM.

Mr. C. NOBLE.

The following Vice-Presidents were also elected:—

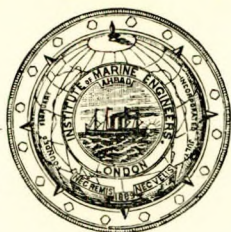
MR. R. ADAM, London.  
,, D. J. BRAND, Queensland.  
,, W. BROCK, Dumbarton.  
,, P. T. CAIRD, Greenock.  
,, P. DENNY, Jun., Dumbarton.  
,, J. G. DOBBIE, Calcutta.  
,, C.S. DU SAUTOY, Southampton.  
,, D. GIBSON, Cardiff  
,, Alderman G. W. KIDD, West  
Ham.

MR. W. H. NORTHCOTT, London.  
,, A. W. ROBERTSON, London.  
,, L. STEELE, R.N., Southampton.  
,, J. STEWART, Blackwall.  
,, A. W. SEABROOK, Bombay.  
,, A. THOMSON, London.  
,, F. W. WYMER, London.  
,, J. WEIR, Glasgow.  
,, W. W. WILSON, Bombay.

It was further decided by the Council, after discussing the question and deploring the circumstances which gave rise to the controversy, that no good end would be served by having an Adjourned Meeting, such as had been proposed at the Annual Meeting, it was therefore decided that no such meeting be held.

SESSION

1895-6.



Office Bearers

and Council.

**President :**

A. J. DURSTON, Esq., C.B., R.N.

**Past Presidents :**

MR. ASPLAN BELDAM. LORD KELVIN, P.R.S.  
MR. G. W. MANUEL. SIR W. H. WHITE, K.C.B., LL.D., F.R.S.  
MR. P. DENNY, LL.D., F.R.S.E.  
SIR THOS. SUTHERLAND, K.C.M.G., M.P.

**Vice-Presidents :**

MR. R. ADAM, <i>London.</i>	MR. W. H. NORTHCOTT, <i>London.</i>
„ D. J. BRAND, <i>Queensland.</i>	„ A. W. ROBERTSON, <i>London.</i>
„ W. BROCK, <i>Dumbarton.</i>	„ L. STEELE, R.N., <i>Southampton.</i>
„ P. T. CAIRD, <i>Greenock.</i>	„ J. STEWART, <i>Blackwall.</i>
„ P. DENNY, <i>Dumbarton.</i>	„ A. W. SEABROOK, <i>Bombay.</i>
„ J. G. DOBBIE, <i>Calcutta.</i>	„ A. THOMSON, <i>London.</i>
„ C. S. DU SAUTOY, <i>Southampton.</i>	„ F. W. WYMER, <i>London.</i>
„ D. GIBSON, <i>Cardiff.</i>	„ J. WEIR, <i>Glasgow.</i>
„ ALDERMAN G. W. KIDD, <i>West Ham.</i>	„ W. W. WILSON, <i>Bombay.</i>

**Hon. Treasurer :**

MR. R. LESLIE.

**Hon. Secretary :**

MR. JAS. ADAMSON.

**Members of Council :**

CHAIRMAN—MR. J. H. THOMSON.

MR. JOHN ADAMSON.	MR. C. NOBLE.
„ J. BLELLOCH.	„ J. R. RUTHVEN.
„ A. CAMPBELL.	„ F. W. SHOREY.
„ J. M. GRAY.	„ J. T. SMITH.
„ C. L. E. MELSON.	„ S. C. SAGE.
„ G. W. NEWALL.	„ W. WHITE.

**Hon. Minute Secretary :**

MR. C. G. NEWBY.

**Conveners of Committees :**

MR. JOHN ADAMSON— <i>Educational.</i>	MR. F. W. SHOREY— <i>Reading Room</i>
„ A. CAMPBELL— <i>Press Cuttings.</i>	„ J. T. SMITH— <i>Transactions.</i>
„ C. L. E. MELSON— <i>Recreation.</i>	„ J. H. THOMSON— <i>Property.</i>
„ J. R. RUTHVEN— <i>Papers and Discussions.</i>	„ W. WHITE— <i>Library.</i>

# INSTITUTE OF MARINE ENGINEERS INCORPORATED.

SESSION



1894-5.

*President :*

SIR THOS. SUTHERLAND, K.C.M.G., M.P.

---

## ANNUAL CONVERSAZIONE.

On Friday, January 4th, the Annual Conversazione in connection with the Institute of Marine Engineers was held in the Town Hall, Stratford, when a large number of members and friends assembled to justify the efforts made for their entertainment by the committee specially entrusted with the arrangements for the event. The large hall was decorated with bunting for the occasion, while in the window recesses, and on a few tables near the entrance, were arranged pictures, photographs, models, plants, and other interesting exhibits, giving the whole a very attractive and pleasing appearance.

The exhibits lent for the evening by various members and friends were very varied in their character, embracing articles useful and ornamental, and the thanks of the Institute, as well as the Committee, are due to all who kindly assisted in adding to the attractiveness of the Hall in this way.

The flag of the Institute, bearing the crest, occupied its usual place at the entrance to the Hall.

The Programme for the evening was as follows:—

## PART I.

Cornet Solo	“The Holy City”	.. .. .	Mr. J. H. TAYLOR.
Glee	“The long day closes”	{	Messrs. WILTSHIRE, H. SHARP.
		{	C. SHARP, and J. GILCHRIST.
Song	“The Valley by the Sea”	.. .. .	Miss MABEL ROWE.
Song	“Thy Sentinel am I”	.. .. .	Mr. FRANK FAIRN.
Song	“Angus Macdonald”	.. .. .	Miss ADELAIDE BROODBANK.
Song	“Close to the Threshold”	.. .. .	Mr. BLECKARN.
Song	“The Bonnie Banks o’ Loch Lomond”	.. .. .	Miss MABEL ROWE.
Song	“Remembrance”	.. .. .	Mr. FRANK FAIRN.
Song	“L’Ardita”	.. .. .	Miss ADELAIDE BROODBANK.
Cornet Solo	“Star of Bethlehem”	.. .. .	Mr. J. H. TAYLOR.

## PART II.

## Snowflake Minstrels.

Chorus	“Strike the Chords of Pleasure”	.. .. .	The TROUPE.
Song	“Come home again to mother”	.. .. .	Mr. W. HYDE.
Song (Comic)	“Hurrah, for the life of a Farmer”	.. .. .	Mr. HOGGER.
Song	“Stars of the Midnight”	.. .. .	Mr. COLE.
Song (Comic)	“Sally, with the Coal-black Eye”	.. .. .	Mr. POPE.
Song	“Beneath the Elm”	.. .. .	Mr. RIVITT.
Song (Comic)	“Dinah, she said Yah”	.. .. .	Mr. A. WILTSHIRE.
Song	“When little Nellie died”	.. .. .	Mr. J. S. GILCHRIST.
Song (Comic)	“The Chinese Parasol”	.. .. .	Mr. CLINKSCALES.
Chorus	“Good-Night”	.. .. .	The TROUPE.

Pianist - Miss MABEL WILTSHIRE.

The following was the Dance Programme.—

## PART I.

DANCES.	MUSIC.
1—Polka	Click, Clack.
2—Quadrille	Marguerite.
3—Valse	The Abbey.
4—Lancers	Ricketty, Racketty.
5—Schottische	Novelty.
6—Der Styrien	Original.
7—Marine Engineers’ Quadrille	Up-to-Date.
1st Fig.—5th Quadrille	
2nd .. —3rd Lancers.	
3rd .. —1st Quadrille.	
4th .. —Waltz Cotillion.	
5th .. —5th Lancers.	
8—Valse	Pennerosa.
9—Highland Schottische—	Black Watch.
10—Lancers	Songs of London.
	“AULD LANG SYNE.”

## PART II.

DANCES.	MUSIC.
11—Polka	Victoria.
12—Valse	Faust.
13—Quadrille	Christopher Columbus
14—Barn Dance	Boston Belle.
15—Lancers	Gaiety Girl.
16—Valse	Espagnole.
17—Schottische	Linger Longer Loo.
18—Alberts	Selected.
19—Polka	Novelty.
20—Valse & Galop—	Bid me Good-bye & Farewell.
	“GOD SAVE THE QUEEN.”

## RECREATION COMMITTEE.

Jas. Adamson.	W. White.
A. C. Campbell.	J. W. Richardson.
J. G. Hawthorn.	F. W. Shorey.
C. L. E. Melsom.	S. C. Sage.
J. Nicoll.	G. Wiltshire.
R. Leslie.	A. W. Robertson.
C. G. Newby.	J. H. Thomson.
W. J. Taylor.	J. T. Smith.
J. G. Latta— <i>Convener.</i>	

A. J. Durston, Esq., R.N. (the President elect) and party were present for a considerable portion of the evening.

The proceedings throughout were of a most enjoyable character, and it is a matter of congratulation that the *Conversazione* is maintaining its popularity.

---

 ANNUAL DINNER AT CARDIFF.

