



**Cleveland Institution
of
Engineers**

**Programme and Contents of Proceedings
1868 – 1942**

19 November 2012

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1868 -1869

PRESIDENT: MR DAVID JOY *

SECRETARIES: THOMAS WHITWELL, THOMAS WRIGHTSON

PROCEEDINGS

	Page No
Nov. 10th, 1868	
Annual General meeting and report of Session 1867-68.	3
Paper on "The line of works of Weardale and Shildon District Water Works Company" by T West with discussion.	9
Dec. 21st, 1868	
Paper on "The construction and erection of a new swing bridge at Kirkcudbright" by G Gilkes, Hopkins, Gilkes & Co. with discussion.	21
Feb. 18th, 1869	
Paper and discussion on "Certain questions affecting the efficiency of steam engines and boilers." by J Head, Fox, Head & Co., Ipswich,	33
Mar. 18th, 1869	
Paper on "The utilisation of blast furnace slag" by W Crossley, Askham Ironworks, Lancs., with discussion.	61
Apr. 29th, 1869	
Paper on "Hot blast stoves" by T Whitwell, with discussion.	77

- Cleveland Engine (Steam Hammer) Works, Middlesbrough.

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1869 -1870

PRESIDENT: MR WILLIAM BARRETT

SECRETARY: JEREMIAH HEAD

PROCEEDINGS

	Page No
Nov. 18th, 1869	
Annual General meeting and report of Session 1868-69.	3 (Nov.)
Presidential address by Mr W. Barrett, Norton Iron Co, Norton. (Topics included the growth in the number of ironworks but lack of a local user industry; appointment of salaried assistant to the C.I.E. Executive; and the worldwide prominence of Cleveland and its engineers.)	9 (Nov.)
Paper on "The ironstone of Cleveland and District" by Mr William Cockburn, Upleatham Mines	17 (Nov.)
Dec. 16th, 1869	
Discussion on "The Ironstone of Cleveland and District"	4 (Dec.)
Paper on "The economical working of steam engines and boilers" by W Waller, Midland Steam Boiler Insurance Co.	7 (Dec.)
Jan. 13th, 1870	
Discussion on "The economical working of steam engines and boilers."	4 (Jan.)
Paper on "A new method of producing wrought iron, free from lamination and at less cost than hitherto." by Vaughan Pendred, editor of "The Engineer", London.	17 (Jan.)
Feb. 10th, 1870	
Discussion on "A new method of producing wrought iron."	18 (Feb.)
Paper on "Marine engines and boilers" by Jacob Wallau, Gateshead	
Mar. 10th, 1870	
Discussion on "Marine engines and boilers."	3 (Mar.)
Paper on "Spectrum analysis" by J. H. Draper, Solicitor, Stockton.	13 (Mar.)
Apr. 7th, 1870	
Discussion on "Spectrum Analysis."	3 (Apr.)
Paper on "The blast furnace hoists of the Cleveland District." by Thomas Wrightson, Stockton.	11 (Apr.)
Appendix "The origin of the planets." by Jeremiah Head.	36 (Apr.)
List of Members, April 1870.	41 (Apr.)
Illustrations for "Blast furnace hoists of the Cleveland District."	48 (Apr.)

The Proceedings for this Session year are bound copies of the individual meeting records with the page numbers starting at Page 1 for each recorded meeting. To aid researching of the archived proceedings, the meeting month has been added together with the relevant page number.

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1870 -1871

PRESIDENT: MR WILLIAM BARRETT

SECRETARY: JEREMIAH HEAD

PROCEEDINGS

	Page No
Nov. 10th, 1870	
Annual report	3 (Nov.)
Discussion on "The blast furnace hoists of Cleveland and District."	8 (Nov.)
Paper read April 7 th 1870 by T. Wrightson	
Paper on "The relations between light, heat and motion." by William Bowron.	23 (Nov.)
Dec. 8th, 1870	
Discussion on "The relations between heat, light and motion."	4 (Dec.)
Paper on "Appliances for the measurement of intense heats" by Benjamin Ford, Thornaby Ironworks, Stockton.	12 (Dec.)
Jan, 12th, 1871	
Discussion on "Appliances for the measurement of intense heats."	4 (Jan.)
Paper on "The abstraction of heat by mechanical means" by Robert Morton, Stockton.	12 (Jan.)
Feb. 9th, 1871	
Discussion on "The abstraction of heat by mechanical means".	10 (Feb)
Paper on "The attainment of high heats in furnaces" by W. H. Maw, Editor of "Engineering", London.	12 (Feb)
Mar. 9th, 1871	
Discussion on "The attainment of high heats in furnaces."	5 (Mar.)
Paper on "The Siemens Furnace" by B. D. Healey, Glasgow	9 (Mar.)
Apr. 13th, 1871	
Discussion on "The attainment of high heats in furnaces" and "The Siemens Furnace".	3 (Apr.)
Paper on "The stability of floating bodies" by Edward Withy, Hartlepool.	17 (Apr.)
List of members, April 1871.	44 (Apr.)

The Proceedings for this Session are bound copies of the individual meeting records with the page numbers starting at Page 1 for each recorded meeting. To aid researching of the archived proceedings, the meeting month has been added together with the relevant page number.

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1871 -1872

PRESIDENT: MR JEREMIAH HEAD

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 9th 1871	
Seventh annual report and balance sheet	4 (Nov.)
Address by the President, Mr Jeremiah Head, Fox, Head & Co., Middlesbrough, on "Our Workmen". (Topics included labour relations, Trades Unions, and the payment of incentives.)	9 (Nov.)
Dec. 14th, 1871	
Discussion upon "The stability of floating bodies," paper read by Mr Edward Withy, M.I.N.A., of Hartlepool, at the last meeting of the previous session.	3 (Dec.)
Description of an "Improved machine for making wrought iron nails," by Mr F. F. Jones, of Middlesbrough.	13 (Dec.)
Communication from Mr Jones.	28 (Dec.)
Jan. 11th, 1872	
Discussion upon "An improved machine for making wrought iron nails," paper read last month by Mr F. F. Jones, of Middlesbrough.	3 (Jan.)
Paper upon "An investigation relating to the operation of steam engine slide-valves," by Mr S. Hannah, of Darlington	11 (Jan.)
Feb. 8th, 1872	
Discussion upon "An investigation relating to the operation of steam engine slide-valves," paper read last month by Mr S. Hannah, of Darlington.	3 (Feb.)
Paper upon "The construction and arrangement of works for the manufacture of iron," by Mr E. Hutchinson, of Darlington.	13 (Feb.)
Mar. 14th, 1872	
Discussion upon "The construction and arrangement of works for the manufacture of iron," paper read last month by Mr E. Hutchinson, of Darlington.	4 (Mar.)
Paper upon "Certain questions relating to the uniform transmission of power in the steam engine," by Mr Thomas Wrightson, Stockton.	21 (Mar.)
Apr. 11th, 1872	
Discussion upon "Certain questions relating to the uniform transmission of power in the steam engine," paper read last month by Mr Thomas Wrightson, of Stockton.	3 (Apr.)
Paper upon "Steam in the Royal Navy," by Mr R. C. Oldknow, R.N., Royal Yacht "Osborne," Portsmouth.	15 (Apr.)
List of members.	31 (Apr.)

The Proceedings for this Session are bound copies of the individual meeting records with the page numbers starting at Page 1 for each recorded meeting. To aid researching of the archived proceedings, the meeting month has been added together with the relevant page number.

