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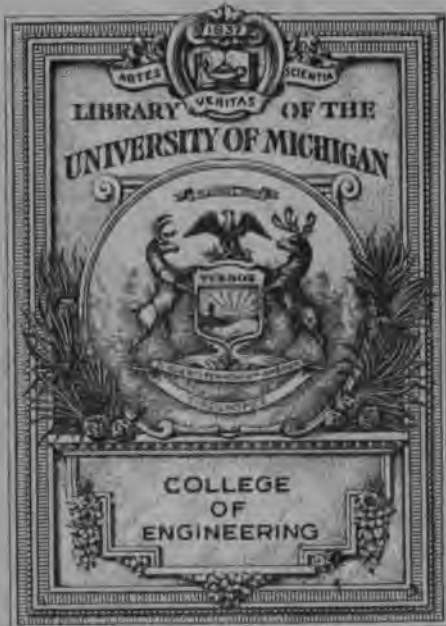
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THE JOURNAL
OF THE
IRON AND STEEL INSTITUTE

GENERAL INDEX

VOLS. XXXVI. TO LVIII.

1890—1900

TOGETHER WITH A HISTORY OF THE DEVELOPMENT
OF THE IRON AND STEEL INSTITUTE

ILLUSTRATED BY PORTRAITS OF THE PAST-PRESIDENTS

EDITED BY

BENNETT H. BROUGH

SECRETARY

LONDON

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SIR HENRY BESSEMER

PRESIDENT 1871-73

1. The first part of the document discusses the importance of maintaining accurate records of all transactions.

2. It also emphasizes the need for regular audits to ensure the integrity of the financial data.

3. Furthermore, the document highlights the role of transparency in building trust with stakeholders.

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5. The document also addresses the challenges associated with data security and privacy.

6. Finally, it provides a comprehensive overview of the current trends in financial reporting.

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P R E F A C E

THIS Index deals with the twenty-three octavo volumes of the Journal of the Iron and Steel Institute published during the years 1890 to 1900 inclusive. It has been compiled on the same system as the Index (1869 to 1881) issued in 1883, and as that (1882 to 1889) issued in 1891, to which it may be regarded as a continuation. The figures immediately following the references relate to the year of publication, the next to the number of the volume (two being issued each year), and the third to the number of the page. The references to the names of Authors and to Subjects are printed in different types.

The volume also contains (1) on pages 1 to 30 an introduction tracing the history of the development of the Institute illustrated by portraits of the sixteen past-presidents; (2) on pages 31 to 56 a list of the papers contained in the Journal (1869 to 1900), arranged chronologically; (3) on pages 57 to 81 a list of the same papers classified according to subjects, the classification being that adopted since 1886 for the arrangement of the Institute's abstracts of the contents of papers relating to iron and steel and cognate subjects published in other journals; and (4) on pages 83 to 90 an index of authors of papers.

28, VICTORIA STREET, LONDON, S.W.
July 1902.

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THE SEVENTH DUKE OF DEVONSHIRE
PRESIDENT 1869-71

HISTORY OF THE DEVELOPMENT

OF THE

IRON AND STEEL INSTITUTE

THE IRON AND STEEL INSTITUTE was founded in 1869, with the objects of affording a means of communication between members of the Iron and Steel Trades upon matters bearing upon their respective manufactures, all questions connected with wages and trade regulations being excluded; and of arranging periodical meetings for the discussion of practical and scientific subjects bearing upon the manufacture and use of iron and steel.

The suggestion that such an Institute should be established was originally made at a quarterly meeting of the Iron Trade of the North of England, held in Newcastle-on-Tyne on September 29, 1868, by the late Mr. John Jones, of Middlesbrough, at that time the Secretary to the North of England Iron Trade, who concluded his paper on "The Position of the Iron Trade in relation to Technical Education" with the following words:—

"Assuming that the British iron trade would eventually be much benefited by a freer interchange of opinions between the various members, by more frequent intercourse with each other, and by the discussion of such matters as affect most closely the interests of this national industry; in short, by the more general diffusion of technical information amongst the members of the trade, I venture to suggest the desirability of establishing a society, to consist of individual members of the iron trade, and of those intimately associated with it. The members of such a society might meet periodically, say once a year, each time in some ironmaking district. On these occasions papers might be read upon matters affecting the trade. People might be invited to send objects of interest for exhibition, and facilities might be afforded, not only for a general interchange of opinion, but for visiting the principal works in the immediate vicinity of the place of meeting.

"In the intervals between the periodical meetings, by an organisation of special committees, it would be practicable to work out fully the more abstruse questions introduced to the notice of the society. Questions of

wages and prices would not come under the cognisance of such an institution, but would be left for the various districts to settle in their own way. The object of such an institution, like the one sketched out, would be to draw into one focus everything relating to the imperial, as distinguished from the local interests of the trade; and by means of such an organisation everything relating to manufacturing operations might be directly and speedily brought under the notice of the members. As nothing of this kind has ever been tried in connection with the iron trade, it is not easy to predict what would be the precise form the society would have to take in order to be most serviceable to the trade. It might not be a success at first, because of the prejudices and jealousies that would have to be overcome here and there; but all progressive movements must have a beginning, and they are not the less promising because they begin in a quiet, unostentatious manner. Supposing even such a scheme were to fail, no harm would be done by the effort to establish the society, and it seems beyond a doubt that much lasting good might result from an institute of this kind. It is, of course, competent for this meeting to approve of the proposed establishment of an Iron or Iron and Steel Institute, or whatever else it might most appropriately be designated. I venture to think that a comparatively short period would be sufficient to test the feeling of the principal ironmasters in this country; and I am sanguine enough to believe that, if proper facilities were afforded for working out this idea, the results would be found to be highly beneficial to the trade.

“With respect to the method which might be the most desirable to adopt in organising an institution of the nature sketched out in this paper, it has been suggested that, in case the general features of the proposed scheme are approved by this section of the iron trade, it might be desirable to name a provisional committee, to consist of, say, three members of the trade from the principal ironmaking districts, and to leave the said committee to frame the requisite regulations, and to make arrangements for an opening meeting, to be held in one of the leading iron manufacturing districts.”

In accordance with resolutions then passed by the members of the North of England Iron Trade, a meeting was convened at the Queen's Hotel, Birmingham, on October 8, 1868. Mr. William Menelaus presided, and the following resolutions were unanimously agreed to:—

1. “That in the opinion of this meeting of representatives of the various ironmaking districts of Great Britain, it is desirable to take steps for the establishment of an Iron and Steel Institute, for the discussion of practical and scientific questions connected with the manufacture of iron and steel.

2. “That it is desirable to base the rules of the proposed institution upon the general principles adopted by the Civil and Mechanical Engineers and kindred societies, rigidly excluding all questions connected with wages and trade regulations.”

The following gentlemen were afterwards named to represent the various ironmaking districts on the Provisional Committee:—

North of England.—EDWARD WILLIAMS, I. LOWTHIAN BELL, DAVID DALE, JAMES MORRISON, BERNHARD SAMUELSON, W. R. INNES HOPKINS, CHARLES BAGNALL, JOHN JONES. *West Coast.*—J. T. SMITH, W. FLETCHER, JOHN LANCASTER, JOHN PATERSON, JAMES SMITH. *South Staffordshire.*—GEORGE J. BARKER, WALTER WILLIAMS, WILLIAM MATTHEWS, JOHN HARTLEY, W. M. SPARROW, FREDERICK SMITH, W. SAUNDERS, SAMPSON LLOYD. *North Staffordshire.*—W. S. RODEN, ROBERT HEATH, J. UDALL, JOHN RAMSBOTTOM. *South Wales and Monmouth.*—W. MENELAUS, ALEXANDER BROGDEN, R. FOTHERGILL, J. PALMER BUDD, ABRAHAM DARBY, WILLIAM PRICE STRUVÉ. *Shropshire.*—THOMAS ELLWOOD HORTON. *Sheffield.*—HENRY BESSEMER, EDWARD VICKERS, GEORGE WILSON, MARK FIRTH. *West Riding.*—F. W. KITSON, E. JEFFRIES, JOHN BUTLER. *Derbyshire.*—J. G. N. ALLEYNE, WILLIAM FOWLER. *Scotland.*—WALTER NEILSON, A. WHITELAW, R. CASSELS, ROBERT HANNAY, NEIL ROBSON.

The members of the Provisional Committee were requested to communicate with the various makers of iron and steel in their respective localities, asking them to become members, in case the proposed Institute should be established. It was further resolved that, although the rate of subscription would have to be fixed at a future date, the meeting considered that it should not exceed three guineas per annum. The Committee considered it desirable that the proposed Institute should have its headquarters in London, but that periodical meetings should be held in the various iron-making districts. In order to allow time for members of the iron and steel trades generally to be consulted, it was resolved that the next meeting of the Committee should be held in London about the end of November. Mr. Jones was requested to act as Honorary Secretary *pro tem.* to the Provisional Committee.

A second meeting of the Provisional Committee was held at the Westminster Palace Hotel on December 17, 1868, at which Mr. I. Lowthian Bell presided; rules were drawn up, and it was resolved that the Duke of Devonshire should be requested to become the first President of the Institute.