AN influential and very representative company assembled in the banqueting hall of the Royal Hotel, Cardiff, on Saturday night, the 13th October, 1894, on the occasion of the fourth annual dinner of the Bristol Channel Centre of the Institute of Marine Engineers. The chair was occupied by Professor A. C. Elliott, D.Sc., the president, upon whose right sat the Mayor of Cardiff (Councillor W. J. Trounce); Mr. John Gunn; Councillor T. H. Riches; Professor Tanner; Rev. J. Wordsworth; and Captain A. J. G. Chalmers, R. N. R. To the left of the President were Principal Viriamu Jones, University College of South Wales and Monmouthshire; Colonel C. H. Page, J. P.; Dr. C. T. Vachell, J. P.; Dr. T. G. Macormack, M.A., M.B., Newport; Mr. A. J. Stevens, President of the South Wales Institute of Engineers; and Mr. James Adamson, Honorary Secretary of the Institute from London. There were also present at the large gathering, Mr. J. B. Ferrier, President of the Cardiff Chamber of Commerce; Mr. W. R. Hawkins, Secretary of the Chamber; Mr. John Spence, Manager of the Tyneside Engineering Works,

Cardiff; Dr. J. Ll. Treharne; Mr. Ivor James, Registrar of University College; Captain Hansen; Mr. E. Handcock, Jun.; Mr. John Duncan, J.P.; Mr. A. K. Hamilton; Mons. Barbier; Mr. T. H. Sloggett, Board of Trade; Mr. M. W. Aisbitt; Mr. T. Widdas; Mr. S. W. Allen; Mr. T. A. Reed; Mr. J. C. Raven; Mr. Ivor G. Williams; Mr. J. Rule (Lloyds); Mr. George Hunter (Bute Docks Co.); Professor Hughes, F.R.C.S.; Mr. J. Jordan, Newport; Mr. J. Fleming; and Mr. A. E. Mills, Bristol; Mr. L. G. Lawrie; Mr. W. Simpson; Mr. J. Brock; Mr. A. Mitchell, R.N.R.; Mr. T. Lowden; Mr. J. Lowden; Mr. D. W. Stephen (Board of Trade); Mr. E. Nicholls, R.N.R.; Mr. S. Parfitt; Mr. C. Massey; Mr. J. Pattison; Mr. J. Shotton; Mr. Sidney F. Walker; and Messrs. Charles Watson, J. Heslop, W. C. Brown, and J. Bond, Swansea; and the following office-bearers of the Centre:—Mr. D. Gibson, Vice-President; Messrs. R. Davison, James Ferrier, R. J. Field, John McCallum, Jos. Williams, and E. John; Members of Committee: Mr. Charles L. Ryder, Honorary Treasurer; Mr. George Sloggett, Honorary Secretary.

Letters of apology for non-attendance had been received from Lord Bute, Lord Windsor, Lord Tredegar, Lord Aberdare, Sir Thomas Sutherland, K.C.M.G., M.P., President of the Institute; Lord Kelvin; Dr. Denny; Dr. W. H. White, C.B.; Mr. Manuel; Sir William Lewis; Sir Morgan Morgan; Colonel Sir Edward Hill, M.P.; the Bishop of Llandaff; Major-General Lee, the President and Secretary of the Southampton Centre. Mr. J. H. Hallett; Mr. Macfarlane Gray; and Mr. Archibald Hood, Past-President of South Wales Institute of Engineers. Sir Edward J. Reed, K.C.B., M.P., wrote:—

“ BROADWAY CHAMBERS,  
WESTMINSTER, S.W.  
October 12th, 1894.

DEAR MR. SLOGGETT,

I have been keeping all my engagements so as to get to Cardiff to-morrow; but I am sorry to say I have



been summoned into the country in a different direction for the purpose of seeing, on an important matter, a friend, who seems to be so near death that I am taking the next express train in order to reach him as quickly as possible. Under these circumstances, I have little hope of being able to reach Cardiff to-morrow evening. I sincerely regret this, as I have looked forward with much anticipation of the pleasure of meeting to-morrow those many friends among the local marine engineers who have invariably shown to me the greatest consideration and kindness. My regret is, perhaps, somewhat lessened by the circumstance, that I hope, certainly, to be in Cardiff next month for some days on mercantile marine matters, and may then have an opportunity of meeting at least some of your friends and mine. Kindly make my excuses to Professor Elliott, whom I should have been so pleased to support on what I have no doubt will be an extremely pleasant and happy occasion. I am scratching a line to my great friend Colonel Page, whose kind hospitality I was to have enjoyed, and who will, I doubt not, well supply my place, and my share of the response which, with him, I was to have made to one of the toasts. Much regretting my absence, and with renewed expression of my extreme regret.

I remain, dear Mr. Sloggett,

Yours very truly,

G. Sloggett, Esq.,

E. J. REED.

35, Stacey Road,

Cardiff.

The foregoing, and other letters were read by Mr. Sloggett, who also read a congratulatory telegram from members assembled at the Institute premises, London, namely:—“London members assembled Institute premises offer congratulations to the members of the Bristol Channel Centre, wishing them a pleasant evening and continued success.”

The PRESIDENT having submitted the customary loyal toast, MR. DAVID GIBSON, Vice-President, gave

“The Navy, Army, and Reserve Forces,” showing how closely allied marine engineers were to the Navy, our first line of Imperial defence.—COLONEL PAGE responded, and urged all employers of labour to assist their *employés* to put in drills as volunteers and to attend the annual inspection.

DR. T. G. MACORMACK M.A., M.B., proposed—“The Institute of Marine Engineers.” He said the medical profession owed much to the engineering profession in having lent to them a metaphor which supplied them on many important occasions with an answer to some of their chief problems. The best way a physician could look upon the human body was as a machine; and in this sense, if in no other, the two professions were somewhat allied, and he was somewhat justified in proposing this toast. (Laughter and applause.) No one held the profession of the marine engineer in greater esteem than he. Members of the Bristol Channel Centre knew that their president, Dr. Elliott, was his great friend; and he had taught him to appreciate not only marine engineering, but engineering in all its departments. Through Dr. Elliott’s kindness, and the courtesy of the members, he had been present at nearly all their excursions, and had the pleasure of listening to the learned disquisitions upon subjects peculiar to their profession; and he had learned to respect them as individuals, and as an Institute. (Applause.) He hoped the Institute would long continue a great factor in the world’s civilisation. There could be no doubt that engineers were the most important class in forwarding our great modern civilization. Their president once told them that the advances made in the construction of marine engines were something like 15 per cent. ahead of any other department of engineering. The Institute of Marine Engineers would not only help on civilization, but would enable engineers to realise their own importance, and help them to go forward to do better work. They were moving on better lines than their predecessors did. He was justified in saying this by the perusal of the proceedings of the London Institute,

in which he read the speech of Dr. Denny, of Dumbarton, who told the gentlemen present that in 1867, when the compound engine was being talked about, he asked Mr. Randolph, of Glasgow, the builder, for particulars respecting it, and the answer he received was—"Go and find out for yourself and pay for it." The foundation of the Institute of Marine Engineers had made it impossible for such an answer to be made nowadays. Gentlemen, the toast is "The Institute of Marine Engineers," coupled with the names of Dr. Elliott, the President of the Bristol Channel Centre, and of Mr. Jas. Adamson, the Honorary Secretary of the Institute. (Hear, hear, and applause.)

THE PRESIDENT, who was received with cheers, said that he was glad to see that the honorary secretary and one of the founders of the Institute honored them with his presence—(applause)—and while he would leave Mr. Adamson to reply for the Institute at large, he himself proposed to say a few words as to the Bristol Channel Centre. That gathering was an unmistakable indication that the Centre was active and flourishing. (Applause.) It possessed one feature which made it especially dear to him, and that was, it was the first branch of a professional society. He believed this principle would be the salvation of the Institute. (Hear, hear, and applause.) Let them consider for one moment what was the present state of their professional and learned societies. They were almost all located in London, and provincial members had the greatest difficulty in attending the meetings, and could only read discussions in which they had had no opportunity of taking part. The result might be to split up all the societies and create a number of local societies which, of necessity, would be small and uninfluential. The Marine Engineers had solved the problem by the method of centres. (Applause.) Seven or eight years ago he advocated this method with regard to the Institute of Electrical Engineers, along with a friend of his, who had since become a prominent electrical engineer in London. They were derided; they were

told they were proposing Home Rule, and the result would be wreck and ruin. (Laughter.) These fears had not been realised; and in proof of the unwisdom of the Institute of Electrical Engineers he could cite the fact that a local society had originated in the North of England, calling itself the North of England Society of Electrical Engineers, which was divorced and separated from the parent Institution. The object of these Centre meetings was self-evident. It was to bring men face to face, to discuss the affairs of life in a way that could not be done by correspondence or by reading discussions taken part in by other people. There was not the slightest doubt in his mind that the oldest of the learned societies would be forced to take up this method of renovating its wasting energies, because wasting they were. (Hear, hear.) Lord Kelvin said the other day, at a meeting of the Institute of Mechanical Engineers, that he was proud of the constitution of the Royal Society, and he recognised that the Institute of Mechanical Engineers was one of the most powerful—next to the Institute of Civil Engineers—societies in the world. Well, it had been forced, in a sense, to take up this question of centres, since this Bristol Channel Centre was established. Glasgow was its best centre; and he was present at one of its meetings the other day. The president was the chief engineer of the Caledonian Railway Company, and one of those who read a paper was a student, but those who took part were responsible engineers. This was convincing proof that they would be forced to follow the lead of the Bristol Channel Centre of the Institute of Marine Engineers. (Applause.) That lead had already been followed in their own Institute by the Southampton Centre, and by a centre at Bombay; and he looked forward to the time when these centres would be spread all over the world, when every marine engineer would be welcomed at every port he called at by his brethren in parliament assembled to discuss matters connected with his profession. (Loud applause.) He (the president) could say a great deal with regard to the advantages to be derived from these meetings from personal contact, but he would now conclude.