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1872 -1873

PRESIDENT: MR JEREMIAH HEAD

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 14th 1872	
Eighth annual report and balance sheet.	4
Address by the President, Mr Jeremiah Head, Fox, Head & Co., Middlesbrough, on "The economic unsoundness of some Trades' Union doctrines".(Topics included the growth of Trade Union Movements; labour situation in the U.S.A.; reduction in daily working hours; and relationships between Unions and Employers.)	9
Dec. 12th, 1872	
"Description of new gas generator, metal melter, and revolving puddling furnace," by Mr John Thomas, Middlesbrough, with discussion thereon.	43
Jan. 16th, 1873	
Paper on "Proposed new Dock for Middlesbrough," by Mr John Dunning, Middlesbrough, with discussion thereon.	68
Paper on "The balance sheets of manufacturing firms: Their principles and theories viewed analytically," by Mr F. R. Goddard, Newcastle.	79
Feb. 13th, 1873	
Discussion upon "The balance sheets of manufacturing firms : Their principles and theories viewed analytically," by Mr F. R. Goddard, Public Accountant, Newcastle.	107
Paper on "The Scotch malleable iron trade," by Mr J. S. Jeans, Editor, Darlington & Stockton Times, with discussion thereon.	114
Mar. 13th, 1873	
Paper on the "Prevention of accidents to steamers, chiefly with regard to foundering at sea," by Mr H. G. Spence, of the firm of Richardson, Duck and Co., Shipbuilders, Stockton-on-Tees.	136
Paper on "Greener & Ellis's patent oxide dry bottoms for mill furnaces," by Mr T. Greener, Darlington, with discussion thereon.	151
Apr. 10th, 1873	
Discussion of paper on the "Prevention of accidents to steamers, chiefly with regard to foundering at sea," by Mr H. G. Spence, of the firm of Richardson, Duck and Co., Shipbuilders, Stockton.	170
"Description of a new high level bridge," by Mr Charles Smith, of Hartlepool, with discussion thereon.	184
Paper on the "Mechanical appliances for removing slag from blast furnaces", (disintegration and removal of slag into barges) by Mr David Joy, Middlesbrough.	193
List of members.	203

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1873 - 1874

PRESIDENT: MR JEREMIAH HEAD

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 13th, 1873	
Ninth annual report and balance sheet.	5
Address by the President, Mr Jeremiah Head, Fox, Head & Co., Middlesbrough, on "Thoughts for the consideration of engineers and others". (Topics included the skills and capabilities required of the engineer, and the resources available in Cleveland)	11
Dec. 11th, 1873	
Paper on "The disintegration and utilization of slag." by Mr Charles Wood, Middlesbrough.	43
Discussion of paper on "Mechanical appliances for removing the slag from blast furnaces" by David Joy (1872-1873 Session) and discussions of above paper by Charles Wood.	64
Jan. 15th, 1874	
Paper on "Coal-cutting by machinery: its probable influence on the future of the Coal Mining Industry," by Mr J. S. Jeans, Editor, "Darlington & Stockton Times".	92
Paper on "The utilization of peat fuel for heating and lighting purposes," by Mr C. E. Bainbridge, London Lead Company, Middleton-in-Teesdale.	117
Feb. 12th, 1874	
Discussion on "The utilization of peat fuel for heating and lighting purposes, by C. E. Bainbridge.	144
Paper on "The construction and working of tramways," by Mr Alfred Dowson, Westminster.	155
Mar. 12th, 1874	
Adjourned discussion on "Coal-cutting by machinery: its probable influence on the future of the Coal Mining Industry."	171
Discussion upon "The construction and working of tramways."	198
Paper on "Machinery for making slag and other bricks," by Captain Bodmer, London.	204
Apr. 9th, 1874	
Paper on "The North-Eastern Railway Company's dock extension works at Middlesbrough," by Mr A. H. Whitham, Middlesbrough.	217
Discussion upon "Machinery for making slag and other bricks."	232
Paper on "marine boilers," by Mr J. W. Richardson, Newcastle-upon-Tyne.	241
List of members	245

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1874 - 1875

PRESIDENT: MR THOMAS WRIGHTSON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 9th, 1874	
Tenth annual report and balance sheet.	6
Address on "The progress of engineering, as likely to be affected by recent discoveries in the physical science," by the President Mr Thomas Wrightson, Teesdale Iron Works, South Stockton. (Topics included differing, 'optimum' dimensions of Cleveland blast furnaces; and the heat efficiency of boilers.)	18
Dec. 14th, 1874	
Discussion on "The North-eastern Railway Company's dock extension works at Middlesbrough" by Mr A. H. Whitham at the 1873-74 Session.	47
Discussion upon paper on "Marine boilers" presented by Mr J. W. Richardson at the 1873-74 Session.	51
Paper on "The practical objections to reversing rolling mills for plates and a proposed substitute," by Mr Edward Hutchinson, Darlington	58
Jan. 18th, 1875	
Discussion on "The practical objections to reversing rolling mills for plates and a proposed substitute."	72
Paper on "The construction of foundries," by Mr J. M. Oubridge, Middlesbrough.	83
Feb. 15th, 1875	
Adjourned discussion upon "The practical objections to reversing rolling mills for plates and a proposed substitute."	94
Discussion upon "The construction of foundries."	107
Paper on "The effect of the mechanical construction of trucks on the Demurrage question and a proposed substitute." by Mr Charles Wood, Middlesbrough.	113
Mar. 15th, 1875	
Discussion on "The effect of the mechanical construction of trucks on the Demurrage question and a proposed substitute."	128
Paper on "The Galton grate and the warming and ventilating of dwelling-rooms." by Mr E. B. Marten, Stourbridge.	144
Apr. 12th, 1875	
Discussion on "The Galton grate and the warming and ventilating of dwelling-rooms."	154
Paper on "The introduction of vertical blowing engines into Cleveland." by Mr Jno. Gjers, Middlesbrough.	174
Paper on "The future of Cleveland in relation to the Iron Trade and the World." by Mr J. S. Jeans, Darlington.	187
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CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1875 - 1876

PRESIDENT: MR THOMAS WRIGHTSON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 15th, 1875	
Eleventh annual report and balance sheet.	8
Discussion on "The introduction of vertical blowing engines into Cleveland" delivered by Mr J. Gjers on 12 th April 1875.	14
Paper on "Boilers and blowing engines for blast furnaces." by Mr A. C. Hill, Coatham.	30
Dec. 13th, 1875	
Adjourned discussion on "The introduction of vertical blowing engines into Cleveland."	64
Discussion on "Boilers and blowing engines for blast furnaces."	73
Paper on "Taylor's arithmetic for the blind." by Mr W. H. Taylor, Stockton.	91
Jan. 17th, 1876	
Adjourned discussion on Messrs Gjers and Hill's papers.	108
Paper on "The economic construction of dwellings for the working classes." by Mr Wm. Henman, Stockton.	127
Feb. 14th, 1876	
Discussion on "The economic construction of workmen's dwellings."	151
Paper on "The Consett Water Works and the construction of the Smiddy Shaw Storage Reservoir." By Mr Jos. E. Hannah, A.I.C.E., Middlesbrough.	176
Paper on "The contamination of boiler feed waters." by Mr W. F. K. Stock, F.C.S., Darlington.	205
Mar. 13th, 1876	
Discussion on "The Consett Water Works and the construction of the Smiddy Shaw Storage Reservoir."	211
Discussion on "The construction of boiler feed waters."	221
Paper on "Head's patent prime mover." by Mr Jeremiah Head, M.I.C.E., Middlesbrough.	226
Apr. 10th, 1876	
Discussion on "Head's patent prime mover."	243
Presidential address by Mr Thos. Wrightson, F.G.S., Stockton on "The application of mechanical principles to the phenomena of sound."(The main topic was a new theory to explain the mechanism of hearing illustrated by the results of practical experiments and different forms of sound waves; and comments on the concept of harmony.)	259
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CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1876 - 1877

PRESIDENT: MR THOMAS WHITWELL

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 6th, 1876	
Twelfth annual report and balance sheet.	5
Paper on "The Tay Bridge." by Mr E. Gilkes, Hopkins, Gilkes & Co., Middlesbrough.	12
Dec. 18th, 1876	
Discussion on "The Tay Bridge."	30
Paper on "The defects of certain single-acting engines with a remedy." by Mr Jeremiah Head, M.I.C.E., Middlesbrough.	38
Jan. 29th, 1877	
Discussion on "The defects of certain single-acting engines with a remedy."	58
Paper on "Certain improvements in machinery for making peat fuel, with suggestions as to special application of peat for fuel and other purposes." by Mr C. E. Bainbridge, Middleton-in-Teesdale.	71
Mar. 12th, 1877	
Discussion on "Certain improvements in machinery for making peat fuel, with suggestions as to special application of peat for fuel and other purposes."	90
President's address by Mr Thomas Whitwell, W. Whitwell & Co., South Stockton, on "Some observations on American practice in engineering." (Topics include the application of natural gas to puddling furnaces and tube welding; locomotive and bridge designs; fire-fighting services; and labour relations.)	102
Paper on "Phosphorus in Cleveland iron ore and in iron." by Mr J. E. Stead, Middlesbrough.	132
Apr. 23rd, 1877	
Petition against the Patents for Inventions Bill with discussion.	158
Discussion on "Some observations on American practice in engineering."	162
Papers on "Improved up-ending tongs." and "An improved squeezer." by Mr Jeremiah Head, M.I.C.E., Middlesbrough.	181
Jun. 4th, 1877	
Petition in favour of the Engineer Officers of the Royal Navy.	187
Discussion on "Improved up-ending tongs" and "An improved squeezer."	196
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CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1877 - 1878