On January 5, 1869, the first voting list of candidates for membership was issued. It included 101 names given in by members of the Provisional Committee.

The first general meeting of members was held at the Westminster Palace Hotel on February 25, 1869. Mr. I. Lowthian

Bell presided, and on the voting papers being opened by the scrutineers the following were declared duly elected as the first President, Trustees, Vice-Presidents, Members of Council, Treasurer, and Secretary:—

President.

THE DUKE OF DEVONSHIRE, K.G.

Trustees.

	Districts Represented.
JOHN HARTLEY	South Staffordshire.
H. W. F. BOLCKOW, M.P.	North of England.
EVAN M. RICHARDS, M.P.	South Wales.

Vice-Presidents.

I. LOWTHIAN BELL	North of England.
JOSIAH T. SMITH	West Coast.
WALTER WILLIAMS	South Staffordshire.
JOHN RAMSBOTTOM	North Staffordshire.
EDWARD VICKERS	Sheffield.
F. W. KITSON	West Riding of Yorkshire.
WILLIAM FOWLER	Derbyshire.
WILLIAM MENELAUS	South Wales and Monmouth.
WALTER NEILSON	Scotland.

Members of Council.

EDWARD WILLIAMS	North of England.
W. R. INNES HOPKINS	North of England.
CHARLES BAGNALL	North of England.
JOHN LANCASTER, M.P.	West Coast.
GEORGE J. BARKER	South Staffordshire.
GEORGE ADDENBROOKE	South Staffordshire.
H. O. FIRMSTONE	South Staffordshire.
ROBERT HEATH	North Staffordshire.
ALEXANDER BROGDEN, M.P.	South Wales and Monmouth.
RICHARD FOTHERGILL, M.P.	South Wales and Monmouth.
WILLIAM THOMPSON CRAWSHAY	South Wales and Monmouth.
THOMAS E. HORTON	Shropshire.
GEORGE WILSON	Sheffield.
Sir JOHN G. N. ALLEYNE, Bart.	Derbyshire.
ROBERT CASSELS	Scotland.

Treasurer.

DAVID DALE Darlington.

Secretary.

JOHN JONES Middlesbrough.

The Duke of Devonshire delivered the Inaugural Address on the evening of June 23, 1869, in the Hall of the Society of Arts. This address is printed in the first volume of the Transactions of the Institute.

On the expiration of the term of the Duke of Devonshire's Presidency, it was felt to be desirable to provide a permanent record of his connection with the Institute, and it was resolved that this should take the form of a portrait of the Duke. A subscription was therefore raised, and Mr. H. T. Wells, R.A., received the commission to paint the portrait, which was presented to the Institute by the subscribers, and now adorns its Council-room.

Soon after the inauguration of the Institute it became clearly apparent that there was an earnest desire among the members to add unreservedly to the general stock of information. The willingness to be enrolled in the ranks of the Iron and Steel Institute was not confined to British ironmasters, but extended itself to Continental and American metallurgists; and after the first Continental meeting, held at Liège in 1873, the Institute acquired the cosmopolitan character that it has since retained.

Since the establishment of the Institute, the occupants of the Presidential Chair have been as follows :—

HIS GRACE THE DUKE OF DEVON- SHIRE, K.G., 1869-71. (<i>Deceased.</i>)	JOHN PERCY, M.D., F.R.S., 1885-87. (<i>Deceased.</i>)
Sir HENRY BESSEMER, F.R.S., 1871-73. (<i>Deceased.</i>)	DANIEL ADAMSON, 1887-89. (<i>De- ceased.</i>)
Sir LOWTHIAN BELL, Bart., F.R.S., 1873-75.	Sir JAMES KITSON, Bart., M.P., 1889-91.
W. MENELAUS, 1875-77. (<i>Deceased.</i>)	Sir FREDERICK AUGUSTUS ABEL, Bart., K.C.B., F.R.S., 1891-93.
Sir C. WILLIAM SIEMENS, F.R.S., 1877-79. (<i>Deceased.</i>)	ED. WINDSOR RICHARDS, 1893-95.
EDWARD WILLIAMS, 1879-81. (<i>Deceased.</i>)	Sir DAVID DALE, Bart., D.C.L., 1895-97.
JOSIAH TIMMIS SMITH, 1881-83.	ED. PRITCHARD MARTIN, 1897-99.
The Right Hon. Sir BERNHARD SAMUELSON, Bart., F.R.S., 1883-85.	Sir WILLIAM ROBERTS-AUSTEN, K.C.B., F.R.S., 1899-1901. WILLIAM WHITWELL, 1901-*

Dealing with the work of his predecessors in the Chair, Sir William Roberts-Austen, K.C.B., as the latest President of the

* At present in office.

century, in his presidential address, delivered in May 1899, wrote as follows:—

“The history of our industry since the formation of this Institute is epitomised by the labours of those who have hitherto occupied the Presidential chair. The Duke of Devonshire, K.G., our first President, worthily sustained the honour of the name of Cavendish, one of the most illustrious in the scientific annals of our country, and the connection of the Duke with the iron industry of Barrow is an incident of the first importance in our industrial records. He highly appreciated the importance of science in relation to the progress of the nation; and the Report of the Royal Commission on Scientific Instruction, of which he was President, contributed in no small degree to the awakening of public attention to the subject. His noble foundation of the Cavendish Laboratory at the University of Cambridge stimulated research on lines closely connected with this Institute, as the work of Clerk Maxwell, of Rayleigh, of J. J. Thomson, of Ewing, and of Heycock and Neville, abundantly testify. It is certain that the main efforts of his life were directed to developing the resources and improving the condition of the people. Neither rank, wealth, nor intellectual gifts had power to affect the simplicity of his character or to lessen the deep sense of duty which controlled all his actions.

“The life-work of our second President, Sir Henry Bessemer, has already been dealt with, and the lesson it teaches is how vastly important the labours of one man may be to a nation. In these days the facilities for work are much greater than they were, and results are obtained by an army of workers; but, as Stanley Jevons has pointed out, the influence of the individual genius is ‘not withering, but is growing with the extent of the material resources which are at his command.’ It was during the Presidency of Sir H. Bessemer that Snelus patented the use of basic lining for furnaces and crucibles, which was ultimately found to be so important in relation to the elimination of phosphorus from pig iron.

“Sir Lowthian Bell embodies for us the progress in blast-furnace practice of at least the last half-century. It was under his Presidency that the first Continental meeting was held, the place chosen being Liège, Belgium’s great metallurgical centre. He was the author of the first paper communicated to the Institute, choosing as a subject ‘The Development of Heat and its Appropriation in the Blast-Furnace.’ There is a passage in the Presidential address of Dr. Percy with reference to the work of Sir Lowthian Bell which I may be permitted to quote. Dr. Percy said: ‘His laborious, careful, and original investigations of scientific problems of the highest interest in the metallurgy of iron and steel must be so well known to this audience that any comment upon them from me would be superfluous, if not presumptuous.’ If Dr. Percy, the metallurgical historian of the age, thus shrank in 1885 from the attempt to give adequate expression to the value of Sir Lowthian’s work, it would be impertinent in me to say more than that the fourteen years which have

passed since Dr. Percy wrote have only served to bring into greater prominence Sir Lowthian's unswerving devotion to the solution of those problems he has so patiently studied.

"Attempts to improve the ancient operation of puddling by the aid of mechanical appliances received their fullest development under the guidance of William Menelaus. The great usefulness of his career may perhaps be well indicated by the statement that he was among the first to be convinced of the vast superiority of steel to puddled iron, and urged its adoption with singular foresight and vigour. His position as manager of Dowlais Works gave great force to his advocacy. By lending his great mechanical resources and power of organisation to scientific research, he brought about some of the greatest improvements that were ever effected in the iron and steel industries. He associated himself, moreover, with Edward Riley, who, as an analytical chemist, subsequently made a distinguished name.

"The work of Sir William Siemens has already been dealt with as fully as time will permit. I will, therefore, only quote the public tribute to his memory which was offered at the time of his death in 1883: 'The nation at large has lost a faithful servant, chief among those who live only to better the life of their fellow-men by subduing the forces of Nature to their use. Looking back along the line of England's scientific worthies, there are few who have served the people better than this, her adopted son—few, if any, whose life's record will show so long a list of useful labours.'

"Edward Williams shares with Menelaus the unique distinction of having been the first to appreciate the great importance of Bessemer's discovery, and within three days after the publication of Bessemer's paper at the British Association he erected at the Dowlais Works a small fixed converter, had blown pig iron, and had rolled the product into bars, 'to the great astonishment of all concerned.' His vigorous address as President of this Institute was remarkable for the then prophetic expression of belief, that the day was 'at hand when either by a Bessemer converter or by the open-hearth . . . there will be produced with absolute certainty, with comparatively light labour, and (he hoped) with fair profit to all concerned, every kind, variation, and quality of the metal iron which we rudely designate steel and wrought iron.' He also made a striking appeal to educated intellectual young men who 'hung listlessly' about the professions 'to break through the absurd old prejudice against seemingly rough work, and come over to the healthy business of iron and steel making, in which they might render the world good service.'