MR. JAMES ADAMSON, Honorary Secretary of the Institute, met with a cordial reception on rising to respond also to the toast. He said it was always a pleasant duty to acknowledge one's indebtedness to friends in the giving of thanks for kindnesses received, and when the rites of hospitality were exercised along with the graces of courtesy, the duty was more than pleasant. The duty entrusted to him exceeded even the more than pleasant. He had to acknowledge indebtedness for kindnesses received, to admire the graces in their exercise, and to express the sensation of gratified—should he say fatherly?—pride on behalf of the Institute of Marine Engineers, when he saw around him the congenial elements of success which were attending the efforts put forth by the Bristol Channel Centre. (Applause.) The birth throes were over, the critical period was passed, and the Centre had been firmly established to walk forward without stick or crutch. For this result, great and many thanks were due to the Senatus of the University College, and they acknowledged their indebtedness with a pleasure and satisfaction due to the very nature of the service rendered in the interests of those branches of science they were more directly concerned with. (Applause.) The courtesy exercised by many of the leading citizens of Cardiff in respect to the establishment of the Institute, and especially the Bristol Channel Centre, added to the pleasure experienced on such an occasion as this, and here, if at any time, he would admit the definition of gratitude as a lively sense of favours to be received—(Laughter.)—knowing that what Cardiff and its citizens did for the Bristol Channel Centre of the Institute would go towards advancing the ever-rising tide of its own prosperity. (Applause.) He thanked them for the reception accorded to the toast of the Institute. Having been directly interested and present at the first pulsations in the heart of the parent, as well as of the child—or children, Southampton being one—he could not but consider that the blood which was instilled into the veins of the Institute through its constitution by those who brought it into being, was sound and healthy

when he saw such results around them. (Applause.) He congratulated the office-bearers of the Bristol Channel Centre on the success which had attended their efforts. Let the members remember that every advance and every success cost more than money, and more than money could purchase, and give their office bearers the utmost confidence and individual effort. (Hear, hear.) If Sir Edward Reed had been present he would doubtless have referred to the Royal Naval Reserve. Since he (Mr. Adamson) came into the room, it had been remarked to him that the Royal Naval Reserve engineers were not treated as they ought to be. They knew that Sir Edward Reed had advocated in Parliament their claims and position, and that he had a warm interest in the matter. They ought to do their utmost to strengthen his hands—(applause)—so that he might be able to establish a better order of things. If their position was improved and advanced, that of the marine engineers of the Royal Navy would be advanced, inasmuch as the advancement of the one implied the advancement, most emphatically, of the other. (Applause.) Continuing, Mr. Adamson said he was very much at one with Dr. Elliott in his views upon the value of Centres, and remarked that while the Doctor had opposition in connection with the Electrical Engineers, he had none in the Institute of Marine Engineers. He (the speaker) held very strongly that the establishment of centres on the same lines as the Bristol Channel Centre, the Southampton, and now the Calcutta and Bombay Centres, was a step in the right direction; and he quite agreed with him that the older institutions might take a leaf out of their book in this respect. (Applause.) It was a great pity that London should monopolise these institutions; and he had always, from the commencement of the Institute, urged very strongly that the Institute of Marine Engineers should take a departure and establish Centres wherever there was a sufficient number of members gathered together. (Applause.) Cardiff could not do better than do all in its power to advance the interests of the Bristol Channel Centre; and he hoped that

at their next annual dinner it would be found that Cardiff had taken so much interest in the Institute of Marine Engineers that the Bristol Channel Centre would have a dining hall of its own. (Laughter and Applause.)

PROFESSOR TANNER proposed "The Port and Trade of Cardiff."

In first responding to the toast, THE MAYOR of Cardiff said there was one cheering feature in connection with the progress of the port, and that was, it was not progressing to the detriment or loss of its neighbouring ports. During the past year Newport had progressed still more rapidly than Cardiff had done.

CAPTAIN POMEROY, Dockmaster, Cardiff, also responded. He referred to the work of the marine engineer, which he said had knit together the colonies of this great empire, and assured its naval and commercial ascendancy. As long as coal was required to generate steam to drive the palaces of the ocean, there could be scarcely any limit to the magnitude and prosperity of Cardiff, which was appropriately the mother of Centres of the Institute of Marine Engineers. (Applause).

CAPTAIN W. J. G. CHALMERS, R.N.R., proposed "The University College of South Wales and Monmouthshire, and Technical Education." He spoke in warmly appreciative terms of the policy of the college authorities, who, he observed, had created a medical school which promised to become one of the strongest in the country, and an engineering department second to none in the Kingdom. (Applause.) A commercial community required a little leaven to lift its aspirations to a higher and broader level; and this had been done by the splendid scheme of technical education, of which the University College of South Wales was so conspicuous an exponent. One of our best known poets in drawing a picture of the future of the world, spoke of science as the pioneer of the enlightenment of the world;

of the steamship and the railway as synonymous with the march of the human mind, and so on, until he reached the splendid climax—

“Till the war drum throbs no longer, and the battle flag is furled,

In the parliament of man, the federation of the world.”

(Applause.) The University College of South Wales allowed the Bristol Channel Centre the privilege of assembling within its walls; it gave it a *locus habitendi* which lent dignity to its deliberations, and influence to its pronouncements; and when they considered that these deliberations and pronouncements must of necessity make for the enlightenment and better progress of the world, they could not thank and esteem that noble institution too highly. Bearing this in mind, he was sure the governing body of the University College would go on in its good work

Not in vain the distant beacons;

Forward! Forward, let us range;

Let the great world spin for ever

Down the ringing grooves of change.

PRINCIPAL VIRIAMU JONES, F.R.S., acknowledged the toast. He rejoiced greatly at the close connection which had been established between the University College and the Bristol Channel Centre. He was proud to think that their president was Professor Elliott—(applause)—under whose guidance the engineering department of the College was being developed. He was more than delighted, too, that it was possible for the College authorities, with their building crowded both in the day and the evening with students, to at least find accommodation for the meetings of the Bristol Channel Centre. (Applause.) He further rejoiced that they had an engineering department in which those sciences were taught that laid the foundation of the practice of their profession, and taught to a very considerable number of students. He saw that the report of the National Association for the Promotion of Technical Education, said that Wales had done very



little towards developing a system of technical education. That really meant that the National Society was very ignorant in regard to the subject about which it professed to speak, because, he ventured to say, that the system of technical education which had been developed in that part of Wales which most needed it, namely, Glamorganshire, Monmouthshire, and Cardiff, would challenge comparison with any system which had been put in force anywhere else in the United Kingdom. (Applause.) If they had finer buildings in which to educate their students, he ventured to say it would challenge comparison with what was being done in any part of the world. (Renewed applause.)

COUNCILLOR T. H. RICHES, M. Inst. C. E., also responded. He pointed out that they had 2,700 students in their technical schools, and they had also, connected with the University, a higher technical department which embraced a very considerable number of advanced students. There was a larger number of engineering scholarships established in this higher technical department for the advanced students of the technical schools, thus placing within the reach of the poorest child the advantages of a higher technical, and, indeed, practically a University education. (Applause). Every citizen in the counties of Glamorganshire and Monmouthshire, and the County borough of Cardiff, had the privilege of sending his sons to this higher technical department at a very much reduced rate of fees. (Hear, hear.) The engineering school of which their president was the distinguished head, had made a very substantial start; and within a very few weeks there would be located in the University College premises at Cardiff, by the assistance of the Technical Instruction Committee, the best testing machine that existed in the whole world. (Applause.) It would be at work in a month, when he invited them to come and see for themselves what facilities it afforded for the instruction necessary to a thorough knowledge of the capabilities of the materials used in the various industries which they more or less controlled. (Applause.)

DR. C. T. VACHELL, M.D., proposed "The Shipping Interest."

MR. J. B. FERRIER, President Cardiff Chamber of Commerce, first responded, and referred to the depressed condition of that industry.

MR. JOHN GUNN followed. He said if he were to depend for a living upon shipping, he should have no "living wage." (Laughter.) They sometimes heard shipowners denounced because they were not more generous in their payments, but there was another side to the picture. There were many thousands of investors who had invested scores and hundreds of pounds who did not receive one brass farthing of interest. Not only did they receive no "living wage," but they got no interest on their investments whatever. (Hear, hear.) No one would rejoice more than he if they were able to pay better wages and claim the services of much better men than were frequently put on board their ships. (Hear, hear.) He could not, however, for a moment sympathise with those shipowners who sought to remedy their grievances by transferring their ships to a foreign flag. Those who did this were not worthy of the name of Britons. (Applause.) Whatever their differences and complaints, let them deal with them as British subjects, and fight them out on their own ground. (Hear, hear.) He knew and recognised that there had been legislation and proposed legislation, and immense vexations issuing from their central office, the Board of Trade—(hear, hear)—but they ought, as men, to combine together and make their complaints known and felt, when, he was convinced, there was sufficient fairness and justice in the country to see that the great British shipping industry had fair play. (Applause.) The modern engineer was the most important equipment of the ship; and he required to be thoroughly trained not only technically, but should also possess capacity to deal with others, and be a man of such character as to command the respect of his fellows, and to work harmoniously with the captain. There could be but

one chief of a vessel, but there ought to be a clear and recognised position for the man upon whom the success of the voyage, and the safeguarding of the ship so much depended. (Applause.) His status must be recognised; all must recognise the importance of the man who directed and controlled, and guided the destiny of the immense property, which, irrespective of the commands from the bridge, was so largely dependent upon his trained skill. (Applause).

MR. SYDNEY WALKER (Member) proposed "Our Guests," and MR. EDMUND HANDCOCK, Junior, acknowledged the toast.

The health of the President was submitted by MR. T. W. WAILES (Member), who cited an instance of the usefulness of the technical school, in which the drawings of a youth in his workshops, casually submitted to him, were so good that he passed them as working drawings at the establishment. The toast was drunk with enthusiasm.

THE PRESIDENT, in response, reminded his hearers of a paper which Mr. Wailes proposed to read on "The Salvage of Ships." Continuing, he said, he had omitted to state in his previous remarks that the Bristol Channel Centre worked in the most amicable way with the parent institution in London. (Applause.) They had never had anything in the nature of friction, and had never talked of disassociation for one single moment. On the contrary, their relations with London were strengthened. He knew men who would never have appeared at the London headquarters, if it had not been for the machinery existing in Cardiff. He had known numbers of Cardiff men taking part in a very good debate, presided over by the chief constructor to the Admiralty. (Applause).

The completely successful proceedings then concluded.