PRESIDENT: MR THOMAS WHITWELL

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 5th 1877	
Annual report and auditor's report	3
President's address by Mr T. Whitwell, W. Whitwell & Co. South Stockton. (Topics included phosphorus removal from Cleveland Iron in the puddling process; the Tay Bridge; marine compound engines, and steel for shipbuilding.)	9
Paper on "A facile mode of compounding engines," by Mr Charles Smith, Hartlepool.	15
Dec. 10th, 1877	
Discussion upon "A facile mode of compounding engines,"	30
Paper on "Phosphorus in iron ore and iron, Part II, by Mr J. E. Stead, Middlesbrough. (This paper was the second part of the lecture presented by the author on the subject at the previous 1876-1877 session on March 12 th , 1877.)	48
Jan, 21st, 1878	
Discussion upon "Phosphorus in iron ore and iron, Part II".	64
Paper on "Mechanical puddling in reference to the manufacture of puddled bar and of ingot steel," by Mr John A. Jones, Middlesbrough.	79
Mar. 4th, 1878	
Discussion upon "Mechanical puddling in reference to the manufacture of puddled bar and of ingot steel"	104
Paper on "An improved fixed Bessemer converter," by Mr L. Wittnöfft, Bochum, Westphalia.	120
Apr. 15th, 1878	
Communication from Mr L. Wittnöfft.	131
Paper on "The construction, dimensions and management of blast furnaces," by Mr Thos. Whitwell, Stockton-on-Tees	133
Paper on "The manufacture of rivets, bolts and various other articles, by a new system of longitudinal rolling," by Mr T. Mudd, Hartlepool.	159
May, 27th, 1878	
Discussion on "The construction, dimensions and management of blast furnaces".	172
Discussion upon "The manufacture of rivets, bolts and various other articles by a new system of longitudinal rolling".	192
Paper on "Mackay and MacGeorge's hydraulic riveting machine," by Mr Jas. Nelson, Engineer, Gateshead-on-Tyne.	201
Communication to the Editor by Mr F. H. Marshall	206
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CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1878 - 1879

PRESIDENT: MR JOHN GJERS

SECRETARY: MR ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 11th 1878	
Annual report and balance sheet	3
President's address by Mr J. Gjers, Ayresome Ironworks, Middlesbrough. (The address contained tributes to Thomas Whitwell, H.W.F. Bolckow and John Vaughan. Technical topics in the address included the development of iron and steelmaking; and the state of the iron trade.)	18
Dec. 16th, 1878	
Discussion on "Mackay and MacGeorge's hydraulic riveting machine," being paper read at last meeting of last session by Mr Jas. Nelson, Gateshead-on-Tyne.	56
Proposed resolutions on "The causes of the present depression in trade," by Mr Jeremiah Head, Middlesbrough-on-Tees.	64
Paper on "Roadways," by Mr Jas. Hall, Stockton-on-Tees.	71
Jan. 27th, 1879	
Paper on "Electric lighting," by Mr Jas. Shoolbred, B.A., M.I.C.E.,r.	91
Discussion on the above.	113
Apr. 20th, 1879	
Paper on "Sewage disposal," by Mr Henry Robinson, M.I.C.E. F.G.S., F.R.G.S., Westminster.	130
Discussion on the above.	148
Paper on "New wrought-iron permanent way, as being made for the N.E. Railway, with a comparative view of the various systems in use on the continent and elsewhere." by Mr Charles Wood, M.I.C.E., Middlesbrough.	157
Jun. 9th, 1879	
Discussion on "Roadways".	191
Discussion on "New wrought-iron permanent way, as being made for the N.E. Railway, with a comparative view of the various systems in use on the continent and elsewhere".	205
Paper on "Gas furnaces," by Mr Alfred Wilson, Middlesbrough	221
List of members.	245
Special Number - Feb. 3rd and 10th, 1879	
Discussion on "Causes and remedies of the present depression in trade".	1
Address by Mr Jeremiah Head	p. 2 Mr F. H. Craggs 67
" Mr H. G. Reid	p.18 Mr C. Wood 78
" Mr John Stevenson	p.33 Mr E. Williams 82
" Mr E. Withy	p.36 Mr T. Wrightson 84
" Mr Jas. Jennings	p.39 Mr E. Withy 87
" Mr E. Windsor Richards	p.60 Mr H. Wilson 92
Reply – Mr Jeremiah Head	93

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1879 -1880

PRESIDENT: MR JOHN GJERS

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 17th, 1879	
Annual report and balance sheet	3
President's address by Mr J. Gjers on the revival of trade, free trade and tariffs.	15
Dec. 15th, 1879	
Paper on "The dephosphorization of iron," by Mr J. E. Stead, Middlesbrough-on-Tees. (Note that there is a second part to this paper presented at the following meeting.)	34
Jan. 26th, 1880	
Discussion on "Gas furnaces," being paper read at last meeting of last session by Mr A. Wilson, Middlesbrough-on-Tees.	68
Paper on "The dephosphorization of iron," Part II by Mr J. E. Stead, Middlesbrough-on-Tees.	81
Discussion of both parts of the above paper.	89
Mar. 15th, 1880	
Paper on "The Cleveland Ironstone," by Mr George Barrow, F.G.S. H.M. Geological survey. (Note that there is a second part to this paper presented at the May meeting of this session)	108
"Description of Hunnings' micro-telephone," by Mr E. Harrison, Darlington, with experiments at Messrs Stevenson, Jacques and Co.'s Offices.	113
May, 3rd, 1880	
Paper on "Improvement in the construction of decked vessels (sail or steam) for the safe carrying of bulk cargoes and the provision of water ballast without loss of stowage space," by Mr H. F. Craggs, of Middlesbrough.	120
Discussion on the above.	155
Appendix.	167
May, 31st 1880	
Paper on "The Cleveland Ironstone, Part II." by Mr Geo. Barrow, F.G.S., H.M. Geological Survey.	180
Adjourned discussion on "Improvement in the construction of decked vessels (sail or steam) for the safe carrying of bulk cargoes and the provision of water ballast, without loss of stowage space," being a paper read at last meeting by Mr H. F. Craggs, Middlesbrough.	187
Excursion to the Hartlepoons.	200
Excursion to the Tees Breakwater.	211
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CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1880-1881

PRESIDENT: MR E. WINDSOR RICHARDS

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

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Nov. 15th, 1880	
Annual report and balance sheet.	3
President's address by Mr E. Windsor Richards, Bolckow Vaughan & Co. (Topics covered included coal supplies and treatment, ironstone mining machinery, blast furnace practice, stove design, Bessemer steelmaking practices, open hearth steelmaking, rolling mills and ingot properties.)	14
Dec. 13th, 1880	
Paper on "Expansion of steam in non-rotative pumping engines," by Mr Henry Davey, F.G.S., M.I.C.E., Leeds.	55
Discussion on the above.	65
Jan. 24th, 1881	
Paper "On electricity as a source of light and of power," by Mr Jas. N. Shoolbred, B.A., M.I.C.E., Westminster.	71
Discussion on the above.	92
Mar. 7th, 1881	
Paper on "A divisible form of electric light," by Mr Joseph W. Swan, F.I.C., Newcastle-upon-Tyne.	105
Discussion on the above	117
Apr. 25th, 1881	
Paper on "Compressed air engines," by Mr Jas. Young, Fence Houses.	123
Discussion on the above.	133
Paper on "House drains, closets and traps," by Mr S. E. Thorrold, South Stockton.	141
Discussion on the above.	149
May, 23rd, 1881	
Discussion upon "Air locomotives"(Compressed air engines), being paper read at previous meeting by Mr Jas. Young, Fence Houses, preceded by remarks upon "High pressure on compressed air as applied to locomotive purposes," by Colonel Beaumont, Westminster.	155
List of members.	179