"Josiah Timmis Smith, in his Presidential address, gave a remarkable retrospect of the period which had elapsed since the foundation of the Institute. He showed that, comparing the year 1880 with the year 1869, 2½ millions more tons of iron had been made with the same amount of fuel, or we had, in fact, economised our fuel supplies to the extent of 10,000,000 tons. He gives a masterly summary of the progress in our industries, and eloquently pleaded that chemistry had proved its claims to

be regarded as the handmaid of the iron manufacturer, and had given our metallurgical art a place in relation to the exact sciences which it could never otherwise have occupied. He also urged with great force that our Institute had broken down the spirit of exclusiveness and prejudice, that is usually the most rampant where knowledge is most wanting.

"To Sir Bernhard Samuelson is due the credit of being the first to succeed in convincing the House of Commons of the national importance of Technical Education in its widest sense, and to induce it to grant a Select Committee to inquire into the provisions for giving instruction in theoretical and applied science to the industrial classes. I wish I knew which of his wise and careful utterances he would like me to quote. Left to my own choice, I reject reference to his elaborate array of statistics, and select the following brief passage from his Presidential address: 'It is to the further development of the world's railways that we must mainly look in the future as in the past for the support of our trade.' Bearing in mind what is happening in Egypt, in South Africa, in China, and on the frontiers of our Indian Empire, the vast importance of railways, to which Sir Bernhard refers, cannot be doubted. Hence the engineer, considered as a pioneer, is absolutely dependent for steel rails and for the material for the construction of bridges on the metallurgist, whose work is the real foundation of progress. One other sentence, which is typical of the whole tenor of his life's work, may be quoted: 'It is in the mutual co-operation (in a scientific spirit) of every grade in our great craft that we may build up the hope, nay, that we may cherish the certain expectation, of placing it on even a higher eminence than that which it has already attained.'

"In no other branch of modern scientific literature than that of metallurgy does one individual stand far above his contemporaries and absolutely dominate his subject as does Dr. John Percy. It may be fairly claimed that he did this, for he truly represents the progress of metallurgical literature during the nineteenth century. He was also the century's greatest teacher; he found metallurgy practised in this country as an empirical art. His splendid works contain a record of its progress; his lectures at the Royal School of Mines secured it a scientific basis, and he trained a body of workers in whose hands the immediate future of metallurgy still, to a great extent, rests. To few men does the nation owe more than to our President of 1885-87. The educational work Dr. Percy began is being actively developed. As regards its progress in the future—which is of vital importance—there seems to me to be no requirements that may not be abundantly met by the extension of existing institutions. The establishment of a Board of Mining and Metallurgy in connection with the new Teaching University for London would, I am satisfied, greatly stimulate instruction in these subjects.

"Daniel Adamson will be known rather as a mechanical engineer, and the originator of the Manchester Ship Canal, than as a metallurgist. His Presidency of this Institute is, however, remarkable for his strenuous advocacy of the use, not only of steel as distinguished from iron, but that for definite purposes steel of a definite degree of carburisation and suitable

composition should be employed. He also eloquently urged that the steel at all stages of its manufacture in its varied applications should receive suitable thermal treatment. He strongly advocated the use of steel for the manufacture of boilers, and he pointed out that by the use of steel rails and weldless solid rolled steel tires the saving to railway shareholders amounted to about £3,120,000 sterling per annum, while the safety and security of the travelling public had been correspondingly increased. No better indication of progress in the decade ending 1889 could well be given than this.

“The vast advance during the century in the applications of iron and steel in the manufacture of machinery, and more especially to locomotives, is fittingly represented by Sir James Kitson. We, moreover, owe him a deep debt of gratitude for the admirable way in which he represented the Institute by presiding at the Autumn Meeting, which was held in Paris in 1889, as well as during the arduous but most remarkable visit to the United States in 1890. Sir James, by his unflagging vigour and unflinching tact, did much to cement the friendship of workers in iron and steel both among our neighbours in France and our kinsmen in America. I will only add that he has persistently advocated the use, and has well maintained the reputation, of that admirable material, ‘best Yorkshire iron.’

“One of the most noteworthy events in the metallurgical progress of this country was the acceptance by Sir Frederick Abel of the post of Chemist of the War Department. The teaching of such illustrious men as Berzelius, Heinrich Rose, and Liebig was just in process of thorough application in this country when Abel left our matchless teacher Hofmann to take his place among the earliest trained analytical chemists whose aid was sought by the ironmaster. He thus became, as it were, the ‘Patron’ of works chemists. They are men on whose patient, monotonous, and often inadequately recompensed, labours the quality of British iron and steel has in no small measure depended, and I am glad to have this opportunity for offering my brethren, the chemists in works, a respectful tribute of admiration. The magnitude of their work may be gathered from the fact stated in the Journal of our Institute, that in one basic steel works over 110,000 determinations are made in a single year by three chemists and six assistants. Of Sir Frederick’s numerous investigations, the one which appeals to us most closely is that which definitely settled as Fe_3C the composition of carbide of iron. Lord Herbert of Lea, who was several times Secretary for War, and was in office soon after Sir Frederick was appointed to Woolwich, appears to have been advised that ‘steel was wholly inapplicable for the manufacture of ordnance.’ When we consider what the nature of our present war material is, and reflect how large a part Abel played in its introduction and adoption, it will be evident that any further comments of mine as to the value of his labours would be unnecessary. He is himself a most active exponent of the truth ‘that the intimate blending of science with practice lies at the root of all industrial progress and success.’

"I am quoting from an American source the testimony that 'an historical sketch of the perfecting of modern processes of steel manufacture would afford the best glimpse that could be given of the career of Edward Windsor Richards.' He was among the first to appreciate the need for reversing mill engines, and an early one erected by him is still at work at Ebbw Vale. He designed the works of Messrs. Bolckow, Vaughan & Co. at Middlesbrough, the largest in the kingdom, and as general manager of the famous Low Moor Works has fully maintained its reputation for the production of one of the most famous varieties of iron in the world. His connection with what is known as the basic process will be alluded to later on. In view of the fact that appliances will handle and forging presses deal with weights of steel up to 100 tons, he long ago anticipated the possibility of making 10 tons of steel into one ingot.

"The progress of an industry during the century can only be adequately indicated by the evidence afforded by statistics. In this respect no more comprehensive statements could have been desired than those embodied in the Presidential address of Sir David Dale. Sir David has, however, secured a firmer claim to the gratitude of the nation than that which is derived from his powers as a statistician. He has from time to time been the trusted arbitrator between masters and men, and as Chairman of one section of the Labour Commission (1891-94), rendered admirable services in the interests both of capital and labour. He was also the representative of this country at the Berlin Labour Congress of 1890. His work has, moreover, enabled us to trace in the last twenty years of the century the progress of the spirit of equity among all sorts and conditions of men, who have gladly borne testimony alike to his firmness and his justice. His efforts have been unwearingly directed to removing difficulties which have from time to time arisen between employers and the employed. I need hardly allude to his long services as Treasurer of this Institute, nor do you need to be reminded that we owe the ability to carry on our work efficiently to his careful husbanding of our resources.

"To the foresight of Edward Pritchard Martin we owe the adoption in practice of one of the great processes which will render the nineteenth century memorable. I refer to what is collectively called the 'Basic process.' It would be impossible to trace its history now. I prefer in any reference, which must of necessity be so brief, to appeal to the appreciative words in the paper which Sidney Thomas and Percy Gilchrist communicated to our Institute in 1879. They then stated that, 'on laying some of the first results obtained from this six-pound converter before Mr. Martin of Blaenavon, he at once recognised their importance, and from that time we have been deeply indebted to him for his unflinching and consistent support and much valuable advice and assistance.' It need only be added that the metallurgical world is also under a lasting debt of gratitude to Mr. Martin. Later on other aid was as gracefully recognised. Mr. Thomas said, on the occasion of his receiving the Bessemer Medal (1883), 'the present position of dephosphorisation has only been

rendered possible by the frank, generous, and unreserved co-operation of Mr. Windsor Richards, and of our earlier and consistent supporter Mr. Martin.' All those I have named have received the Bessemer Medal. We lost Sidney Thomas far too soon. Mr. Snelus, to whose work I have already referred, and Mr. Gilchrist received the highest honour the scientific world has to bestow—the Fellowship of the Royal Society. The introduction of labour-saving machinery in the great Dowlais Works, which Mr. Martin directs, marks an era in British metallurgy."

The Trustees, holding the property of the Institute in trust for the Society, have been as follows:—

JOHN HARTLEY, 1869-84.	GEORGE T. CLARK, 1880-98.
H. W. F. BOLCKOW, 1869-78.	Sir HENRY BESSEMER, 1885-98.
EVAN M. RICHARDS, 1869-80.	Right Hon. Lord WIMBORNE, 1898-1900.
Sir JOSEPH W. PEASE, Bart., 1878-1900.	Sir DAVID DALE, Bart., 1898-1900.