GEORGE SLOGGETT,

*Honorary Secretary,*

*Bristol Channel Centre.*

**BRISTOL CHANNEL CENTRE**

**VISIT TO CHEPSTOW AND TINTERN.**

On the afternoon of Saturday, 2nd June, 1894, the Members of the Bristol Channel Centre, with some friends, visited the interesting districts of Chepstow and Tintern. Proceeding from Cardiff by rail in a reserved saloon carriage, and taking up a detachment of members at Newport, the party arrived at Chepstow, inspected the iron railway bridge constructed by Brunel across the River Wye, and then proceeded to Chepstow Castle. After being conducted through the fine old ruins the members assembled in a marquee specially erected in the Castle grounds for the occasion. Here Mr. David Gibson presided, while Professor A. C. Elliot, D.Sc., President of the Centre, read the following paper:—

**ISAMBARD KINGDOM BRUNEL (RAILWAY AND MARINE  
ENGINEER): A THUMB-NAIL SKETCH.**

The nineteenth century dawned darkly in Europe on the most terrific and protracted of all the bloody struggles wherein the British nation has yet been involved. Never was the strain on men, money, and energy so intense; never was internal stress—born of levellers, Napoleonic worshippers, and the craven crowd produced by starvation—more dangerous and more difficult to gauge and control. In the grey of the breaking light Nelson had gone aloft; but British men were undismayed because they knew as he knew that his work was done. Still surged the struggle for life for all till eight bells of the morning watch, when the sun burst forth and the darkness flew away as the hero of a hundred fights steered the Ship of State through and beyond the black breakers of the seething straits of Waterloo. Strong men breathed again, and the weak, the women and the children wept for joy, and for the fallen. And the cry in the land was for bread and for work.

Peace and security guaranteed, as it seemed for ever, produced the natural reaction. Interest in industry—which is the generic name for the arts that produce the real wealth, happiness, health, strength, and the fighting powers of nations—revived as by miracle, displaying thereby the full meaning of the award of the Great Arbitrator. Asks and answers Victor Hugo: “Did Wellington defeat Napoleon?” No. Did Blucher defeat Napoleon? No. God defeated Napoleon.” Victor Hugo exhibits his keenness, as usual, and, as usual, his lack of discernment. The question why? he neither asks nor answers. Actual fact is a sufficient commentary. The Director of Destiny preserved unbroken the spirit and the power of that nation, among all others the most devoted to the mechanical arts: the nation, that is, which had sent forth in its beginnings and infancy the steam engine; and the nation which should in due time produce the railway, the railway locomotive, and an innumerable fleet of iron or steel steamers to track all the waters of the earth. He who by study of the records of the past has reached the belief that, on the average, man has made from remote ages steady progress in the acquisition of power over the potential forces of nature, and in appreciation of the true nobility of the call to live and work, cannot mistake the deliverance of that Sunday afternoon. The nation of workers—even of shopkeepers—is not the nation of slaves: rather in a free country is it the nation of kings (literally strong men). Let us think: if I forget thee (my country) let my right hand forget her cunning. Thus sang the Hebrew poet, king, and strong man. There is no mistake possible in the conclusion: racial pre-eminence is a question of the cultivation of the mechanical arts. Even the final arbitrament—war—has become part and parcel of mechanical engineering.

The great awakening of industrial enterprise in this country during the first quarter of the present century is a thing without parallel of any sort. A transformation scene on a scale of a mile to the mile was enacted. The Engineer assumed the dictatorship of the country's policy: the Duke of Wellington became his Prime Minister.

The engineer was not one, but many: there were the Stephensons, Brunels, and Trevethicks, fathers and sons; the brothers Rennie, Watt, Telford, Fairbairn, and amongst the younger men Vignoles, Gooch and Crampton.

The Stephensons and the Brunels form a strange parallel, and a strange contrast: the fathers were born within a few years of 1775, and died, one in 1848, and the other in 1849; the sons died in the same year, 1859, and though George Stephenson's life was actually comprised within the span of Sir Marc Isambard Brunel's, yet the younger Brunel was the younger Stephenson's junior by three years. The fathers had little in common and probably never met; from first to last, George Stephenson was the rough-cut diamond, and Sir M. I. Brunel was the polished gentlemen—a friend, no doubt, of Joseph Bramah, and of Henry Maudslay, but that in a strictly professional way. The sons were quite different, and the closest of friends. Isambard Kingdom Brunel inherited his mother's gentle, calm, and purely English disposition; mechanical instinct, and the passion for originality he caught from his father. In the whole history of engineering, so far as it has gone, there is probably no more remarkable scene to picture than that of I. K. Brunel standing at Robert Stephenson's right hand during the hoisting of the tubes of the Britannia bridge, and Robert Stephenson assisting Brunel at the launch of the "Great Eastern"; and all that seems so noble and so queer, because the younger Stephenson and the younger Brunel always appeared before the public and Parliamentary committees as inveterate enemies. Before leaving the subject of the parallel or contrast (being something of both) between these two, it may be remarked that Robert Stephenson's personal popularity was unbounded, whereas Brunel raised troops of bitter enemies, the rancour of whose enmity survives to this day. On the other hand, Stephenson's political career, though well understood and fairly judged in his life-time, has on many an occasion drawn down upon his reputation

shafts poisoned by party venom. Brunel's father fled France to save his life: neither father nor son touched British politics.

It is already clear that I. K. Brunel was an only son. Though educated in Paris he "remained an English-man." On his return to England, after undergoing what would seem to have been to him the drudgery of school, he started on the Thames Tunnel as an assistant to his father. What sort of work this was may be gathered from a terse phrase of Rankine: in his *Civil Engineering* he heads a description of this extraordinary enterprise 'Tunnelling in mud.' The risk, disasters, the final triumph of skill, and the cost are written at length in history. Suffice it to say that on more than one occasion young Brunel did deeds of daring, and once all but lost his life. In this dark and dangerous school he intensified and developed the readiness of resource and tenacity of purpose which became the principal characteristics of his professional career.

The first iron bridge in the world was erected over the Severn at Coalbrookdale, by Abraham Darby: a semicircular cast iron arch of 100 ft span. The English Thomas Pain—French and American revolutionary and religious controversialist—is usually credited with the design of the cast iron bridge at Wearmouth, completed in 1796. In one way this is correct, and, in another, quite wrong. Rowland Burdon was the engineer, but there is reason to believe that the design was modelled after an experimental bridge built by Pain and exhibited in London about 1788, which bridge was sold when Pain became bankrupt shortly afterwards. A considerable number of cast iron bridges—some, for example, like Telford's Southwark bridge (1819) of larger dimensions—had been built before the advent of the great railway construction period, when their erection became an every-day occurrence. Within the last ten years the use of cast iron for under railway bridges has been prohibited by the powers vested in the Board of Trade.

Bridges of great antiquity on the suspension principle are to be found in China; but the first European chain bridge was erected over the Tees near Middleton, about 1741, and others of course followed. At the beginning of the century the subject had attracted much attention amongst engineers, both in this country and in France. Captain Brown patented the long link chain in 1817, and he, with many contemporaries proclaimed the suspension bridge the long span bridge of the future. Telford, driven from his original proposal of cast iron arches by the conservers of the shipping interest, adopted the principle for the Menai bridge (1819-1826) 580 ft. span; he was immediately followed by Sir Marc I. Brunel with the Ile de Bourbon bridges, and by many others. The suspension bridge for long spans held the field undisputed till 1850.

Young Brunel's first independent start in life was made in 1831, when at the age of 25, he found himself, after a severe competition with the veteran Telford, engineer for the proposed Clifton suspension bridge. He sent in not one plan but several, the best of which were so bold that success was only achieved by toning down from 1180 ft. span to 600 ft.—a little over the Menai span which Telford declared could not safely be exceeded. The erection had not long begun, when the works came to a standstill for want of funds. After Brunel's death a company was formed to complete the undertaking, and at the same time to secure a sort of tribute to his memory. The proposal was to purchase and erect at Clifton the Hungerford bridge (designed by Brunel in 1841) then about to be removed to make way for the Charing Cross bridge of Sir T. Hawkshaw. The magnificently picturesque structure we know so well is the result.

From the inception of the G.W.R. in July 1833, till his last watch was called in November, 1859, Brunel was chief engineer. The first Bill introduced in 1834 passed the Commons supported, amongst others by Daniel O'Connell and Mr. Labouchere, afterwards



Lord Taunton; but it was lost in the Lords. Next session the Bill was again introduced, and after a stiff fight passed both Houses. \*It is interesting to note that in Committee George Stephenson gave evidence in favour of Brunel for the first and last time.

Brunel early apprehended the significance of gauge, and foreseeing the possibilities of railway speeds far beyond the narrow limits set by the ideas of the time, he rejected the tram-road precedent of Stephenson—certainly a bold step for a young engineer of seven-and-twenty. By 1838 the line was opened from Paddington as far as Maidenhead. Speeds of 40 miles per hour were immediately obtained with trains of then considerable mass: the narrow gauge performances were thrown into the shade despite the prophets of failure; and so far success was assured. Brunel's gauge of 7 ft. was fixed exactly, by a consideration to which he himself did not long attach importance—the placing of the wheels outside the frames; but his main contention was unquestionably correct; namely, that the wider the gauge of a railway the greater must be its speed capacity. Farther, that in this view the 4 ft. 8½ in. gauge was too narrow for the probable future requirements of this country. For years the Great Western led the way in speed, both in fancy record and every day performance; the fame of the *Flying Dutchman* flew on the four winds of heaven; and the names of Brunel and Gooch were other words for lightning. But the narrow gauge lines had ramified North, East, and South, with all the feverish rapidity that the railway mania lent them. The Great Western, compelled to close quarters, first met the narrow gauge projectors in fierce fight on the Oxford to Rugby extension, and then rose up the horrors of a “break of gauge.” The *mixed* gauge was the result. Slowly, but surely, the third rail rent the broad gauge in twain. Burdened everywhere by the weight of narrow gauge connections, the Great Western directors instituted a policy of starvation, designed

---

\* This, and some of the preceding paragraphs, are quoted from an article by the author which appeared in the *National Observer*.

to eventually induce complete paralysis of the building of new broad gauge engines and rolling stock. The end is accomplished: in May, 1892, the broad gauge suffered complete extinction. After weathering the numbing-blast of the Gauge Bill, which veered into the contrariety of the Gauges Act, after the storms of 50 years! 'Tis a strange, sad tale.