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1881-1882

PRESIDENT: MR E. WINDSOR RICHARDS

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 7th, 1881	
Annual report and balance sheet	3
Paper on "Vyles' patent easily-tested lightning conductor and testing apparatus," by Mr Samuel Vyle, Associate of Telegraph Engineers, Middlesbrough.	12
Discussion on above.	18
Paper on "The 'Brush' system of electric lighting," by Mr Samuel Vyle, Associate of Telegraph Engineers, Middlesbrough.	26
Discussion on above.	38
Dec. 12th, 1881	
The Society of Arts' new patent bill, explained by Mr Jeremiah Head, Middlesbrough.	54
Paper on "Mudd's patent pendulous marine engine governor," by Mr Thomas Mudd, Hartlepool.	67
Discussion on above.	79
Feb. 6th, 1882	
President's address by Mr E. Windsor Richards. (Topics covered included a comparison of American and Cleveland practice for Bessemer steelmaking, rail rolling, blast furnaces and steel plate for shipbuilding.)	87
Discussion on Mr J. Head's resolution on the Society of Arts' proposed bill for the amendment of the Patent Laws.	100
Mar. 6th, 1882	
Paper on "The pitch of rivets in wrought iron bridges," by Mr Alfred D. Ottewell, Whit. Sch., Darlington.	126
Paper on "The shipping and discharging of cargoes," by Mr James Taylor, Middlesbrough.	133
Apr. 17th, 1882	
Discussion on "The pitch of rivets in wrought iron bridges," being paper read at last meeting by Mr Alfred D. Ottewell, Whit. Sch., Darlington.	148
Paper on "The geology of Middlesbrough and it's surroundings," by Mr Thos. Allison, Guisborough.	155
Jun. 12th, 1882	
Discussion on "The geology of Middlesbrough and its surroundings," read at last meeting by Mr. Allison, Guisborough.	173
Paper on "A rapid method of phosphorus determination," by Mr J. E. Stead, F.C.S., Middlesbrough.	179
Paper on "Gas analyses," with remarks on the combustion of gases, by Mr J. E. Stead, F.C.S., Middlesbrough.	189
Paper on "Blast-furnace plant in America," by the President (Mr E. Windsor Richards, Middlesbrough)	199
Discussion on the above.	201

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1882 -1883

PRESIDENT: MR E. F. JONES

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

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Nov, 6th, 1882	
Annual report and balance sheet	3
Address by the President, Mr E. F. Jones, Normanby Ironworks, Middlesbrough. (The subject of the address was development of the Cleveland iron trade, particularly blast furnace design and practice, from 1853 to 1882.)	13
Discussion.	22
Dec. 11th, 1882	
Paper on "The soaking pit process," by Mr John Gjers, Middlesbrough	28
Discussion on above.	41
"Notes upon carbon and other deposits from blast-furnace gases," by Mr Charles Wood, Middlesbrough.	47
Discussion on above.	56
Jan. 22nd, 1883	
Address on "The Channel Tunnel," by Colonel Beaumont, Westminster.	64
Discussion on above.	78
Mar. 12th, 1883	
Paper on "Ice-making plant," by Mr J. A. Knights, South Stockton.	90
Discussion on above.	99
Apr. 16th, 1883	
Address on "The salt deposits of Middlesbrough and the mode of winning them," by Mr T. Hugh Bell, Middlesbrough.	106
Discussion on above.	127
Visit to Messrs Bell Brothers' Salt Works at Port Clarence.	133
May, 21st, 1883	
Paper on "The exhaust injector," by Mr A. Slater Savill, Manchester.	141
Discussion on above.	154
List of members at the end of the proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1883 -1884

PRESIDENT: MR E. F. JONES

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov, 5th, 1883	
Annual report and balance sheet	2
Paper on "The education of mechanical engineers," by Mr W. Ripper, Sheffield	13
Dec. 10th, 1883	
Discussion on "The education of mechanical engineers," being paper read at last meeting by Mr Wm. Ripper, Sheffield.	46
Paper "On the new Patent Law," by Mr G. J. Clarkson, Fellow of the Institute of Patent Agents, Stockton.	66
Jan. 28th, 1884	
Discussion on "The new Patent Law," being paper read at last meeting by Mr G. J. Clarkson, Stockton-on-Tees.	81
Paper on "The Haswell mechanical coal-getter," by Mr W. F. Hall, Fence Houses, read by the inventor, Mr W. Low.	100
Mar. 3rd, 1884	
Discussion on "The Haswell coal-getter," being paper read at last meeting.	123
Paper on "The Wheelock direct-acting steam engine, with automatic expansion gear," by Mr Daniel Adamson, Dukinfield, near Manchester.	128
Discussion on the above.	137
Apr. 7th, 1884	
Paper on "American bridge-building from an Englishman's point of view," by Mr Alfred D. Ottewell, Whit. Sch., Louisville, Ky., U.S.A.	146
Paper on "The iron-making materials of Australia and the prospects of their development," by Mr Theodore West, Darlington.	158
Discussion on the above.	166
May, 19th, 1884	
Paper on "The production and application of heating gas," by Mr A. Wilson, Stafford.	172
Discussion on the above.	193

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1884 -1885

PRESIDENT: MR ALFRED C. HILL

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov, 10th, 1884	
Annual report and balance sheet	2
President's address by Mr A.C. Hill, Manager and Engineer, Cleveland Ironworks. (Subjects covered included improvements in the manufacture of Cleveland Iron in the previous 30 years and a short history of the basic process for manufacturing steel.)	14
Dec. 8th, 1884	
Paper on "The mechanical refrigeration of air and its applications," by Mr T. B. Lightfoot, M.I.M.E., M.I.C.E., London.	48
Discussion on the above.	82
Mar. 9th, 1885	
Paper on "The gradual reduction system of manufacturing flour by chilled iron rolls," by Mr Henry MacDonnell, Stockton-on-Tees.	96
Discussion on the above.	115
Apr. 13th, 1885	
Visit to the Cleveland Flour Mills, South Stockton.	119
Discussion on "The gradual reduction system of manufacturing flour by chilled iron rolls," being paper read at last meeting by Mr Henry MacDonnell, Stockton-on-Tees.	123
Paper on "Telpher lines; or, the transport of goods on aerial tramways, with the aid of electricity, by Professor Fleeming Jenkin, L.L.D., F.R.S., Edinburgh University	133
May, 18th, 1885	
Discussion on "Telpher lines; or, the transport of goods on aerial tramways, with the aid of electricity, by Professor Fleeming Jenkin, L.L.D., F.R.S., Edinburgh University.	151
Paper on "The manipulation of heavy forgings," by Mr T. Putnam, Darlington.	163
Discussion on the above.	179
Aug. 16th, 1885	
Excursion to Hury Reservoir	187
Paper on "The Hury Reservoir," by Mr W. H. C. Stanford.	191
Report on the Hury Reservoir by Mr Wm. Gunn.	198

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1885-1886

PRESIDENT: MR ALFRED C. HILL

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov, 16th, 1885	
Annual report and balance sheet	2
Discussion on Auditor's report	10
President's address by Mr A.C. Hill, (This short address suggested the need for papers on the production of low silicon iron, methods for disposal of slag and the saving of fuel in steam engines.)	15
Paper on "Modern practice in slide-valves," by Mr Tom Westgarth, Middlesbrough.	20
Discussion on above.	34
Dec. 14th, 1885	
Paper on "The tower spherical engine," by Mr R. H. Heenan, M.I.C.E., M.I.M.E., Manchester.	45
Discussion on above.	64
Discussion on "modern practice in slide valves" by Mr Tom Westgarth	70
Jan. 18th, 1886	
Paper on "Pile-driving machines," by Mr Perry F. Nursey, C.E., President of the Society of Engineers, London.	72
Discussion on above.	85
Mar. 1st, 1886	
Paper on "An outline history of the locomotive engine," by Mr Theodore West, Darlington.	94
Letter from Mr E. A. Cowper.	119
Discussion on above.	121
Apr. 5th, 1886	
Paper on "An outline history of the locomotive engine," (being sequel to the former paper) by Mr Theodore West, Darlington.	126
Discussion on above.	166
May, 17th, 1886	
Paper on "Material economy in house girders and permanent way," by Mr R. H. Graham, Greenwich. (Paper refers to metal and wood railway sleepers.)	172
Discussion on above.	197