Since the establishment of the Institute there have been but three Honorary Treasurers, namely—

Sir DAVID DALE, Bart., 1869-95.	WILLIAM WHITWELL, 1895-1901.
WILLIAM HENRY BLECKLY, 1901-*	

Since the formation of the Institute, the following gentlemen have held the office of Vice-President:—

Sir LOWTHIAN BELL, Bart., F.R.S., 1869-72.	CHARLES MARKHAM, 1880-87.
WILLIAM FOWLER, 1869-76.	E. FISHER SMITH, 1881-89.
F. W. KITSON, 1869-76.	Lord FREDERICK CAVENDISH, 1881.
WILLIAM MENELAUS, 1869-74.	Sir JAMES RAMSDEN, 1882-95.
WALTER NEILSON, 1869-70.	E. WINDSOR RICHARDS, 1884-92.
JOHN RAMSBOTTOM, 1869-70.	WILLIAM EVANS (Bowling), 1884-93.
JOSIAH TIMMIS SMITH, 1869-80.	DANIEL ADAMSON, 1885-86.
EDWARD VICKERS, 1869-70.	EDWARD PRITCHARD MARTIN, 1887-96.
WALTER WILLIAMS, 1869-80.	WILLIAM JENKINS, 1888-94.
Sir JOHN G. N. ALLEYNE, Bart., 1870-*	GEORGE JAMES SNEBUS, F.R.S., 1889-*
ROBERT CASSELS, 1871-82.	WILLIAM WHITWELL, 1890-94.
ROBERT HEATH, 1871-89.	JAMES RILEY, 1893-*
EDWARD WILLIAMS, 1873-78.	ANDREW CARNEGIE, 1895-*
RICHARD FOTHERGILL, 1875-79.	ARTHUR KEN, 1895-*
JOHN LANCASTER, 1877-83.	ALEXANDER THIELEN, 1896.
Right Hon. Sir BERNHARD SAMUELSON, Bart., F.R.S., 1877-82.	Sir WILLIAM THOMAS LEWIS, Bart., 1897-*
Sir JAMES KITSON, Bart., M.P., 1879-88.	PERCY C. GILCHRIST, 1898-*
	SAMUEL R. PLATT, 1899-*
JOHN DEVONSHIRE ELLIS, 1901-*	

* At present in office.

Since the formation of the Institute, the following gentlemen have served as Members of Council :—

GEORGE ADDENBROOKE, 1869-72.	GEORGE JAMES SNELUS, F.R.S., 1881-88.
Sir JOHN G. N. ALLEYNE, Bart., 1869.	SIDNEY GILCHRIST THOMAS, 1882-83.
CHARLES BAGNALL, 1869-83.	PERCY C. GILCHRIST, F.R.S., 1884-1898.
GEORGE J. BARKER, 1869-89.	ALFRED HEWLETT, 1884-93.
ALEXANDER BROGDEN, 1869-79.	JAMES RILEY, 1884-92.
WM. THOMPSON CRAWSHAY, 1869-93.	Lord EDWARD CAVENDISH, 1885-89.
ROBERT CASSELS, 1869-70.	JOHN CUNNINGHAME, 1885-93.
H. O. FIRMSTONE, 1869-70.	Sir FREDERICK A. ABEL, Bart., K.C.B., D.C.L., F.R.S., 1888-90.
RICHARD FOTHERGILL, 1869-74.	SAMUEL R. PLATT, 1888-99.
ROBERT HEATH, 1869-70.	JOHN DEVONSHIRE ELLIS, 1888-1901.
T. E. HORTON, 1869-77 and 1882-89.	BENJAMIN WALKER, 1889-90.
W. R. INNES HOPKINS, 1869-72.	ANDREW CARNEGIE, 1890-94.
JOHN LANCASTER, 1869-76.	Sir WILLIAM ROBERTS - AUSTEN, K.C.B., D.C.L., F.R.S., 1890-96.
EDWARD WILLIAMS, 1869-72.	ROBERT ABBOTT HADFIELD, 1890-*
GEORGE DAWES, 1869-73.	Sir WILLIAM THOMAS LEWIS, Bart., 1890-96.
GEORGE WILSON, 1869-72.	ALEXANDER THIELEN, 1890-95.
WILLIAM S. RODEN, 1871-81.	Sir BENJAMIN HINGLEY, Bart., 1891-*
Sir JOSEPH WHITWORTH, 1871-74.	WILLIAM BEARDMORE, 1891-*
Sir C. WILLIAM SIEMENS, 1871-76.	ARTHUR KEEN, 1891-95.
WILLIAM DANIEL ALLEN, 1873-74.	DAVID EVANS, 1893-*
E. FISHER SMITH, 1873-80.	VICTOR C. W. CAVENDISH, M.P., 1894-*
JAMES HUNTER, 1873-75.	ARTHUR COOPER, 1894-*
WILLIAM WHITWELL, 1874-89.	WILLIAM EVANS (Cyfarthfa), 1894-*
DANIEL ADAMSON, 1875-84.	ARTHUR TANNETT WALKER, 1894-*
Right Hon. Sir BERNHARD SAMUELSON, Bart., F.R.S., 1875-76.	FRANCIS WILLIAM WEBB, 1895-*
Sir JAMES RAMSDEN, 1875-81.	JOHN EDWARD STEAD, 1895-*
Sir JAMES KITSON, Bart., M.P., 1878.	Sir ALFRED HICKMAN, M.P., 1896-*
WILLIAM RICHARDSON, 1878-89.	Sir EDWARD H. CARBUTT, Bart., 1897-*
HENRY ROBERTSON, 1878-87.	ADOLPHE GREINER, 1897-*
CHARLES MARKHAM, 1879.	GEORGE AINSWORTH, 1899-*
WILLIAM JENKINS, 1880-87.	
E. WINDSOR RICHARDS, 1880-83.	
Lord FREDERICK CAVENDISH, 1880.	
WILLIAM EVANS (Bowling), 1880-83.	
EDWARD PRITCHARD MARTIN, 1880-86.	
WILLIAM HENRY BLECKLY, 1881-93.	

Since the establishment of the Institute there have been but three Secretaries :—

JOHN JONES	1869-77
JAMES STEPHEN JEANS	1877-93

and Bennett H. Brough, who, having acted as Editor of the Foreign Abstracts for the Journal since June 12, 1884, was appointed Secretary on February 24, 1893.

* At present in office.

The Council at the present time is constituted as follows :—

President.

WILLIAM WHITWELL.

Treasurer.

	Elected on Council	Elected Vice- President	Elected Treasurer
BLECKLY, W. H. (Lancashire)	Sept. 1881	April 1894	May 1901

Vice-Presidents.

	Elected on Council	Elected Vice- President
ALLEYNE, Sir J. G. N., Bart. (Derbyshire)	Feb. 1869	Sept. 1870
SNELUS, G. J. (Cumberland)	Sept. 1881	May 1889
RILEY, J. (Stockton)	April 1884	May 1893
CARNEGIE, A. (U.S.A.)	Sept. 1890	May 1895
KEEN, A. (Birmingham)	May 1891	Aug. 1895
LEWIS, Sir W. T., Bart. (South Wales) .	Sept. 1890	July 1897
GILCHRIST, P. C. (London)	May 1884	July 1898
PLATT, S. R. (Lancashire)	Jan. 1888	July 1899
ELLIS, J. D. (Sheffield)	Nov. 1888	July 1901

Council.

	Elected
HADFIELD, R. A. (Sheffield)	Sept. 1890
HINGLEY, Sir B., Bart. (Staffordshire)	May 1891
BEARDMORE, W. (Glasgow)	Oct. 1891
EVANS, D. (Middlesbrough)	May 1893
CAVENDISH, V. C. W. (London)	April 1894
COOPER, A. (Middlesbrough)	April 1894
EVANS, W. (South Wales)	April 1894
TANNETT-WALKER, A. T. (Leeds)	April 1894
WEBB, F. W. (Crewe)	May 1895
STEAD, J. E. (Middlesbrough)	Aug. 1895
HICKMAN, Sir A. (Staffordshire)	Feb. 1896
CARBUTT, Sir E. H., Bart. (London)	July 1897
GREINER, A. (Belgium)	Aug. 1897
AINSWORTH, G. (Durham)	July 1899
WHILE, J. M. (Barrow)	July 1901

The Past-Presidents, Sir Lowthian Bell, Bart., Josiah T. Smith, Right Hon. Sir Bernhard Samuelson, Bart., Sir James Kitson, Bart., Sir F. A. Abel, Bart., E. Windsor Richards, Sir David Dale, Bart., E. P. Martin, and Sir William Roberts-Austen, are, *ex officio*, permanent Members of the Council.

MEETINGS.

Since the establishment of the Institute, two General Meetings have been held in each year, one of them in London in May, and the other, in the Autumn, in such locality as the Council might direct. The Autumn Meetings of the Institute have been held in the following localities :—

1869 . . Middlesbrough-on-Tees.	1886 . . London.
1870 . . Merthyr Tydvil.	1887 . . Manchester.
1871 . . Dudley.	1888 . . Edinburgh.
1872 . . Glasgow.	1889 . . Paris.
1873 . . Liége.	1890 . . New York.
1874 . . Barrow-in-Furness.	1891 . . London.
1875 . . Manchester.	1892 . . Liverpool.
1876 . . Leeds.	1893 . . Darlington.
1877 . . Newcastle-upon-Tyne.	1894 . . Brussels.
1878 . . Paris.	1895 . . Birmingham.
1879 . . Liverpool.	1896 . . Bilbao.
1880 . . Düsseldorf.	1897 . . Cardiff.
1881 . . London.	1898 . . Stockholm.
1882 . . Vienna.	1899 . . Manchester.
1883 . . Middlesbrough-on-Tees.	1900 . . Paris.
1884 . . Chester.	1901 . . Glasgow.
1885 . . Glasgow.	