Assuming, as we may well do, that the engineer exerts in each case all his powers of design to producing in the respective circumstances of different gauges the most powerful locomotive possible, the attainable horse-power will vary as the square of the gauge. Now the resistance of a fast train is a rather complex function of the speed and other quantities; but, roughly, we may assume that the total resistance will vary simply as the speed: whence it follows, that the necessary horse-power varies as the square of the speed. Thus we arrive at the conclusion that the maximum paying train speed varies directly as the gauge. The north-wards bound expresses leaving London about 10 o'clock in the morning have the following average speeds to the first stop after leaving town:—Great Northern, 10 a.m., King's Cross to Grantham, 105·5 miles—speed 51·88 miles per hour; Midland, 9.45 a.m., St. Pancras to Leicester, 99·25 miles—speed 51·78 miles per hour; London and North Western, 10 a.m., Euston to Rugby, 82·5 miles—speed (allowing for halt at Willesden) 49·15 miles per hour. These are ordinarily heavy trains. Lighter and faster work is done; for example, the Great Northern, Sheffield and Manchester express shows an average speed on the run between Grantham and King's Cross of 54·1 miles per hour. On the other hand, the Great Western broad gauge express which left London for Penzance at 10.15 a.m. (followed an hour after by the almost equally fast *Flying Dutchman*) maintained an average speed of 53·28 miles per hour as far as Swindon (77·25 miles) the first stop; and though the new narrow gauge engines for the express traffic have 20 in. by 24 in. cylinders, as against the old *Lord of the Isles* class, with 18 in. by 24 in., these trains are

running the same booked time. It appears, therefore, that in our day, the best narrow gauge speeds are but on a bare equality with the old broad gauge performances. But to be quite safe, let us assume that the Great Northern run just mentioned represents the best work of the narrow gauge with the paying train: then the corresponding speed for the *Flying Dutchman* of the broad gauge should have been according to the principle already enunciated, 80·4 miles per hour. Why then was the actual average speed of the Great Western spectre less than 80 miles per hour? The answer is, that two years ago the broad gauge engines were as they had been in the time of the Great Exhibition; to say the least, they were 30 years behind the age. The other side of the picture is very different. Every nerve has been strained to make the modern narrow gauge engine the magnificent and wonderously powerful machine it now is; and notwithstanding the fact that the limits grow narrower and narrower with each successive advance, the struggle still goes on. But the gauge is inexorable: the increase of transverse dimensions can be carried no further; and we have to confess that, setting aside mere fractional differences, the narrow gauge locomotives of to-day have reached full development in point of power and speed. The question is, shall we remain for ever content with average speeds between stops of 52 and 53 miles per hour? Are the eight-and-a-half hours between London and Edinburgh fixed for all time? True, some smart work was done during the railway races on the London and North Western, by old engines, to the exclusion of the compounds; on the Great Northern by Mr. Patrick Stirling's, 18 by 28 single drivers; and on the North Eastern, by Mr. Worsdell's two cylinder compounds. But after all, the race was a mere rush: as a railway performance the thing was palpably absurd. The stops were curtailed: one lost the pleasure of a visit to the bookstall; one scalded one's mouth with hot soup or that horrible burning mixture called railway coffee; and one swallowed one's whisky in hurry and in misery. The accommodation was shockingly curtailed; one was

crushed and suffocated ; one opened the windows only to be choked with dust ; and the care of ladies and belongings was harrowing to the soul. This sort of thing was clearly impossible of toleration, dearly as we love smart travelling. What then is the alternative ? Trunk wide gauge lines equipped with engines capable of indicating 3,000 horse power each : average ordinary express speed 80 miles per hour ; London to Edinburgh in 5 h. 35 m. ; London to Cardiff in 2 h. 15 m.\*

The Chester and Holyhead Railway, with R. Stephenson as chief engineer, was projected in 1843. The most important engineering work was deemed to be a bridge over the Conway river near the town of that name. The Menai Strait was proposed to be crossed by acquiring half of Telford's great bridge. The Bill was passed, with five miles on one side and the other of Menai Straits cut out. The span must necessarily be great, and this, in consonance with the ideas of the time, called for a suspension bridge. But Stephenson saw that a structure of this sort was too flexible for railway traffic. He conceived the idea of a stiffened suspension bridge, the platform to be as it were a great tube of wrought iron, capable of admitting the passage of the train through its interior. In this shape the Bill passed next session and consequently became an Act. Little or nothing was then known of the design of wrought iron structures, and Stephenson, resolving to proceed by experiment, called in Fairbairn to make model bridges and experiment. According to R. Stephenson, he himself had entertained the idea that a close investigation might show that the tube alone could be made to do all the work ; according to Fairbairn, Fairbairn demonstrated from the experiments that a rectangular tube could be made all-sufficient. Be that as it may, Stephenson and Fairbairn solved the Britannia bridge problem between them, and gave to the world the wrought iron plate girder

---

\* Since this was written the London to Edinburgh record (397 miles) has been reduced to 6 hours 19 minutes, including stops. This was accomplished by a "racing" train : the author is, however, discussing the question of everyday performance.

bridges of which hundreds of thousands are now in existence. The great bridge was in process of design and construction from 1844 to 1850.

The Chepstow bridge was begun in 1849, and finished in 1852. It has three land spans of 100 ft. each in wrought iron continuous girders, and one river span of 300 ft., also in wrought iron. To be severely accurate, it is a compound structure; and to be still more accurate and severe, it is a stiffened suspension bridge. Anchorage for chains on one side was out of the question: so it would seem Brunel took the pull of the chains inside the bridge itself against a great wrought iron strut, which forms the most prominent feature of the bridge. But not only is the stiff and continuous platform suspended from the nodes of the chain, but diagonal bracing and verticals are introduced between the chain and the tubular strut. If the diagonal bracing were made up of straight links in every instance, the bridge would be composed of a great truss carrying longitudinal continuous bearers. The lowest link is not straight, and its length varies slightly with the load on the structure. To this extent the bridge is composite—in Scottish phrase, “neither flesh, fowl, nor a guid red herring.” But, practically, the bent and broken centre link when screwed up tight, could be replaced by a straight link, in which case the bridge resolves itself into an immense truss, with great longitudinal bearers. In these days, no engineer would dream of designing a structure of the composite class—a structure, that is to say, in which the stresses in some parts depend upon fitting and screwing up—when he could more easily design a structure in which the stresses are absolutely determinate without a shadow of a doubt. Leaving out of account the defect indicated, the Chepstow bridge was the first instance of a great wrought iron truss. The construction is extremely common in America, but it falls to be recorded that the first American trussed bridge was not erected till after the Chepstow bridge was finished, and there is some doubt whether the first American bridge of that type did not contain cast iron compression

members, in which case it would fall to be classed with, but after, R. Stephenson's unfortunate bridge over the Dee.

The principle of the Saltash bridge is identical with that of the Chepstow bridge, but the size and external form are different. It is interesting to remark that some of the suspension links made for the original Clifton bridge were used up at Saltash.

It is reported that at a meeting of the Great Western directors held in 1835, one of their number, inclined to show the white feather, was enlarging on difficulties generally, and the enormous distance from London (where the meeting was held) to Bristol, when Brunel interrupted with an impatient shout, "Why not make it longer? Why not carry your steam power through to New York?" Not long after the Great Western Steam Ship Company was floated. In a note added to the prospectus, Brunel said: "The resistance of vessels does not increase in direct proportion to tonnage. This is easily explained: the tonnage increases as the cube of the dimensions, while the resistance increases about as the square, so that a vessel of double the tonnage of another, capable of carrying an engine twice the size, does not really meet with double the resistance. Speed, therefore, will be greater with the larger vessel, or the proportionate power of the engine, and consumption and fuel may be reduced." Here was the germ of the *Great Eastern*: here is the explanation of the existence of the modern cargo steamer of 10,000 tons dead weight capacity.

The *Great Western*, built to Brunel's designs, established the present fleet of Atlantic liners. The second, and only other boat of the Company, the *Great Britain* was the first iron-built liner, and the first screw liner. But a Company owning only two boats, however good, is peculiarly at the mercy of accident, and the financial strain caused by the stranding, and saving of the bigger and better boat in 1846, was too

severe for speedy reduction. Yet another untoward factor in this the first Atlantic steamship liner was the keen competition of the Cunard Company, which sprang into existence in 1840, and shortly afterwards proved victorious in the struggle for the mail contract, and all that it meant. The Company lived for about eleven years, and both of their boats were sold as going concerns.

The *Great Eastern* project was communicated to, and taken up by, the Eastern Steam Navigation Company—a Company with a capital unexpended in 1852. But this would fill a volume. Brunel's bridges have been surpassed. The Chepstow bridge is a mere speck beside the Forth Bridge. Yet the *Great Eastern* still stands on record as the biggest liner the world has yet seen, and the fastest boat of her day. We are rapidly approaching the point of coincidence. The *Lucania* is but 12% shorter than the *Great Eastern*; her speed is up to 21.88 knots on the average. The 23 knot boat which will cross the Liverpool and New York Ferry in five days, probably before 1900 A.D.—say five years from now—will, I venture to say, coincide exactly with the *Great Eastern* in point of size. The paying train must be big, and it must be swifter; the paying boat must be big, and it must be swifter. Brunel foresaw these things, and he educated the world to recognise these facts fifty years before they would otherwise have been discovered.

A vote of thanks to Dr. Elliot for his very interesting paper, moved by Mr. T. W. Wailes, seconded by Mr. Jos. Williams, was carried by acclamation.