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1886 -1887

PRESIDENT: MR RICHARD HOWSON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov, 22nd, 1886	
Annual report	2
Auditor's report	5
President's address by Mr Richard Howson, Sir B. Samuelson & Co., Middlesbrough on "The conservation of force and some of its possibilities." (This address considered the transformation of energy states between potential, kinetic, heat, liquid and gaseous states including the human organism; with application to industrial energy sources such as the steam engine and electrical energy)	12
Dec. 20th, 1886	
Paper on "The Mersey Tunnel," by Mr Francis Fox, M. Inst., C.E. (Sir Charles Fox & Sons), Westminster.	38
Discussion on the above.	57
Jan. 17th, 1887	
Paper on "Gas engines," by Mr Edward Crowe, Middlesbrough.	64
Discussion on the above.	83
Mar. 7th, 1887	
The late Mr John Thompson	91
Paper on "Hydraulic cement from Cleveland slag," by Mr J. E. Stead, F.I.C., F.C.S., Middlesbrough	93
Discussion on the above.	130
Apr. 4th, 1887	
Paper on "Dynamometric measurement," by Mr R. H. Froude, London.	148
Discussion on the above.	163
May, 16th, 1887	
The late Mr Samuel Godfrey	167
Paper on the "Production and use of water-gas," by Mr A. Wilson, Stafford.	169
Discussion on the above.	190

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1887-1888

PRESIDENT: MR RICHARD HOWSON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 14th, 1887	
Annual report	2
Auditor's report	5
President's address by Mr R. Howson. (Brief Address refers to the "extraordinary" development of similar Institutions in every department of science since the formation of the CIE in 1864.)	10
Paper on "The effect of dissociation on combustion," by Mr Edward Crowe, Middlesbrough.	13
Discussion on the above.	22
Dec. 12th, 1887	
Paper on "The Vizcayan Mining Industry; or the Iron Mines of Bilbao," by Mr Jeremiah Head, M. Inst. C.E., Middlesbrough	36
Discussion on the above.	68
Feb. 23rd, 1888	
Paper on "The working of the new Patent Law," by Mr G.J. Clarkson, F.I.P.A., Stockton-on-Tees.	83
Discussion on the above.	97
Apr. 16th, 1888	
"The Architect's Registration Bill"	109
Paper on "The Stockton and Middlesbrough Water Works," by Mr D. D. Wilson, Middlesbrough.	111
Jun. 4th, 1888	
Paper on "Cupolas for re-melting cast iron," by Mr Charles Hornung, Middlesbrough.	188
Discussion on the above. (The discussion includes a reference to the injection of hydrocarbon oil "two penny-worth per hour" into the tuyeres of a cupola by Clyde Pipe Foundry, Glasgow : Invented by their foreman, Mr William Dickey.)	202
List of Members and Rules at the end of the proceedings	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1888 -1889

PRESIDENT: MR CHARLES WOOD

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 19th, 1888	
Annual report and balance sheet	3
President's address by Mr Charles Wood, Tees Ironworks, Middlesbrough. (Topics included the development of alloys and metalloids for iron and non-ferrous metals; for example the addition of silicon to pure cast iron. Also the development of steel sleepers for railways.)	17
Dec. 17th, 1888	
Paper on "The Cowles process of electrical smelting and the production of aluminium," by Mr William Boby, London.	45
Discussion on the above.	66
Jan. 28th, 1889	
Paper on "Forced and assisted draught: as applied to marine and other boilers and other purposes," by Mr Henry Wilson, Stockton.	80
Discussion on the above	93
Feb. 25th, 1889	
Paper on "The waste of fuel and possibilities of economizing same," by Mr R. J. Worth, Stockton.	109
Discussion on the above.	130
Appendix.	145
Apr. 8th, 1889	
Discussion on "The waste of fuel and possibilities of economizing same," being paper read at last meeting by Mr R. J. Worth, Stockton.	149
Paper on "The race to Edinbro," by Mr Jno. H. Barker, Newcastle.	172
Jun. 3rd, 1889	
Discussion on "The race to Edinbro'," being paper read at last meeting by Mr Jno. H. Barker, Newcastle-on-Tyne.	209
List of Members and Rules at the end of the proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1889 -1890

PRESIDENT: MR CHARLES WOOD

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 20th, 1889	
Annual report and balance sheet	2
President's introductory remarks and comments on electric rivetting of iron plate.	8
Paper on "Gold mining in Australia," by Mr Theodore West, Darlington.	13
Discussion on above.	41
Jan. 29th, 1890	
The late Mr Daniel Adamson	45
Adjourned discussion on "Gold mining in Australia," being paper read at last meeting by Mr Theodore West, Darlington.	47
Paper on "The Goodfellow and Cushman light weight, high capacity tubular frame freight cars," by Mr M. R. Jefferds, C.E., London.	55
Discussion on above.	80
Mar. 12th, 1890	
The late Mr Jopling	89
Paper on "Is it desirable that the railway systems of Great Britain and the Continent should be continuous" and, if so, whether by a bridge or a tunnel across the Dover Straits?" by Mr Jeremiah Head, M. Inst., C.E., Middlesbrough.	91
Discussion on above.	104
Apr. 23rd, 1890	
Adjourned discussion on "Is it desirable that the railway systems of Great Britain and the Continent should be continuous? and, if so, whether by a bridge or a tunnel across the Dover Straits?" by Mr Jeremiah Head, M. Inst., C.E., Middlesbrough, with communications from Mr Wigham Richardson, Newcastle and Professor W. Boyd Dawkins, Manchester.	111
May, 21st, 1890	
Papers on "Street tramways," by Mr W. Southorn, Guisborough.	144
Discussion on above.	193
Jul. 21st, 1890	
Visit to Lumpsey Mines, near Brotton, to inspect Priestman's oil engine and Steavenson's hydraulic drill at work.	201
List of Members and Rules at the end of the proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1890 -1891

PRESIDENT: MR C. J. BAGLEY

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 24th, 1890	
Annual report and balance sheet	3
Presidential address by Mr J. Bagley, Moor Ironworks, Stockton, on "A comparison of American and Cleveland blast-furnace plant." (Topics covered included the reputation of the C.I.E. abroad, outstanding production rates of American blast furnace plant based on facilities to allow hard driving with shorter campaigns and accelerated re-lines, and the potential for matching in Cleveland by modification of existing plant or Greenfield site.)	9
Paper on "The desiccation of the blast in the manufacture of pig iron," by Mr W. Henry Fryer, B.A., Coleford	16
Dec. 15th, 1890	
Discussion on "The desiccation of the blast in the manufacture of pig iron," by Mr W. Henry Fryer, B.A., Coleford.	78
Paper on "The manufacture of basic open-hearth steel," by Mr James Davis, Park Gate, Rotherham.	87
Jan. 19th, 1891	
Mr W. Henry Fryer's reply on the discussion of his paper on "The desiccation of the blast in the manufacture of pig iron."	103
Additional contribution to the discussion on Mr Fryer's paper, by Mr Charles Cochrane, Pedmore, Near Stourbridge.	109
Paper on "Bessemer calculations and tables", by Mr W. Henry Fryer, B.A., Coleford.	111
Discussion on "The manufacture of basic open-hearth steel," read at last meeting by Mr James Davis, Park Gate, Rotherham.	120
Appendix: Description of samples displayed at the meeting.	158
Feb. 23rd, 1891	
Paper on "Notes on American blast-furnace practice and a comparison with the work done in the Cleveland District," by Mr W. Hawdon, Middlesbrough.	171
Discussion on the above.	190
Apr. 6th, 1891	
Paper on "Observations on various matters of interest to engineers in the United States of America," by Jeremiah Head, M. Inst., C.E., of Middlesbrough and London.	207
Discussion on the above.	270
Apr. 25th, 1891	
Paper on "Railway signalling," by Mr William Jno. Cudworth, Darlington.	281
Discussion on the above.	304