The London meetings have almost invariably been held by kind permission in the rooms of the Institution of Civil Engineers. The meetings of 1869 and 1895 were held at the house of the Society of Arts.

PUBLICATIONS.

A periodical Journal of the Iron and Steel Institute is issued by the Council at intervals of six months. It contains the Minutes of the proceedings of each meeting, with the original Papers, and discussions upon them, communicated to the Institute; and Notes on the Progress of the Home and Foreign Iron and Steel Industries, comprising abstracts of the contents of papers relating to iron and steel published in other scientific and technical Journals and Transactions. The principal aim of these notes is to give the persons interested in such matters a general view of what is taking place in the iron and steel industry, and, by indicating the sources of information, to enable those who may be desirous of fuller information to refer to the originals.

Certain special volumes have also been published; the list comprising an Index to the Journal from 1869 to 1881, a subject-matter

Index from 1882 to 1889, a Catalogue of the Library, a special volume on the American Iron Trade in 1890, and a brief Index of the Papers contained in the Journal of the Institute from 1869 to 1894, and a Name Index to the Journal from 1869 to 1896.

The number of papers read before the Institute, and the number of pages in the volumes of the Journal from 1869 to 1900, have been as follows :—

Year.	Papers.	Plates.	Pages.	
1869	9	4	238	
1870	2	4	79	
1871	20	18	957	
1872	18	34	830	
1873	25	30	570	
1874	20	26	528	
1875	17	56	716	
1876	16	21	685	
1877	19	22	820	
1878	14	25	624	
1879	20	23	665	
1880	18	13	812	
1881	21	40	770	
1882	16	29	859	
1883	18	47	911	
1884	16	49	767	
1885	15	29	835	
1886	24	31	1114	
1887	16	30	994	
1888	18	27	868	
1889	15	30	1022	
1890	{ 18 New York meeting } { 8 International do. }		62	1371
Special	3	18	527	
1891	17	53	927	
1892	18	34	1176	
1893	20	43	1088	
1894	20	50	1258	
1895	20	54	1252	
1896	20	63	1131	
1897	21	25	1226	
1898	20	59	1230	
1899	20	36	1082	
1900	19	39	1173	
Total	581	1124	29,105	

The publication of the abstracts of papers published in other journals was begun in 1871, under the editorship of David Forbes,

F.R.S., as an attempt to supply, in some measure at least, a long-acknowledged deficiency in technical information in this country—namely, an account in English of what is being done in the different branches of the iron and steel manufactures abroad. The abstracts for that year covered 50 pages. In 1896 the amount of literature had so increased that it was found necessary to devote 500 pages of the Journal to the abstracts. The number of papers relating to iron and steel and kindred subjects published in other home and foreign technical journals abstracted during recent years has been as follows:—

Years.	Abstracts Published.
1893	1130
1894	1132
1895	1201
1896	1136
1897	1422
1898	1388
1899	1337
1900	1507

Up to 1885 the abstracts were arranged geographically under the heads of the various countries to which they referred, but in the first volume of 1886 a subject arrangement was adopted, which has been followed ever since, the abstracts being classified under the following heads:—Iron Ores; Refractory Materials; Fuel; Production of Pig Iron; Production of Malleable Iron; Forge and Mill Machinery; Production of Steel; Further Treatment of Iron and Steel; Physical Properties; Chemical Properties; Chemical Analysis; Statistics; and Bibliography.

LIBRARY.

The Reference Library of the Iron and Steel Institute includes a number of standard works relating to iron and steel, many of which were presented by Lady Siemens from the library of Sir C. William Siemens, besides a representative collection of British and Foreign technical Journals and Transactions. Many omissions of standard works on metallurgy have still to be supplied. It is hoped that Members will volunteer to repair the more serious of these, either by the presentation of books that are missing, or by placing at the disposal of the Council the funds necessary for their acquisition.

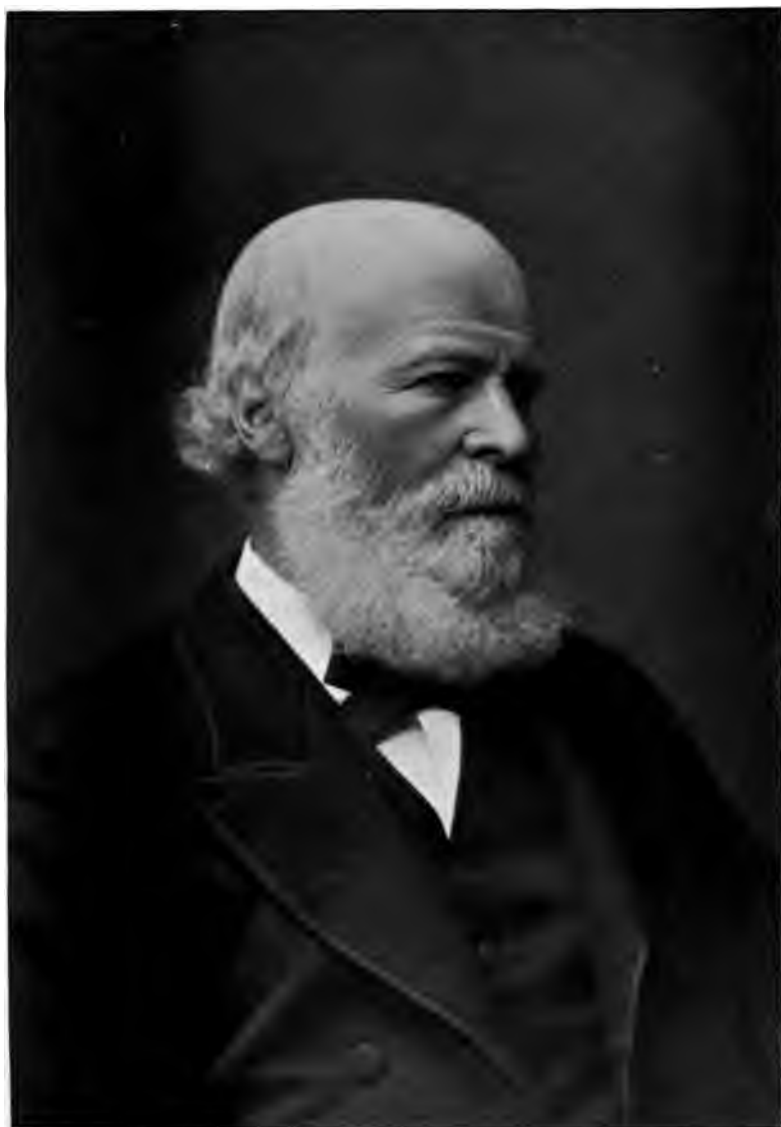


Photo: ELLIOTT & FRY

SIR LOWTHIAN BELL BART.
PRESIDENT 1873-75







Photo: ALFRED FREKE

WILLIAM MENELAUS

PRESIDENT 1875-77







SIR C. WILLIAM SIEMENS, F.R.S.
PRESIDENT 1877-79





EDWARD WILLIAMS

PRESIDENT 1879-81

From an oil-painting presented to the Institute by the late Mr. WILLIAM JENKINS of Consett