Following out the programme, the next step was towards the Beaufort Hotel, Chepstow, where a luncheon was partaken of, after which the party was conveyed by means of brakes to Tintern. Here sufficient time was allowed to pay a visit to the grand old remains of Tintern Abbey. The return journey was then made to Chepstow. The drive through the delightful scenery of the Wye Valley was a most enjoyable one.

After a short stay at Chepstow the party took train again for Newport and Cardiff, the latter place being reached about 10 p.m., thus ending a most pleasureable trip.

GEORGE SLOGGETT,

*Honorary Secretary,*

*Bristol Channel Centre.*

### VISIT TO EXMOOR.

On Saturday, the 7th July, 1894, the members of the Bristol Channel Centre and their friends assembled at the Pier Head, Cardiff, and embarked on the steamer *White Rose*, kindly placed at their disposal by the owners, Messrs. D. B. McCallum & Sons, Engineers, Cardiff. Refreshments were provided on board. The weather was fine, with a fresh breeze blowing. After a run of some two hours the *White Rose* came to an anchor in Porlock Bay. The party landed and partook of an excellent luncheon provided for the occasion at the Anchor Hotel, Porlock Weir. Professor A. C. Elliott, D.Sc., presided. At the conclusion of the repast, Dr. Elliott called on Mr. T. W. Wailes (Member) who referred in appropriate terms to the generosity with which the boat had been lent to the party for the occasion, and proposed the toast of "Messrs. D. McCallum & Sons." Mr. Henry Cambridge (Member) Newport, seconded this, and the toast was duly honoured and responded to by Mr. David McCallum on behalf of the firm. Mr. John McCallum (Member) read a paper of considerable interest on "Marine Engineering," at the conclusion of which he was accorded a warm vote of thanks, on the motion of Mr. W. Evans, seconded by Mr. Sydney F. Walker.

"The Institute of Marine Engineers" was proposed by Captain Hansen, and responded to by the President.

Dr. T. G. Macormack gave "The Press," and acknowledgements were made by Messrs. Parker and Smurthwaite of the "Western Mail" and the "South Wales Daily News" respectively.



The party then went for a long drive over Exmoor, towards Lynton and the Doone Valley. This district has been made justly famous by Mr. Blackmore in his well known work "Lorna Doone." After a short stop to inspect the quaint little church, where John Ridd, the hero of the novel, was wedded to Lorna Doone, the drive was continued to the Lorna Doone farm. Time would not permit of going on through the Doone Valley, although a distant glimpse was obtained of it. The return journey, by a slightly different route, getting tea, and re-embarking on the *White Rose*, occupied the remainder of the time.

With a calm night and a clear sky the cruise up channel to Cardiff was a very delightful one and fitly concluded a day, the memory of which will always recall to the minds of those who were present, pleasant associations in the history of the Bristol Channel Centre.

GEORGE SLOGGETT,

*Honorary Secretary,*

*Bristol Channel Centre.*

---

## INAUGURATION OF THE SOUTHAMPTON CENTRE.

The Southampton Centre of the Institute was inaugurated on Saturday evening, May 12th, 1894, by a dinner held in the Masonic Hall, Albion Place, at which Dr. W. H. White, C.B., the Chief Constructor of the Navy, and Past-President of the Institute, occupied the chair. The attendance also included the Rev. J. K. Melliss (chaplain to the Seamen's Mission at Southampton), Mr. H. Wilding (manager of the American Line), Capt. H. de la Cour Travers (Castle Line), Messrs. C. S. Du Sautoy, R.N.R. (President of the Southampton Centre), G. W. Manuel, R.N.R. (London), A. J. Day (Vice-President), H. P. Arthur (Royal Mail Steam

Packet Company), Jas. Lungley (Union Company), A. Beldam (past President), Archibald Thomson, J. F. Flannery, J. P. (London), L. Steele, Dayer, Morris Miles (Chairman of the Hartley Institution), Boothroyd, John Clark (Docks), J. Boyd (Glasgow), Parry, Fraser, Willey, Shapter, Dundas, J. H. Thomson (London), A. Brown (Isle of Wight Company), W. F. Turner, Cowell, Napier, Murray, Mackintosh, Williams, H. Turner, Cutler, J. Hawthorn, J. Slater, and others, the gathering being of a representative and important character. Mr. James Adamson (the Hon. General Secretary) and Mr. John Griffiths (the Hon. Local Secretary) occupied the vice-chairs. Grace before and after meat was said by the Rev. J. K. Melliss.

In commencing the toast list, the CHAIRMAN briefly proposed the "Royal" toasts, remarking that the Prince of Wales, the Duke of York, and the Duke of Edinburgh were honorary members of more than one engineering society. He ventured to say a year ago that he hoped the time would come when the Institute of Marine Engineers would number among its honorary members at least the Duke of York, and he was confident that if a request of that kind was put forward in a proper way it would be very kindly considered, and might be agreed to by the Duke, who, as a naval officer, took the keenest interest in matters connected with marine engineering. (Applause.)

Mr. A. J. DAY (vice-president), gave the "Army, Navy, and Reserve Forces," and said that as a body of marine engineers they were closely connected with the army and navy; indeed, they might claim to be one of the auxiliary forces, and a very important auxiliary force, too. (Hear, hear.) Some of the operations of the army and navy could hardly have been carried out successfully without the assistance of marine engineers. If we should unfortunately become involved in a large war, soldiers would have to be conveyed to distant shores speedily, but that could not be done without the assistance of the marine engineer, and,

therefore, the success of the efforts of the army would very largely depend on them. As to the navy, in these days our ships were so full of machinery, that it was almost necessary for every Jack Tar to be a marine engineer. This reminded him of the recent agitation in the country as to the state of the navy. How far that agitation was justified it was not for him to say, but he believed it was actuated by a patriotic sentiment animating all Englishmen, and that was that Britannia shall and must rule the waves, and that she could not do unless she had a fleet much stronger than the fleet of any other nation. (Applause.) It was a satisfaction to everybody to know that Her Majesty's Government was largely increasing the power of the fleet and adding to the number of the ships. He was not one who shared the opinion of some critics who were always ready to find fault, and were so fond of saying that the service was going to the dogs (hear, hear); his own opinion was there was a good deal of life in the old dog yet. (Applause.) He referred to the successful operations of Major Forbes in Matabeleland, and the heroic death of Captain Wilson and his brave companions, adding that he could not believe that Britain had so far arrived at the pinnacle of her fame that she was bound to come tottering down, and whenever the occasion arose, marine engineers would always be ready in any emergency to render what assistance they were able to give. (Applause.)

Mr. L. STEELE, R N., in response, said that as an old naval hand it always gave him great pleasure to add his meed of praise on behalf of the navy. The Vice-President had just told them that the House of Commons had recently voted several millions in order to increase the number of ships, but taking into consideration the vast area to be covered by the navy, and the great interests it was bound to protect, he thought that instead of six millions, if Parliament had voted sixteen there would have been no questions raised, for it was admitted by all that we must maintain the efficiency of the navy. (Hear, hear.) When they

considered the number of ships needed, and the vast amount of money it took to build one of them, six millions would not go very far, and it would provide only six or eight ships at the farthest. The marine monsters now built, struck the uninitiated with a certain amount of awe, and when they were told they were ships they would scarcely believe it. The object of the Admiralty and those who were advising them was to make these ships as destructive as possible; there was a certain amount of perfection to be attained in that way, and the equivalent of that was simplicity, which was the summit of perfection. The gentlemen who gave their brains and their energy to the construction of these ships were no doubt actuated by patriotic and unselfish motives, and it behoved them to give them every encouragement and assistance by the formation of such an association as that which would be able to furnish a vast amount of information to the Admiralty and to other quarters. (Hear, hear.) As to the ships of the navy, they could not say much about them. They were bound to fulfil a certain duty due to the amount of money put into them, and they must cause the naval architect a vast deal of anxiety, especially considering the criticisms passed upon them by the old sea dogs who had served in Eighteen Hundred and war times (laughter), and were firmly convinced there was nothing equal to the broadside three-decker vessels of their day. (Hear, hear.) As regarded the personnel of the navy, he believed every one, from Admiral to the second-class boy, was actuated by a desire to do his duty (hear, hear), and considering the machinery there was in the ships, it was necessary that almost all of the men should be skilled workmen. (Hear, hear.) He argued that the status of naval engineers ought to be improved to an extent commensurate with their increasing responsibilities. (Hear, hear.)

Mr. MANUEL, R.N.R., also responded, and said he had no doubt the deck officers of the Royal Naval Reserve would prove a most valuable auxiliary to Her Majesty's navy. They were already in touch with the navy,

many of them having served in Her Majesty's ships in a way that did credit to the mercantile marine. (Hear, hear.) The engineers of the mercantile marine had not yet had the opportunity of coming into touch with the engineers of the navy on the duties they had to fulfil, but should it be the wish of the Government to appoint a time for them to serve similar to that of the deck officers, they would not be found behind in a desire to discharge their duties on board Her Majesty's vessels. (Hear, hear.) Marine engineers had had great facilities for obtaining experience in regard to engines that propel the vessels, but there was a vast amount of auxiliary routine in the vessels of the navy which it took time to become acquainted with, and his opinion was that marine engineers in the mercantile marine should be asked to serve a certain time in the ships of the navy. The principal duty of the mercantile marine engineer was to propel the vessel, and they were second to none in their ability to do that; they had, too, done it with a remarkable adaptation to the mail services in which they were employed, and their regularity was simply astonishing. Railway trains were sometimes a quarter of an hour or half an hour late, but the ships had to cover distances perhaps of 12,000 miles, and the records of the correctness of speed which they maintained were remarkable; and this, too, was done with a freedom from accident and detention that was remarkable, while the ability with which the machinery was repaired under adverse circumstances was deserving of the highest commendation. (Hear, hear.) He did not say this in disparagement of naval engineers, because they had not the opportunities which the mercantile marine had of acquiring a knowledge of continuous driving at full speed over distances of 76,000 miles per annum. (Hear.) The speaker referred to the heroism of the engineers of H.M.S. *Victoria* and the P. and O. steamer *Bokhara* in sacrificing their lives at the post of duty, and in conclusion repeated that when Her Majesty's Government called on the marine engineers of the mercantile marine for assistance they would find them ready to respond to the call of duty. (Applause.)