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1891-1892

PRESIDENT: MR C. J. BAGLEY

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 16th, 1891	
Annual report and balance sheet	3
Paper on "Priestman's oil engine," by Mr M. B. Mountain, Glasgow. (Ref. Priestman Bros., Hull.)	11
Discussion on the above	48
Dec. 14th, 1891	
Paper on "The Pietzka Patent puddling and heating furnace," by Mr Joseph von Langer, Leeds.(Ref. Witkowitz Iron & Steel Works, Austria.)	61
Discussion on the above	74
Jan. 18th, 1892	
Paper on "Domestic sanitation," by Mr R. Laing Hay, Architect and Consulting Sanitary Specialist, Newcastle-upon-Tyne.	87
Discussion on the above	113
Feb. 22nd, 1892	
Paper on "Draining mines," by Mr Henry Davey, M. Inst., C.E., Westminster.	127
Discussion on the above	135
Apr. 4th, 1892	
Paper on "A new incline truck drop for calcining kilns," by Mr Charles Wood, M. Inst., C.E., Middlesbrough.	146
Discussion on the above.	150
Paper on the "Skinningrove Harbour Works," by Mr William Kidd, Assoc. M. Inst., C.E., Loftus-in-Cleveland.	154
Discussion on the above	164
May, 23rd, 1892	
Paper "On the subterranean water-sheds of Cleveland, their features of interest to the engineer and the mechanical problems they involve," by Mr A. L. Steavenson, Durham.	183
Discussion on the above	203

List of Members and Rules at the end of Proceedings.

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1892 -1893

PRESIDENT: MR Wm. HAWDON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 14th, 1892	
Annual report and balance sheet	3
President's address by Mr Wm. Hawdon, Sir B Samuelson & Co., Middlesbrough. (The President encouraged Iron makers to utilise local phosphoric ores rather than foreign, the impact of which had tripled in recent years. He claimed that the advent of the basic Bessemer process and Saniters' desulphurisation technique favoured use of local iron in steel production. This was necessary as demand for iron itself was falling due to steel becoming the material of choice for construction and ship building.)	11
Paper on "The application of the Le Chatelier pyrometer to blast-furnaces," by Mr Chas. Lowthian Bell, Middlesbrough	25
Discussion on the above	32
Dec. 19th, 1892	
Paper on "The desulphurising of iron and steel by the calcium oxy-chloride process," by Mr E. H. Saniter, Wigan	43
Discussion on the above	56
Jan. 16th, 1893	
Paper on "The early struggles of open-hearth steel making and of steel casting manufacture," by Mr Wm. Shaw, Middlesbrough	71
Discussion on the above	84
Feb. 20th, 1893	
Paper on "The Luhrig process of washing and treating coal," by Mr J. l'Anson, Darlington	97
Discussion on the above	113
Paper on "The 28in. steel mills, with shears and subsidiary plant, for the New British Iron Co. Ltd.," by Mr Jeremiah Head, M. Inst., C.E., F.C.S, Middlesbrough	121
Discussion on the above	130
Apr. 20th, 1893	
Paper on "Compounding blowing engines," by Mr Tom Westgarth, Middlesbrough	137
Discussion on the above	145
May, 15th, 1893	
Paper on "Concrete and its application to marine construction," by Mr William Kidd, Assoc., M. Inst., C.E., Middlesbrough	160
Paper on "Lessons learnt at sea : Impressions of a marine engineer," by Mr John Henry Barker, Newcastle-on-Tyne	181
Discussion on the above	
List of Members at end of the Proceedings	197

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1893 -1894

PRESIDENT: MR Wm. HAWDON

SECRETARY: ANGUS MACHPERSON

PROCEEDINGS

	Page No
Nov. 13th, 1893	
Annual report and balance sheet	2
Paper "On vessels constructed for the over-sea bulk oil trade," by Mr E. H. Craggs, Middlesbrough.	8
Discussion on the above.	24
Dec. 18th, 1893	
Paper on "Harbour improvements at Sunderland : New protecting piers," by Mr G. T. Nicholson, A.M.I.C.E., Sunderland. (River Wear Commissioners)	40
Discussion on the above.	57
Feb. 19th, 1894	
Paper on "Economy of steam in rolling-mill engines," by Mr R. J. Worth, Stockton-on-Tees.	65
Discussion on the above.	88
Mar. 19th, 1894	
Communication from Mr Rupert Thos. Cooke	100
Discussion on "Economy of steam in rolling-mill engines," being paper read at previous meeting by Mr R. J. Worth, Stockton-on-Tees.	105
Paper on "Evaporative condensers," by Mr Tom Westgarth, Middlesbrough.	117
Discussion on the above.	123
Apr. 9th, 1894	
Paper on "Bilbao Harbour Works," by Mr Wm. Kidd, Assoc. M. Inst., C.E., Loftus-in-Cleveland.	132
Paper on "Electric power installations," by Mr D. Selby Bigge, Newcastle-on-Tyne.	150
May, 21st, 1894	
Paper on "Electric power installations," being "Supplementary notes" to paper read at previous meeting by Mr D. Selby Bigge, Newcastle-on-Tyne.	166
Discussion on the above.	173
Jul. 20th, 1894	
Excursion to the Waterworks of the Stockton and Middlesbrough Corporation in Baldersdale.	191
List of Members and Rules at the end of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1894 -1895

PRESIDENT: MR J. E. STEAD

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 12th, 1894	
Annual report.	3
Paper on "Different types of basic open hearth steel furnaces." by Bernard Dawson, Malvern Link and discussion.	10
Dec. 17th, 1894	
President's address by Mr J. E. Stead, Pattinson & Stead, and discussion. (The President discusses the reduction of 'waste' in iron and steel production by reducing steel loss in slags; the use of phosphorus bearing slags in agriculture and producing slag-based cements and concrete. The loss of heat in B.F. slags is highlighted. Technical review examines performance of mixes and the Saniter desulphurisation process, new forms of B.F. and the advent of alloy steels. The merging of local technical societies and the formation of Technical Libraries to bring together all published work on steelmaking and other interests is advocated.)	67
Paper on "The Meldrum Furnace and economy in steam raising." by T. F. Meldrum, Manchester and discussion.	94
Jan. 14th, 1895	
Paper on "The relative fertilizing value of different varieties of basic slag." by J. E. Stead, Agricultural Analyst to the County Borough of Middlesbrough and discussion.	123
Paper on "Solubility of basic slag." by C. H. Ridsdale and discussion.	166
Feb. 18th, 1895	
Paper on "American rail and tramways." by Jeremiah Head, London & Middlesbrough.	201
Apr. 8th, 1895	
Paper on "The microscopic structure of steel." by Professor Arnold and discussion.	263
May, 20th, 1895	
Paper on "A new economical desulphurising gas calcining kiln." by Charles Wood, Middlesbrough and discussion.	268
Paper on "Modern gas lighting." by David Terrace, Middlesbrough and discussion.	290

A list of Members is given at the beginning of the proceedings

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1895 -1896

PRESIDENT: MR J. E. STEAD

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 11th, 1895	
Annual report	2
Memoirs for Mr Edgar Gilkes and Mr Wm. H. Barrett.	4
Paper on "The progress of the movement for the introduction of the metric system into the United Kingdom," by Mr G. H. Baines, West Hartlepool.	10
Paper on "The advantages of the metric system compared with the British system of weights and measures," by Mr F. Howard Livens, A.M.I.C.E., M.I.M.E., Lincoln.	27
Discussion on the above.	45
Dec. 16th, 1895	
Paper on "An introduction to the study of micro-metallography," by Mr J. E. Stead, Middlesbrough.	53
Paper on "Preliminary micro-chemical examination of malleable casting," by Mr J. E. Stead, Middlesbrough.	79
Discussion on the above.	94
Appendix to the above.	98
Jan. 13th, 1896	
Paper on "The South Yorkshire Coalfield," by Mr Frank Baker, C.E., F.G.S., Middlesbrough.	105
Discussion on the above.	115
Feb. 17th, 1896	
Paper on "British types of land boilers," by Mr Edward G. Hiller, Manchester.	121
Communication from Mr Jeremiah Head.	154
Discussion on the above	158
Appendix to the above.	169
Apr. 13th, 1896	
Paper on "Electric tramways," by Mr Philip Dawson, Assoc., M. Inst., C.E., M.I.E.E., Westminster.	173
Discussion on the above.	197
Paper on "The economical utilisation of waste gases from blast furnaces," by Mr A. S. Keith, Middlesbrough.	203
Discussion on the above.	212
Summer excursion to the Stockton and Middlesbrough Water Works at Hury and Blackton in Baldersdale.	225

A list of Members and Rules are given at the beginning of the Proceedings.