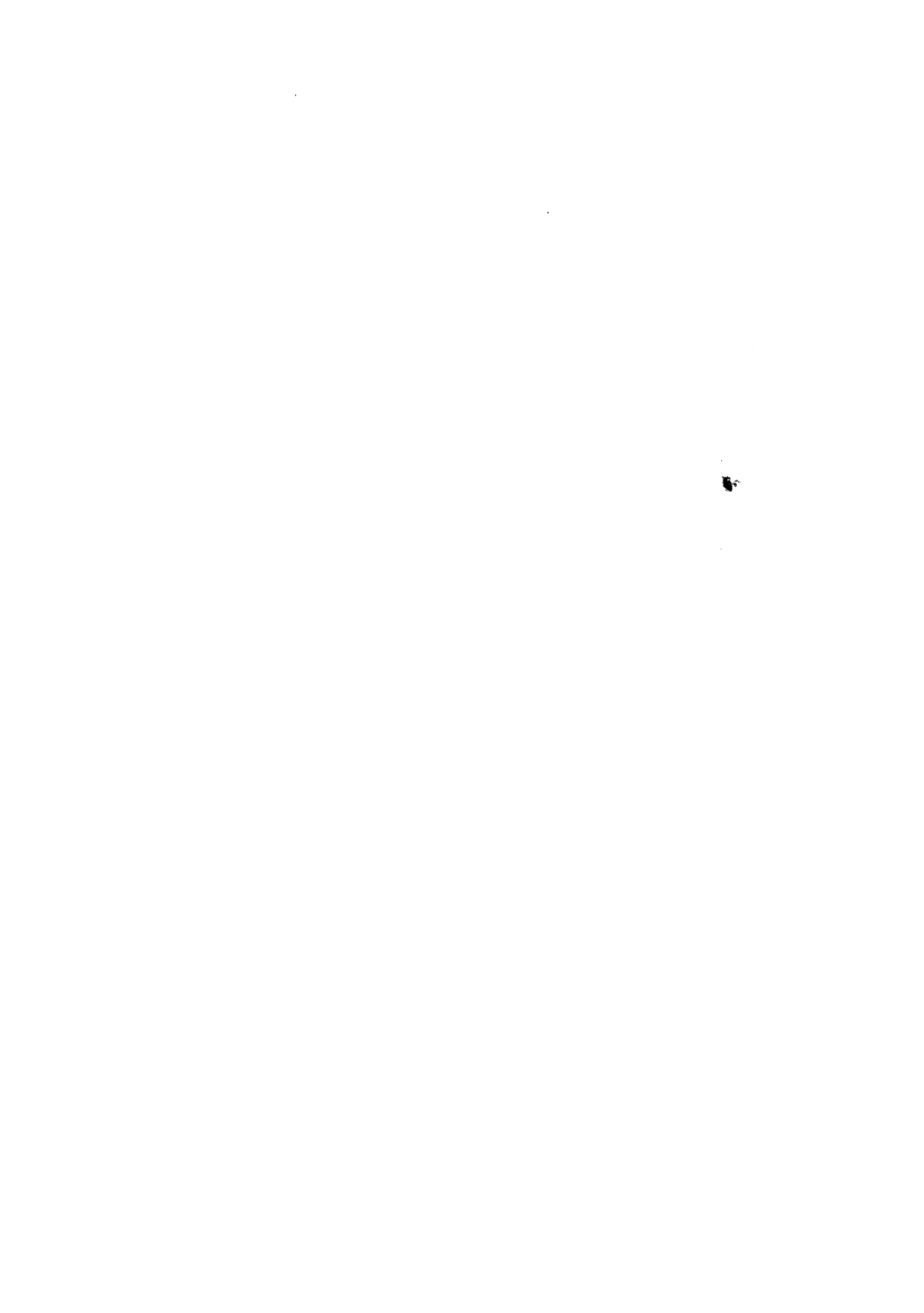




Photo: ELLIOTT & FRY

JOSIAH TIMMIS SMITH
PRESIDENT 1881-83



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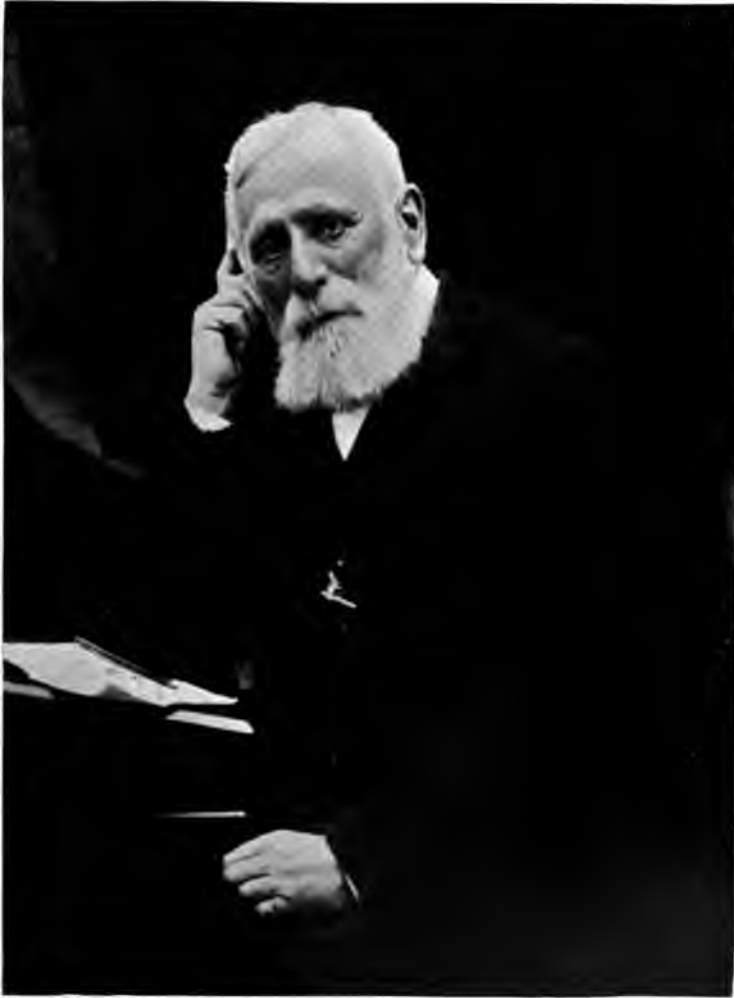


Photo: JOHN FERGUS

RIGHT HON. SIR BERNHARD SAMUELSON, BART., F.R.S.
PRESIDENT 1883-85



JOHN PERCY M.D., F.R.S.
PRESIDENT 1885-87

From a Drawing by J. GILBERT, 1859

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Phot.: ELLIOTT & FRY

DANIEL ADAMSON
PRESIDENT 1887-89



Photo: ELLIOTT & Fry

SIR JAMES KITSON, BART., M.P.
PRESIDENT 1889-91





Photo: FRADELLE & YOUNG

SIR FREDERICK A. ABEL BART. G.C.V.O. K.C.B.
PRESIDENT 1891-93





EDWARD WINDSOR RICHARDS
PRESIDENT 1893-95







Photo: BARRAUDS, Limited

SIR DAVID DALE
PRESIDENT 1895-97



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IVAR Sjöström, Stockholm

EDWARD PRITCHARD MARTIN
PRESIDENT 1897-99

1897-99





PRESIDENT 1899-1901

*From a bas-relief in bronze, modelled by Mr. G. W. DE SAULLES in the possession of the
Iron and Steel Institute*





THE BESSEMER GOLD MEDAL.

In 1873 Sir (then Mr.) Henry Bessemer invested the sum of £400 in perpetual debentures of the London and North-Western Railway, to furnish funds for the annual provision of a Gold Medal, to be awarded at each Annual Meeting of the Institute. The Council may award the Medal either to Members or non-Members of the Institute. The awards are to be—(1) To the inventor or introducer of any important or remarkable invention, either in the mechanical or chemical processes employed in the manufacture of iron or steel; (2) for a Paper read before the Institute, and having special merit and importance in connection with the iron and steel manufacture; (3) for a contribution to the Journal of the Institute, being an original investigation bearing on the iron and steel manufacture, and capable of being productive of valuable practical results. The Council may, in their discretion, award the Medal in any case not coming strictly under the foregoing definitions, should they consider that the iron or steel trades have been or may be substantially benefited by the person to whom such award is made.

Since the Medal was instituted the awards have been as follows:—

1874. Sir LOWTHIAN BELL, Bart., F.R.S.	1888. DANIEL ADAMSON.
1875. Sir C. WILLIAM SIEMENS, F.R.S.	1889. { JOHN DEVONSHIRE ELLIS. HENRI SCHNEIDER.
1876. ROBERT FORESTER MUSHET.	1890. { WILLIAM DANIEL ALLEN. HON. ABRAM S. HEWITT.
1877. JOHN PERCY, M.D., F.R.S.	1891. The Right Hon. Lord ARM- STRONG, C.B., F.R.S.
1878. PETER, Ritter von TUNNER.	1892. ARTHUR COOPER.
1879. PETER COOPER.	1893. JOHN FRITZ.
1880. Sir JOSEPH WHITWORTH, Bart.	1894. JOHN GJERS.
1881. WILLIAM MENELAUS.	1895. HENRY MARION HOWE.
1882. ALEXANDER LYMAN HOLLEY.	1896. HERMANN WEDDING.
1883. { GEORGE JAMES SNELUS, F.R.S. SIDNEY GILCHRIST THOMAS.	1897. Sir FREDERICK A. ABEL, Bart., K.C.B., F.R.S.
1884. { EDWARD WINDSOR RICHARDS. EDWARD PRITCHARD MARTIN.	1899. HER MAJESTY QUEEN VIC- TORIA.
1885. RICHARD AKERMAN.	1900. HENRI DE WENDEL.
1886. EDWARD WILLIAMS.	1901. JOHN EDWARD STEAD.
1887. JAMES RILEY.	

THE CARNEGIE RESEARCH SCHOLARSHIPS.

A Research Scholarship or Scholarships, of such value as may appear expedient to the Council of the Iron and Steel Institute from time to time, founded by Mr. Andrew Carnegie (Vice-President), who has presented to the Iron and Steel Institute sixty-four one-thousand dollar Pittsburg. Bessemer and Lake Erie Railroad Company 5 per cent. Debenture Bonds for the purpose, will be awarded annually, irrespective of sex or nationality, on the recommendation of the Council of the Institute. Candidates, who must be under thirty-five years of age, must apply on a special form before the end of April to the Secretary of the Institute.

The object of this scheme of Scholarships is not to facilitate ordinary collegiate studies, but to enable students, who have passed through a college curriculum or have been trained in industrial establishments, to conduct researches in the metallurgy of iron and steel and allied subjects, with the view of aiding its advance or its application to industry. There is no restriction as to the place of research which may be selected, whether university, technical school, or works, provided it be properly equipped for the prosecution of metallurgical investigations.