Mr. ARCHIBALD THOMSON in submitting "The Shipping Interest," said it was a large toast, but with the Chairman's permission he should like to localise it, because then he should be able to say something about it. He thought perhaps there was not one gentleman sitting at those tables who could speak of the shipping interests of Southampton so long back as he could. He was brought to Southampton when he was a very little boy, wearing a white pinafore with a large leather belt round it, about 1840—more than half a century ago, and his first association with the shipping interests of the port commenced with that time. In those years the docks were not built. He could remember seeing the navvies from Lancashire digging out a large hole and landing the gravel, sand, and mud, to make Canute-road. His father was one of the first chief engineers who came round to Southampton from Scotland in one of the first four steamers that came there to commence the service of the Royal Mail Steam Packet Company. In those days the vessels lay down the river nearly opposite Netley, and the only means of communication between them and the town was by one or two sailing boats that a man named William Dibble used to run, and there was a large hulk in the river on which there were two or three blacksmiths' fires, with a relay of men to do the repairs of the Royal Mail steamers when they were needed. When the docks were finished the steamers came in, and the great West India factory was built. Then the P. and O. Company came, and he remembered when they first started. He believed they had six steamers, and they ran from Southampton to the Rock of Gibraltar, and no farther. There was not much doing at that time in Southampton, except that one or two steamers used to run to the Channel Islands and to France about the size of a big bass fiddle and about the same shape (laughter), carrying a few passengers and letters once a fortnight, and a few sailing vessels coming to the Itchen with timber. As time went on the P. and O. Company and the Royal Mail Company extended their operations, and then the Union Company started with two or three

small vessels that were more like brigs with screws in their sterns than anything else, and they opened up the large trade which was seen to-day. To see the progress that had been made gave him a great amount of pleasure, and he was always glad to come back to the old place where he went to school for many years, and to which he returned to have his first start in life at the Royal Mail factory as a journeyman at 21s. a week, when he thought he was a big man. (Laughter.) The progress of Southampton had continued. It was seriously stopped or burdened when the P. and O. Company went away, but Southampton would not admit that; the people said it was nonsense, and that if the P. and O. had left, other people had come, and that they had never missed it. Perhaps in a monetary point of view they had not done so, but still, there was a certain amount of prestige with the P. and O. Company which would have brought other companies to the port. However, they went, and Southampton lagged for many years in the progress she ought to have made as a port possessing many natural advantages; she ought, in his opinion, to have gone ahead faster than she had done. One great disadvantage she had always laboured under was that she had not a large manufacturing district near or about, and in this respect did not compare favourably with Liverpool or Glasgow, which had wealth at their backs, and where there was wealth, the men who made it would use their best endeavours to keep the district going, and to keep it before the world. (Hear, hear.) That had not been the case with Southampton, which had also suffered from the sluggish way in which the Dock Company managed its business. Twenty years ago it ought to have gone to the London and South-Western Company or some other large company, and have brought them here, and by amalgamation or some other means sought to have concentrated trade at the port. (Hear.) He said that now Southampton was on the right road; they had the immense power and wealth of the London and South-Western Company behind them, and had their foot on a ladder which would raise them

to a position that would make it, he would not say superior to any other port in the Kingdom, but certainly one of the second ports, because what was being done would be conducive to business and save the Companies a large amount of money. (Applause.) The progress must go on now that there were proper people at the helm. (Hear, hear.) Some of them might not live to see all that he prophesied would take place, but some would live to see the port one of the greatest outlets and inlets for the commerce of the country. (Applause.) He had the greatest sympathy with the town, and was delighted to come there because he always met some of his oldest and dearest friends. (Hear, hear.) He asked them to drink to "The Shipping Interest," trusting it would go on and prosper, and lead Southampton on to future success and fortune. (Loud applause.) He coupled the toast with the names of Mr. Wilding and Captain Travers. (Hear, hear.)

Mr. WILDING (American Line), who was heartily received, said he was sorry that Captain Wait, who was to have been his leader in responding, was not present. He had been greatly interested in Mr. Thomson's reminiscences. He had told them what the shipping interest was in days gone by. That the shipping interest of to-day was so widely different to what he had described was largely, he thought almost entirely, due to the effort, the success, and the skill shown by the marine engineer, and the toast of the shipping interest was therefore a very appropriate one at such a meeting as that. (Hear, hear.) It was not merely what had taken place during the fifty years Mr. Thomson had alluded to that they had to consider, but they had to look to the marine engineers to still further develop the shipping interest, and he felt it could not make much progress except by the efforts and the skill that they were able to bring to bear upon it. (Hear.) They were relying upon their doing, during the next fifty years, even more than they had done during the past half century. (Hear, hear.) It was true, progress had



been great, but there was no such thing as finality to such a matter. (Hear.) They relied upon the marine engineers to increase the speed of the ships, which, of course, had to be done. There were prophets who said we had reached the limits of profitable speed, but they relied upon the marine engineer to prove these were false prophets, and it was only by their efforts that this could be proved. It was gratifying to those who were connected with the shipping interest to see such an association as that formed, in which marine engineers could meet together and help each other, and by exchanging and comparing information which each individual might obtain, thus make it common property, and by adding to the common stock of knowledge, leads to the progress of their profession—in much the same way as a snowball—gathering up a multitude of ideas and making them useful—ideas which in the individual could accomplish very little, but which in the bulk would accomplish very much. (Applause.) There was a branch of this question, of which, probably, their President did not think very much, because he was independent of pounds, shillings, and pence. (Laughter.) Marine engineers were, however, required to turn their attention to it in these days of competition, when the profit of a shipping undertaking depended very largely, not merely upon their skill, but on their caution and on their being absolutely satisfied that they were absolutely successful before they asked the shipowners to adopt what they had to bring before them. (Hear, hear.) Therefore, he asked them to be not only skilful, but to be cautious too. The difference between skilful and cautious engineering was all the difference between a successful shipping undertaking and an unsuccessful one. (Hear.) He felt some diffidence in coming there at first, and then he came to the conclusion that shipowners were a sort of half-bred engineers. They had heard a good deal about modern engineering and listened to lectures on the subject, and if they had not learned something it must be that they had not had good teachers. Therefore he felt he was not out of place; indeed, he felt to some extent at home in congratulating them on the

formation of their association and wishing them success in their efforts to help forward their profession and making it what they wished it to be. (Hear, hear.) In doing that they would be helping the shipping interest, and so making this country, which depended so largely upon that interest, more predominant among the nations of the world than it ever had been before. (Loud applause.)

Mr. MORRIS MILES (Chairman of the Hartley Institution) proposed "The Institute of Marine Engineers," and expressed surprise that he should have been called upon to propose what he considered was the toast of the evening. Mr. Wilding had said, very much better than he could, a great deal of what he had been going to say. He was very pleased the Institute had met in Southampton. It was, he was told, formed about five years ago, and numbered about 800 members. He was also pleased, as a Southampton man, to know that the centre in this town was considered to be the second in the country in connection with their important institution. It was a great thing to know that the Institute had come to Southampton and fixed a home there, and he was sure the town would give it every facility for carrying on its work profitably. (Hear, hear.) He confessed he did not know much about engines, but he had had the advantage of seeing papers sent to him by Mr. Griffiths, and he came to the conclusion that to those who knew all about them they were most agreeable books to read. (Laughter.) The branch had expressed a desire to hold their meetings at the Hartley Institution, and he assured them the Council of that Institution, when he spoke to them with regard to the application, received the suggestion that it should be granted with the greatest pleasure, and expressed a desire to assist them in every possible way. (Hear, hear.) The Hartley Council were starting a laboratory, in which they intended to teach the principles underlying their profession, viz., physical science and mathematics, and he hoped the Institute would give the Council the advantage of their experience. He commended the objects

of the Institute at further length, and then gave the toast, coupled with the names of the distinguished Past-Presidents—Dr. White and Mr. A. Beldam. (Cheers.)

Dr. WHITE, C.B., who was heartily applauded on rising, said he was sure most of them felt the deepest sympathy with him in the task he had now to discharge. They had been told by Mr. Wilding that he had the most supreme contempt for matters connected with pounds, shillings, and pence, and they had been told by Mr. Miles that he had to appear as the champion of an institution which provided unreadable books, which was enough for an average man to deal with ; but when he further had in his memory the fact that he was credited by Mr. Steele as being the individual responsible for the building of some of those monstrous things, which by courtesy were called ships, but which really were not so, his position was one of increasing difficulty ; and, further, when he remembered last, but not least, that he, who was not a marine engineer, had to respond for the Institute of Marine Engineers, and that they were wanting to hear a gentleman speak after him who was a genuine marine engineer, what, he would ask, must his feelings be ? (Laughter.) Well, notwithstanding all this, he did undertake to be the champion of the Institute of Marine Engineers. (Hear, hear.) He had known something of its working, as its president, during a full year, so far as his opportunities permitted, and he was convinced that it was one of the most useful institutions of its kind in existence, and which, although still in its infancy, had done and was doing a great deal of work, and showed signs of the greatest vitality and progress. (Hear, hear.) When he was asked to become the president, rather more than a year ago, he found himself in this difficulty. As they might imagine, he had a few things to think about, and some work to do that was not always easy to get through. (Hear, hear.) He was assisted greatly in that undertaking by the kindly and continued criticisms of his many friends, especially those connected with the Press,