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1896 -1897

PRESIDENT: MR THOMAS WESTGARTH

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 9th, 1896	
Annual report	3
Paper on "The Gravitation Works of the Stockton and Middlesbrough Water Board," by Mr F. W. MacAuley, Assoc. Mem., Inst., C.E., Resident Engineer.	10
Discussion on the above.	32
Dec. 14th, 1896	
Paper on "The Bertrand-Thiel process of making steel," by Mr Percy C. Gilchrist, A.R.S.M., F.R.S., London.	125
Discussion on the above.	177
Appendix I by J. E. Stead on the effect of phosphorus and silicon in fluid iron when mixed with or brought into contact with fluid oxide of iron.	202
Appendix II The Bertrand-Thiel open hearth process by Joseph Hartshorne, Philadelphia.	206
Jan. 11th, 1897	
Paper on "Carburetted water gas," by Mr A. G. Glasgow, Westminster.	43
Discussion on the above.	65
Feb. 15th, 1897	
Paper on "Light railway construction," by Mr E. R. Calthrop, C.E., Liverpool.	78
Discussion on the above.	121
Mar. 29th, 1897	
Paper on "Motor cars," by Mr W. Worby Beaumont, M. Inst. C.E., M. Inst., Mech. E., Westminster.	220
Discussion on the above.	269
Oct. 4th, 1897	
Exhibition of Lantern slides illustrating views of tours of the Iron and Steel Institute members in Spain.	280

A list of Members and Rules are included at the beginning of the proceedings.

Note that pages 41 to 124 have been bound incorrectly in the body of the Proceedings which explains the odd sequence of page numbers.

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1897 -1898

PRESIDENT: MR THOMAS WESTGARTH

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 15th, 1897	
Annual report and statement of accounts	3
President's address by Mr Thomas Westgarth was a short description of the electrical machinery at the Works of Messrs Sir Christopher Furness, Westgarth & Co., Ltd., Middlesbrough. (The address includes early example of electrical power generation to drive cranes, fans, rolls, hoists, lighting and machinery shafting in the speaker's works and initial generation by dynamos driven by vertical triple expansion condensing engines and boiler plant.)	8
"Notes on modern practice in electric power work and the recent developments on the North-East Coast," by Mr D. Selby Bigge, Newcastle-on-Tyne.	15
Discussion on the above.	28
Dec. 13th, 1897	
Paper on "The principles and elements of electric driving," by Mr R. G. Bell, Newcastle-on-Tyne and discussion.	43
Jan. 17th, 1898	
Memoir of the late Mr T. D. Ridley.	58
Paper on "Pumping engines with description of those used by the Stockton and Middlesbrough Corporation's Water Board," by Mr R. J. Worth, Stockton-on-Tees.	61
Discussion on the above.	100
Feb. 28th, 1898	
Lecture on "The Workmen's Compensation act, 1897," by Mr Stanley Brown, London.	111
Discussion on the above.	129
Oct. 3rd, 1898	
Paper on "Water tube boilers," by Mr J. H. Ashby, London.	143
Discussion on the above.	168
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CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1898 -1899

PRESIDENT: MR G. J. CLARKSON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 14th, 1898	
Annual report.	3
Paper on "A microscopical study on causes inducing to structural fracture in iron and steel." by Dr J. E. Stead, Middlesbrough.	12
Memoir -- Mr John Gjers.	38
Dec. 19th, 1898	
Paper on "The Ford and Moncur hot blast stove." by Mr Jos. H. Harrison, Middlesbrough followed by discussion.	45
Jan. 16th, 1899	
Paper on "Water cooling as applied to condensing." By Mr H. W. Jarvis, Middlesbrough followed by discussion.	76
Feb. 27th, 1899	
President's address: "A review of the transactions and utility of the Cleveland Institution of Engineers." by Mr G. J. Clarkson, Teesdale Iron Works, South Stockton. (The address included a review of the formation of the C.I.E. and content of previous presidential addresses; development of the 'Cleveland' blast furnace and comparison with hard driven, high output and short campaign American furnaces; claim for Cleveland's development of Cowper and Whitwell hot blast stoves; persistence of Puddling process and replacement by Basic Bessemer and Basic Open Hearth processes and reluctance to accept basic steel for certain applications.	102
Memoir - Mr Jeremiah Head.	120
Mar. 16th, 1899	
Paper on "Gas Power." by Mr J. Emerson Dowson, Westminster followed by discussion.	129
Apr. 24th, 1899	
Paper on "Charging steel furnaces." by Mr Henry Tomkins, Stockton followed by discussion.	182
May, 29th, 1899	
Paper on "Electric traction on tramways." by Mr J. Clifton Robinson, London.	207
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CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1899 -1900

PRESIDENT: MR G. J. CLARKSON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 13th, 1899	
Annual report and statement of accounts.	3
Presidential address by Mr G. J. Clarkson: "Patents for the British Empire." (The address covered the multiplicity of patents required to cover a single application in the British Empire and Colonies and approach to single patents per country.)	10
Paper on "Raising or lifting water by air, or the Pohle Air Pump," by Mr Charles Wood, M.I.C.E., Middlesbrough.	12
Discussion on the above.	20
Dec. 11th, 1899	
Paper on "Superheated steam," by Mr J. H. Ashby, London.	31
Discussion on the above.	49
Jan. 22nd, 1900	
Paper on "The pneumatic pyrometer and autographic recording gauge," by Mr Edward A. Uehling, Middlesbrough.	61
Discussion on the above.	86
Feb. 26th, 1900	
Paper on "Practical metallography," by Mr J. E. Stead, F.I.C., F.C.S., Middlesbrough.	97
Note on "The structure of phosphoretic pig metals," by Mr J. E. Stead, F.I.C., F.C.S.	131
Apr. 2nd, 1900	
Paper on "Automatic coal weighing and recording machines," by Mr Charles Ingrey, A.M.I.C.E., Westminster.	140
Discussion on the above.	153
Apr. 23rd, 1900	
Paper on "Zinc as a protective coating for iron and steel," by Mr Sherard Cowper-Coles, Westminster.	160
Discussion on the above.	226
List of Members and Rules at beginning of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1900 -1901

PRESIDENT: MR W. H. PANTON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 12th, 1900	
Annual report.	3
Presidential address by Mr W. H. Panton, Britannia Iron Works, Middlesbrough. (Topics included the superior Continental and American Iron and Steelmaking practices; the extension of open hearth steelmaking; and the static Bessemer development.)	11
Dec. 10th, 1900	
Paper on "Metallic alloys." By Mr J. E. Stead, Middlesbrough.	23
Feb. 4th, 1901	
Paper on "Elementary training of the engineer." by Mr Angus MacPherson, Middlesbrough including discussion..	86
Mar. 25th, 1901	
Paper on "Blowing engines." by Mr T. Westgarth followed by discussion.	125
Apr. 22nd, 1901	
Paper on "Water tube boilers in the British and other navies." by R. J. Worth, Stockton followed by discussion.	145
Memoir - Mr Charles Wood.	208

A list of Members and Rules are given at the beginning of the Proceedings.