The appointment to a Scholarship shall be for one year, but the Council may at their discretion renew the Scholarship for a further period. The results of the research shall be communicated to the Iron and Steel Institute in the form of a Paper to be submitted to the Annual General Meeting of members, and if the Council consider the Paper to be of sufficient merit, the Andrew Carnegie Gold Medal shall be awarded to its author. Should the Paper in any year not be of sufficient merit, the Medal will not be awarded in that year.

In 1901 scholarships each of the value of £100 were awarded to Dr. Alfred Stansfield, D.Sc. (London), Dr. John Alexander Mathews (New York), and Julius Goldberg (Leoben, Austria).

THE
ROYAL CHARTER OF INCORPORATION.

It having been determined that it would be for the advantage of the Institute to obtain incorporation under a Royal Charter, a petition was addressed, on behalf of himself and the other members of the Iron and Steel Institute, to Her Majesty in Council by Edward Pritchard Martin (President 1897-1899); and the Royal Assent having been obtained, the Institute was incorporated under the following Charter:—

C H A R T E R.

Victoria by the Grace of God of the United
Kingdom of Great Britain and Ireland Queen,
Defender of the Faith.

TO ALL TO WHOM THESE PRESENTS SHALL COME GREETING:—

WHEREAS it has been represented to Us that William Cavendish, the Seventh Duke of Devonshire (since deceased); Sir Isaac Lowthian Bell, of Northallerton, in the County of York, Baronet; Josiah Timmis Smith, of Stratford-on-Avon, in the County of Warwick, Esquire; William Menelaus, of Dowlais, in the County of Glamorgan, Esquire (since deceased); The Right Honourable Sir Bernhard Samuelson, of Banbury, in the County of Oxford, Baronet; Sir James Kitson, of Leeds, in the County of York, Baronet, M.P.; Edward Windsor Richards, of Caerleon, in the County of Monmouth, Esquire; Sir David Dale, of Darlington, in the County of Durham,

Baronet; Sir John Gay Newton Alleyne, third Baronet, of Belper, in the County of Derby; and others of Our subjects did, in the year One thousand eight hundred and sixty-nine, form themselves into a Society which is known by the name of "THE IRON AND STEEL INSTITUTE," having for its objects the affording of a means of communication between members of the iron and steel trades upon matters bearing upon their respective manufactures, excluding all questions connected with wages and trade regulations, and the arrangement of periodical meetings for the purpose of discussing practical and scientific subjects bearing upon the manufacture and working of iron and steel, of which Society Sir William Chandler Roberts-Austen, K.C.B., is the present President:

AND WHEREAS it has been further represented to Us that the Society was not constituted for gain, and that neither its projectors nor its members derive, nor have derived any pecuniary profit from its prosperity. That it has during its existence, a period of thirty years, steadily devoted itself to the advancement of the knowledge of the metallurgy of iron, and contributed substantially and beneficially to the prosperity of the country. And that the members comprising the Society have been, and are, practically engaged in works where iron or steel is produced or worked, or have been and are persons of scientific attainments in metallurgy, and that the Society has since its formation diligently pursued the objects for which it was established by holding half-yearly meetings in London and elsewhere, at which matters of great importance and interest in the furtherance of these objects have been under discussion. And has published fifty-three volumes of Proceedings, forming a valuable work of reference on the metallurgy of iron and steel and cognate subjects. That distinguished individuals in foreign countries have availed themselves of the facilities offered by this Society for communicating important scientific and practical discoveries made abroad, and that thus a useful interchange of valuable information has been effected. And that the Society, out of funds supplied by its members, has expended,

and continues to expend, large sums of money on its proceedings, in furthering research, and in the maintenance of its library of technical works :

AND WHEREAS it has also been represented to Us that the Society is the oldest Institute in Great Britain connected with metallurgy, and that the property of the said Society would be better secured, its useful operations extended, and at the same time a more permanent establishment would be given to it among the scientific institutions of the United Kingdom of Great Britain and Ireland by the grant of a Royal Charter of Incorporation :

NOW KNOW YE that We, taking the premises into Our Royal consideration, and being desirous of encouraging a design so laudable and salutary, of Our especial grace, certain knowledge and mere motion have willed, granted and declared, and do by these presents for Us, Our heirs and successors will, grant and declare in manner following, that is to say :—

INCORPORATION.

1. For the purpose of maintaining, carrying on and extending the work and objects aforesaid, the said Sir William Chandler Roberts-Austen and such others of Our loving subjects as are now members of the said Society, and such others as shall from time to time hereafter become members thereof, according to such Bye-laws as shall be made as hereinafter mentioned, and their successors shall for ever hereafter be by virtue of these Presents a body politic and corporate, by the name and style of "The Iron and Steel Institute" (hereinafter referred to as the Institute), and shall by the same name have perpetual succession and a Common Seal, with full power and authority to alter, vary, break and render the same at their discretion, and by the same name to sue or be sued in every Court of Us, Our heirs and successors, and be for ever able and capable in law, notwithstanding the statutes of mortmain, to acquire, have, take and hold all the real estates, chattels,

real and personal estate, belonging to or held in trust for the Institute, as and when the same shall be lawfully conveyed or otherwise assured to the body corporate hereby created; and also take, purchase and hold to them and their successors any goods, chattels and personal estate or property whatsoever, and all real estates and chattels real of whatsoever tenure which they or their successors shall think desirable for the use or purpose of the Institute, or to be held in connection therewith with a view to the future advantage thereof, provided that the yearly value of the real estate and chattels real so to be acquired and held shall not at any time exceed in the whole the sum of £3000 according to the annual value thereof at the times when the same shall be respectively acquired by the Institute. And they and their successors shall, subject to the provisions of these presents, be able and capable in law to grant, sell, demise, alienate, exchange, mortgage, convey in mortmain or otherwise deal with or dispose of all or any of the property, real estate and chattels, real or personal property, belonging to the Institute, in such manner as they may think fit, and by the name aforesaid to do all other matters incidental or appertaining to a body corporate.

And We do also will, ordain, and declare as follows, that is to say:—

2. There shall be a General Meeting or General Meetings of the Members of the Institute, to be held from time to time as hereinafter mentioned, and there shall be a Council to direct and manage the concerns of the said body politic and corporate, and the General Meetings and the Council shall have the entire direction and management of the same, in the manner and subject to the regulations hereinafter mentioned.

3. There shall be a President, Past-Presidents, a Treasurer, Vice-Presidents, and a Secretary or Secretaries of the said body politic and corporate, and the Council shall consist of the President, Past-Presidents, Treasurer, and Vice-Presidents, and not more than twenty nor less than fifteen other Members of the Institute. And We do hereby further will and declare

that the said Sir William Chandler Roberts-Austen shall be the first President of the said body politic and corporate, and the other persons now being the Past-Presidents, Treasurer, Vice-Presidents, and other Members of the Council, shall be the first Members of the Council of the said body politic and corporate, and shall continue such until the election of officers shall be made in pursuance of these presents.

4. It shall be lawful for the Members of the said body politic and corporate hereby established to hold a General Meeting once in the year or oftener, for the purposes hereinafter mentioned, namely, that the President, the Treasurer, Vice-Presidents, and other Members of the Council, shall be chosen at such General Meeting; and that the General Meetings shall from time to time make and establish such bye-laws as they shall deem to be useful and necessary for the regulation of the said body politic and corporate for the admission of Honorary and Foreign Members, and of Members, for the management of the estates, goods, and business of the said body politic and corporate, for fixing and determining the number of Vice-Presidents and the other members of the Council and the number of Secretaries as aforesaid, and the time and manner of electing the President, Vice-Presidents, Treasurer, and other Members of the Council, and the period of their respective continuance in office; and such bye-laws from time to time they shall or may alter, vary, or revoke, and shall or may make such new and other bye-laws as they shall think most useful and expedient for the said body politic and corporate, so that the same be not repugnant to these presents or to the laws and statutes of this Our realm, and shall and may also enter into any resolution, and make any regulation respecting any of the affairs and concerns of the said body politic and corporate, that shall be thought necessary and proper.

5. The first such General Meeting as aforesaid for the election of Officers shall take place within twelve calendar months from the date of these presents, and the present rules and regulations of the Institute so far as they are not inconsistent with these presents, shall continue in force until the same shall be altered by a General Meeting.

6. The Council shall have the sole management of the income and funds of the said body politic and corporate, and the appointment of the Secretaries and officers, attendants, and servants as shall in the discretion of the Council be deemed necessary or useful for the Institute, as also the entire management and superintendence of all the other affairs and concerns thereof, and shall and may, but not inconsistent with or contrary to the provisions of this Our Charter, or any existing bye-law or laws, and statutes of this Our realm, do all such acts and deeds as shall appear to them necessary or essential to be done for the purpose of carrying into effect the objects and views of the said body politic and corporate.

7. The rules and bye-laws to be made by the Institute shall not have effect until they have been submitted to and allowed by the Lords of Our Council.

IN WITNESS WHEREOF, We have caused these Our Letters to be made Patent Witness Ourselves at Westminster the first day of November in the sixty-third year of Our reign.