who took to themselves the privilege of giving advice, which, of course, he might say he always took. Being fairly occupied, the question arose whether he ought to accept the honour offered to him, and to become the president for the year. Well, he felt, as a man engaged in designing ships, and interested in the progress of naval architecture, they had done him a very high compliment, and he thought it his plain duty, within the limits possible to him, to meet their wishes, and to try to further the progress of the Institute. (Hear, hear.) It was an Institute, the primary object of which was to assist marine engineers to improve their knowledge, and so enable them to do their work more efficiently. (Hear, hear.) They had heard from Mr. Wilding, in words that were impossible to improve upon, what were the responsibilities and the possibilities of the marine engineer—what his work did and might do in the way of furthering the commercial success of the shipping interest of this country. Upon them who had charge of the machinery, which abounded even in the merchant ships of these days, devolved the task of making or marring the shipping interests of the British Empire and its dependencies. When he said that he might say more, and that without offence—that upon them in that way devolved the progress of humanity, because upon the success of the shipping interests of the world depended the power of interchanging commodities, of intercourse between the nations of the earth, the growth of knowledge, the beating down of prejudice, and the happiness of mankind. (Applause.) Looking back upon nearly five years, he asked, had the Institute justified itself? He thought it had; he thought it might be fairly said to have more than justified itself. There was in the record of those books, which they had been told were difficult to read (a laugh), that which those who did read them looked upon as valuable additions to the technical literature of the country. (Hear, hear.) The discussions that had taken place, summarised in the "Transactions," would bear comparison with the discussions of other technical societies, but beyond that was the fact that it had established a home in London

for marine engineers throughout the world, and that branches were being formed, and they were celebrating the opening of one to-night, which were growing in numbers and would render valuable help to the parent centre. (Hear, hear.) When one heard of an institution that in five years, or thereabouts, had reached 750 members, it seemed to be a great thing. Well, it was a great thing, and the Institute had great reason to be proud of the position it had attained, but when one thought of the numbers of mercantile marine engineers in this country, the position was not one that they should be content with. (Hear.) He knew they were not content with it. They knew, too, that the principle which Mr. Wilding had laid down as to progress was one of wide and almost universal application. There was a French proverb that said, "It is the first step that costs." They who came in after the foundation, and after all the hard earnest work of making a start had been got over, ought not to criticise the institution, but it was for them to recognise its great value, and what had been done by its officers to develop it during the last five years, and then to think what may be done in the future, and, applying to what Mr. Miles might allow him to call the geometrical centre, he believed that those who met five years hence to celebrate its anniversary would find its numbers very largely increased. He attached great importance to the educational work of the Institute; but there was a social side, which was also of value. He spoke of the pleasure he and his wife had had in the social business with the Institute at Stratford, and said he hoped they would be able to arrange gatherings on similar lines in Southampton, either at the Hartley Institution or in some other building. The Institute, he pointed out, was likely to be of the greatest use to the young engineer, and he added that the scheme included the development of centres in foreign parts. It was altogether based upon a wise and broad-minded scheme, and he thanked them for wishing it continued success. (Loud applause.)

Mr. A. BELDAM (Past-President) also responded.

branches to draw all nourishment from the parent stem, but centres, taking root locally, and serving as supports to the tree. He had much pleasure in coupling the toast with the name of a gentleman, whose kindness and courtesy to the Southampton Centre, had become proverbial, Mr. Morris Miles, of Hartley Institute, and he hoped that the same kindness and courtesy would be maintained and reciprocated in the future to the advantage of both Societies. He also coupled with the toast the name of another gentleman, connected with other Societies besides their own, and in naming Mr. Flannery he was quite sure, not only that the toast would be heartily received, with his name added, but would be placed in good hands for a response. (Applause.)

Mr. MORRIS MILES, in response, repeated his assurance that the Hartley Council would assist the Institute by every means in their power, and added that they had just appointed Dr. Stewart as teacher in physical science and mathematics, and Mr. Garton had kindly given them £500 for the purpose of teaching engineering science, which had been supplemented by other subscriptions to a considerable amount. (Hear, hear.)

Mr. FORTESCUE FLANNERY, in responding, said that though they had 800 members in the Institute of Marine Engineers, when he reminded them that the engineers in the mercantile navy alone numbered 30,000 they would see what an enormous field there was for further advance and progress. (Hear, hear.) The mercantile fleet of this country was valued at one thousand millions, while the whole of the land in the country was valued, according to the Chancellor of the Exchequer, at only two thousand millions. The Institution of Marine Engineers had, in his opinion, a great and far reaching national duty before it. The engineers of the Royal Navy were in a state of discontent from the insufficiency of their numbers to perform the responsible duties thrown upon them, and the engine room artificers were in an even worse state, as they had most substantial grievances, not only as regards pay, but as regards

position. Most of the engine room artificers in the Navy were men of similar standing to our own Mercantile Engineers in the junior rank—that is to say, they had served an ample apprenticeship, and were respectable mechanics, most of them well educated, yet they were obliged to associate too closely, for discipline, with the firemen under their care; they had no separate cabin accommodation, and, except in very few ships, no proper mess accommodation, and they were not eligible for promotion to the extent that their abilities as engineers frequently justified. The result was that the Admiralty could not obtain either engineers or engine room artificers in sufficient numbers to properly man the Fleet, whilst in the Mercantile Marine there was practically no difficulty in getting numbers of high-class men. The patriotic duty which would fall upon the Institution of Marine Engineers, would be to bring together more closely the personnel of the Royal and Mercantile Marines, and make more readily available for war service the 30,000 skilled Marine Engineers in the Merchant Navy. A proper interchange of service between the engineers of both branches would be beneficial on both sides; the Royal Navy Engineers would obtain a much wider experience of driving at high speed, and getting from the machinery and boilers everything that they were capable of for long sea passages, as distinguished from mere trial trips or short runs under forced draught; and on the other hand, the status of the Mercantile Marine Engineer would be improved, and his self-respect increased, by his holding Her Majesty's Commission, and taking a higher social position even than he does to-day.

Such a reform could only be carried out by an Institution such as theirs, and he looked forward to that reform being vigorously taken in hand, and carried through to a successful issue by the great and powerful body that the Institution was now in the way to become. (Applause.)

The CHAIRMAN next proposed "Success to the Southampton Centre." He said that Mr. Flannery

had well put the case, which he himself might have presented to them, for the formation of a local centre. Mr. Thomson had told them the story of the rise, the apparent decadence, and the resurrection of Southampton. He had said these were days when the inhabitants of the town would not admit even temporary retrogression, but they were certain now of this, that whether the curve did take a downward turn or preserved itself horizontally, it had now taken an upward movement. (Hear, hear.) Whatever the course might be Southampton would be sure to benefit. They were now developing the great natural advantages of the port. A point to which Mr. Flannery had called attention—the increasing size of ships of high speed requiring great draught of water—was very little understood by many who discussed matters of ship designing, but in Southampton the difficulty was met. Not many days ago, when speaking to Mr. Huddart, who was instituting a new line of Atlantic steamers to run in connection with the steamers on the Pacific side down to Australia, he found he had this point in his mind—that on the other side, the ports in which they could load in deep water were not limited, though they were on this side, but Southampton possessed this great advantage. (Hear, hear.) There was a great aggregation of engineers in connection with the lines that used Southampton. The port was growing and must grow, and the step to form this centre had been taken none to soon. He spoke of the value of the services of Mr. Du Sautoy, as first president, and Mr. Griffiths, as secretary, and coupled the toast with the name of Mr. Du Sautoy. (Cheers.)

Mr. DU SAUTOY, R.N.R., M.I.N.A., said he hoped all the anticipations of the Southampton Centre would be realised. The establishment of a centre was first contemplated and discussed between himself and members of the parent Institute, at the conversazione, in London, in 1892, and negotiations were carried on with the Council and the hon. secretary until January, 1894, when a basis was agreed upon and terms arranged. On



February 1st a general meeting of certificated engineers was held, when it was decided to take steps to establish a centre. The total number of members residing here at that time was only four. A committee was formed, and on February 6th the names of twenty-seven gentlemen for membership and six for associate membership were submitted. By the tenth day after the first meeting the centre consisted of thirty-one members and six associates; one month after, forty-five and eight, and at present the strength was sixty-five members and fourteen associates. (Applause.) The selection of rooms received serious consideration, and negotiations were still in progress, the Hartley Council in the meantime granting the use of the Council Chamber at the Institution, once a fortnight, at a small rent. The first paper would be read there in about a fortnight, the subject being "The mechanical shipment of coal," with lantern illustrations of the systems in use at various ports. When rooms were obtained it was hoped to hold fortnightly meetings for the reading and discussion of scientific papers, and to form a library, of which the volumes already sent by Mr. Adamson would be a nucleus. He hoped all engineers at the port who were qualified would join the Institute. The Local Committee had decided to propose Mr. Wilding, Captain Wait, and Captain Chapman for the privilege of honorary membership. (Cheers.) In conclusion, he announced letters of apology from Sir Francis Evans, M.P., Mr. Tankerville Chamberlayne, M.P., Mr. Alfred Giles (President of the Institute of Civil Engineers), Mr. Durston (Engineer-in-Chief to the Admiralty), Captain Chapman, Captain Wait, Alderman Bone (Mayor of Southampton), Dr. Elliott and Mr. Sloggett (of the Bristol Channel Centre), and Mr. John Dixon.

Mr. BELAM proposed "The Chairman," whose health was enthusiastically wished; and Dr. White, in the course of a brief reply, mentioned that Sir Thomas Sutherland, Chairman of the P. and O. Company, had been elected to succeed him as President of the Institute.



## P R E F A C E .

---

58, ROMFORD ROAD,

STRATFORD,

*February 24th, 1894.*

A Meeting of the INSTITUTE OF MARINE ENGINEERS was held this evening at Gresham College, Basinghall Street, E.C., presided over by W. H. WHITE, Esq., C.B., LL.D., when a Paper on "Mechanical Appliances for the Shipment of Coal," by MR. W. S. ALLEN (Member) was read, and illustrated by a very fine collection of views, shown by means of the Lantern and Lime Light.

The Discussion was adjourned till Monday, March 12th

Arrangements are in hand for reading the Paper at Cardiff and Southampton.

JAS. ADAMSON,

*Honorary Secretary.*