By Warrant under the Queen's Sign-Manual.

MUIR MACKENZIE.



L. S.

In accordance with the preceding Royal Charter, the Members of the Iron and Steel Institute elect, out of their own body, a Council by whom the business of the Institute is conducted, in conformity with the following bye-laws:—

BYE-LAWS.

1. The Society shall be designated "THE IRON AND STEEL INSTITUTE."

2. The objects of the Institute shall be—

To afford a means of communication between members of the Iron and Steel Trades upon matters bearing upon their respective manufactures, excluding all questions connected with wages and trade regulations.

To arrange periodical meetings for the purpose of discussing practical and scientific subjects bearing upon the manufacture and working of iron and steel.

SECTION I.—Constitution.

3. The Institute shall consist of members who shall be more than twenty-one years of age, and shall have one or other of the following qualifications:—

(a) Persons practically engaged in works where iron or steel is produced or worked.

(b) Persons of scientific attainments in metallurgy, or specially connected with the application of iron and steel.

It shall be within the province of the Council to elect Honorary Members, the number not to exceed twenty.

SECTION II.—Election of Members.

4. A recommendation for admission according to Form A in the Appendix shall be forwarded to the General Secretary, and by him be laid before the Council. The recommendation shall be in writing, and be signed by not fewer than three members.

5. Such applications for admission as are approved by a majority of the Council shall be inserted on a voting list. This voting list shall specify the name, occupation, address, and proposers of the candidates, and shall be forwarded to the members at least fourteen days previous to the next general meeting, when the lists that have been returned to the General Secretary shall be opened, only in presence of the members,

by Scrutineers, to be appointed by the meeting for that purpose. The elections shall take place at the general meetings only.

[*Note.—Gentlemen whose proposal forms are passed by the Council after the voting lists have been issued, shall be allowed to attend the subsequent general meeting; and if afterwards duly elected members, it is understood that their subscription becomes payable in respect of the year in which the said meeting is held.*]

6. The election shall take place by ballot, three-fifths of the votes recorded being necessary for election.

7. When the proposed candidate is elected, the General Secretary shall give him notice thereof, according to Form B, but his name shall not be added to the list of members of the Institute until he shall have paid his first annual subscription, and signed the Form C in the Appendix.

8. In the case of non-election, no mention thereof shall be made in the minutes, nor any notice given to the unsuccessful candidate.

SECTION III.—Officers and Mode of Election.

9. The officers of the Institute for the management of its affairs shall consist of one President, nine Vice-Presidents, fifteen Members of Council, a Secretary or Secretaries, and one Treasurer. All members who have filled the office of President of the Institute shall be *ex-officio* permanent members of the Council, under the title of Past-Presidents.

10. The President shall be elected for two years, and shall not be eligible for re-election until after an interval; three Vice-Presidents and five Members of the Council, in rotation, shall retire annually, but shall be eligible for re-election, unless disqualified by non-attendance during the previous year. In addition, those Vice-Presidents and Members of Council shall retire who have not attended any meeting of the Council or Institute during the previous year, unless such non-attendance has been caused by special circumstances, which shall have been duly notified to the Council.

11. Candidates shall be put in nomination at the ordinary general meeting preceding the annual meeting, when the Council shall present a list specifying which of the number are eligible for re-election. Any member shall be then entitled to add names to the list of candidates. Members may also nominate candidates for office up to one month previous to the annual meeting, the names to be sent to the General Secretary. The voting list of the proposed names shall be forwarded to the members, and must be returned to the General Secretary previous to the election.

12. Each member may erase any name or names from the lists, but the number of names on the list, after such erasure, must not exceed the number to be elected to the respective offices as before enumerated. The lists which do not accord with these directions shall be rejected by the Scrutineers. The votes for any member who may not be elected as President or Vice-President shall count for him as Vice-President or other member of the Council. The voting to be conducted in the manner specified in Section II.

13. The Council shall have power to fill up any vacancies that may occur during their year of office.

SECTION IV.—Duties of Officers.

14. The President shall be Chairman at all meetings at which he shall be present, and in his absence one of the Vice-Presidents. In the absence of a Vice-President, the members shall elect a Chairman for that meeting.

15. The Treasurer shall hold in trust the uninvested funds of the Institute, which shall be deposited in the name of the Society at a bank approved by the Council; he shall receive all moneys, and shall pay all accounts that are properly certified as correct by the Council; and shall present, from time to time, a statement of the Society's accounts.

16. The General Secretary shall attend all meetings, shall take minutes of the proceedings, shall be responsible for the safe custody of all papers, books, and other property of the Institute, and, under the direction of the Council, shall conduct the general business of the Institute.

SECTION V.—Meetings.

17. There shall be at least two general meetings in each year, one of which shall be held in London in the Spring, and the other in August or September, in such locality as the Council may direct. The meeting in the Spring shall be the annual meeting for the election of officers.

18. Twenty members shall be entitled to call, through the General Secretary, a special meeting, the objects thereof to be stated in the requisition. The business of such meeting shall be confined to the special subjects named in the notice convening the same.

19. All members shall have notice of, and shall be entitled to attend, each meeting of the Institute, and to receive copies of the Institute's publications gratuitously.

20. No alteration of the Rules or Bye-laws shall be made except at the annual meeting, and a notice of any proposed alterations shall be given at the general meeting to be held in August or September.

SECTION VI.—Subscriptions.

21. The subscription of each member shall be two guineas per annum ; and members elected after January 1st, 1870, shall pay an entrance fee of two guineas each. Any member whose subscription is not in arrear may at any time compound for his subscription for the current year and all future years by the payment of thirty guineas.

22. The subscriptions shall be payable in advance on January 1st in each year. Any member whose subscriptions shall be twelve months in arrear shall forfeit all the privileges of the Institute ; and the Council, after having given due notice, in the form D in the Appendix, shall be empowered to remove such name from the lists of the Institute.

SECTION VII.—Communications of Members.

23. All communications shall be submitted to the Council, and, after their approval, shall be read at the general meetings.

24. All communications made to the Institute shall be the property of the Society, and shall be published only in the Transactions of the Institute, or by the authority of the Council.

SECTION VIII.—Property of the Institute.

25. All the property of the Institute, other than funds in the hands of the Treasurer, shall be held by three Trustees, in trust for the Society. The Trustees shall be appointed by the members in general meeting assembled ; and in case any vacancy in the Trustees occurs, the same shall be filled by election at the next general meeting—the Chairman, in all cases, having a second or casting vote.

26. All books, drawings, communications, models, and the like, shall be accessible to all members according to the Bye-laws. The Council shall have power to deposit the same in such place or places as may be considered most convenient for the members.

27. Every person desirous of bequeathing to the Institute any personal property, is requested to make use of the following form in his will :—“ I give and bequeath to the Trustees of the Iron and Steel Institute in London [here mention the property or sum of money intended to be bequeathed] for the use of the Institute.”

SECTION IX.—Consulting Officers.

28. The members in general meeting assembled shall have power to appoint such consulting officers as may be thought desirable from time to time, and may vote them suitable remuneration.

SECTION X.—Prizes.

29. The Society may offer annually a certain sum to be appropriated in Prizes or Medals, for Essays on subjects prescribed by the Council, for inventions of a specified character, or for improvements in special departments of the iron or steel manufactures. A list of the subjects for which prizes will be given shall be presented in each Annual Report.

SECTION XI.—Dissolution.

30. The Institute shall not be broken up unless upon the vote of two-thirds of the members present at any general meeting, convened for the purpose of considering the dissolution; and after confirmation by a similar vote, at a subsequent meeting, to be held not less than three, or more than six months after the first; and notice of this last meeting shall be duly advertised as the Council or a general meeting may advise.

A P P E N D I X.

FORM A.

Mr. A. B. (address in full), being of the required age, and desirous of becoming a member of the Iron and Steel Institute, we, the undersigned, from our personal knowledge, do hereby recommend him for election.

His qualifications are _____

Witness our hands this _____ day of _____ 19 _____

_____ } *Names of
Three
Members.*

FORM B.

SIR,—I beg to inform you that on the _____ you were elected a member of the Iron and Steel Institute, but, in conformity with the Rules, your election cannot be confirmed until the accompanying form be returned with your signature, and until your entrance fee and first annual subscription (amount £ _____) be paid to me. If the first subscription is not received within two months of this date, your election will become void.

I am, Sir, your obedient Servant.

General Secretary.

_____ day of _____ 19 _____

FORM C.

I, the undersigned, being elected a member of the Iron and Steel Institute, do hereby agree that I will be governed by the regulations of the said Institute, as they are now formed, or as they may be hereafter altered; that I will advance the interests of the Institute as far as may be in my power; provided that, whenever I shall signify in writing to the Secretary that I am desirous of withdrawing my name therefrom, I shall (after the payment of any arrears which may be due by me at that period) be free from this obligation.

Witness my hand this _____ day of _____ 19 _____

FORM D.

SIR,—I am directed to inform you that your subscription to the Iron and Steel Institute, amounting to _____, is in arrear, and that if the same be not paid to me on or before the _____ day of _____ 19 _____, your name will be removed from the lists of the Institute.

I am, Sir, your obedient Servant,

General Secretary.

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