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1901 -1902

PRESIDENT: MR W. H. PANTON

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 13th, 1901	
Annual report.	2
Presidential address by Mr W. H. Panton, Britannia Iron Works, Middlesbrough. (Topics included the need for greater specialisation in rolled product range to compete with USA and Germany.)	8
Paper on "Lord Armstrong: His life and work." by Dr H. P. Gurney, Newcastle-upon-Tyne.	11
Dec. 10th, 1901	
Paper on "Boiler feed water and water softening." by J. H. Ashby, London followed by discussion.	31
Jan. 21st, 1902	
Paper on "Electrical accumulators." by M. Bohdan de Szyszkowski, Paris followed by discussion.	64
Feb. 25th, 1902	
Paper on "Recent practice in central condensing plants." by W. H. Roy, Manchester.	100
Mar. 25th, 1902	
Discussion on "Recent practice in central condensing plants" "Loewe Works, Berlin." by H. F. L. Orcutt.	141 155
Apr. 29th, 1902	
"A visit to the United States of America." by Henry Crowe, Hartlepool followed by discussion.	159
List of Members and Rules at beginning of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1902 -1903

PRESIDENT: MR F. HERBERT MARSHALL

SECRETARY: ANGUS MACPHERSON

PROCEEDINGS

	Page No
Nov. 11th, 1902	
Annual report.	3
Paper on "The manufacture of weldless chains." by A G. Strathern, Gartsherrie followed by discussion.	11
Dec. 9th, 1902	
Paper on "The use of blast furnace gas in gas engines." by C. A. Cochrane, Middlesbrough (Cochrane Ormesby Ironworks) followed by discussion.	52
Jan. 20th, 1902	
Paper on "The manufacture of open hearth steel." by C. H. Macmillan, Manchester, followed by discussion.	120
"Notes on recent visits to the United States." by H. S. Jackson, Middlesbrough, followed by discussion.	149
Feb. 24th, 1903	
Paper on "The steam turbine." by the Hon. G. L. Parsons, Newcastle-upon-Tyne followed by discussion.	190
Mar. 24th, 1903	
Paper on "Roller bearings, their latest developments and practical applications." by T. W. How, Westminster followed by discussion.	240
Apr. 21st, 1903	
Paper on "Recent developments in electric power plant." by J. W. F. Warren, Middlesbrough followed by a discussion.	296
List of Members and Rules at beginning of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1903-1904

PRESIDENT: MR F. HERBERT MARSHALL

SECRETARIES: ANGUS MACPHERSON and WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 9th 1903	
Annual Report and Accounts	
Presidential Address by Mr F. Herbert Marshall, Tees Iron Works, Middlesbrough. (Topics included a short history of the C.I.E.; American amalgamation of works into combines; and innovation in plant design.)	2 8
Paper on "Blowing Engines at Tees Iron Works," by Mr F. Herbert Marshall, Middlesbrough, followed by discussion	15
Memoir – Mr A C Downey	43
Feb. 1st, 1904	
Paper on "Simple Instructions to Boiler and Engine Attendants," by Mr H. G. Scott, Middlesbrough, followed by discussion.	47
Feb. 22nd, 1904	
Paper on "Some notes of the cost of generating electrical energy," by Mr E J Fox, Rugby, followed by discussion.	83
Mar. 21st, 1904	
Paper on "Motor car construction," by Mr A. M. Hall, Middlesbrough	139
Memoir – Sir J. W. Pease, Bart., M.P.	164
Apr. 18th, 1904	
Paper on "Coke ovens and their history," by Mr Paul J. Mallmann, (M.A., New York), London, followed by discussion.	166
Appendix I. List of Principal patents granted from 1620 to 1903	218
Appendix II. Latest type of Otto by-product ovens	224
Appendix III. The Huessener coke oven	229
Appendix IV. Koppers regenerator by-product coke oven	232
Memoir – Mr Angus Macpherson	244

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1904-1905

PRESIDENT: MR ROBERT J. WORTH

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 7th 1904	
Annual Report and Statement of Accounts	3
Presidential Address by Mr R. J. Worth, McKenzie & Co., Stockton. (Topics covered include developments in blast furnace practice since the President relocated to Cleveland in 1862; closed top furnaces; blowing engine development ; stove preheaters ; the 'Cleveland' blast furnace ; growth in output; poor mill performance; the need for development of steam plant efficiency for reversing mills; and efficiency of steam power for mine winding gear.) Discussion on the above.	18
Dec. 5th, 1904	
Paper on "Thermometers and pyrometers with some of their industrial applications," by Mr Robert S Whipple, Cambridge. Discussion on the above.	48
Jan. 16th, 1905	
Paper on "Are we trying to meet foreign competition in the manufacture of iron and steel?," by Mr Jos. H Harrison, M Inst. C.E, Middlesbrough. Discussion on the above.	89
Feb. 20th, 1905	
Paper on "Science in the Iron Foundry," by Mr J E Stead, F.R.S., F.I.C., etc., Middlesbrough	119
Appendix I. "Various authorities on the effects of metalloids, etc.. in cast iron.	144
Appendix II. Specifications for U.S foundry irons	151
Appendix III. Specifications for foundry materials	153
Appendix IV. Experience of U.S. ounders working foreign irons.	175
Paper on "Pig iron for foundry work," by Mr P Munnoch,, Middlesbrough.	177
Discussion on the above.	189
Mar. 27th, 1905	
President's address by Mr R. J. Worth. (Topics covered included fuel inefficiency in steam driven rolling mills and the case for replacing reversing mill with 3-high or double 2-high mill powered with gas engines or steam turbine.)	207
Apr. 17th, 1905	
Paper and discussion on "Ferro-concrete and its applications," by Mr Cecil C Markham, Assoc. M. Inst. C.E., Darlington	216
List of Members and Rules at beginning of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1905-1906

PRESIDENT: MR ROBERT J. WORTH

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 13th 1905	
Annual Report and Statement of Accounts	1
New rules	7
Discussion on Mr J E Stead's lecture on "Science in the iron foundry" presented in the last session.(Feb 20 th 1905)	11
Dec. 11th, 1905	
Paper on "Design and the safety of machinery," by Mr Edward Crowe, Stockton-on-Tees.	14
Discussion on the above.	30
Jan. 29th, 1906	
Paper on "Non-conducting work with special reference to boiler and pipe covering by Mr Ashby W Warner, A.I. Mech. E., Norton	48
Discussion on the above	68
Paper on "The commercial utilisation of the surplus gases from blast furnaces," by Mr Gerald Hoogh-Winkel, M.I.E.E., M.I. Mech. E., London.	79
Discussion on the above.	98
Feb. 12th, 1906	
Paper on "Turbines vs. piston-engines," by Mr R M Neilson, A.M.I. Mech. E. Hartlepool.	105
Discussion on the above.	127
Mar. 12th, 1906	
Paper on "Forging presses," by Mr A J Capron, M.I. Mech. E. Sheffield.	137
Discussion on the above.	157
Paper on "Crystallisation and segregation of steel ingots," by Mr J E Stead, F.R.S. F.I.C., Middlesbrough. <i>(Delivered in Middlesbrough on Nov, 13th, 1905)</i>	163
Discussion on the above.	172
Apr. 9th, 1906	
Paper on "A visit to German steel works and rolling mills," by Mr Henry Crowe, Middlesbrough.	218
Discussion on the above.	266
Apr. 30th, 1906	
Death of Sir David Dale.	275
Further discussion of Henry Crowe's paper from the April meeting.	276
List of Members and Rules at beginning of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1906-1907

PRESIDENT: MR J. H. HARRISON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 12th 1906	
Annual Report and Statement of Accounts	2
President's address by Mr J. H. Harrison, Consulting Engineer, Middlesbrough. (Topics included an appreciation of J. E. Stead's contributions; encouragement of younger members to present papers; improvements in blast furnace practice; benefits of integrated plants; benefits of size of steel furnaces; conversion of waste products for profit, e.g. blast furnace slag; and use of excess blast furnace gas to generate electricity for sale.)	10
Dec. 10th, 1906	
Paper on "Productive efficiency of steel works," by Mr James Waite, Redcar.	31
Discussion on the above.	47
Jan. 28th, 1907	
Conversazione – (Exhibition of models and discussion of new technology.)	67
Communication on "Brinell's method for testing the hardness of metals." by Mr J E Stead and Mr T Greville-Jones	69
Description of "Parson's turbo blowing engine." by Mr A. Q. Carnegie.	81
Description of "The Theisen patent centrifugal contra-flow gas washer." by Mr Tom Westgarth	84
Description of "Model of tilting steel furnace adopted for the Talbot steel process." by Mr Thomas Twynam	87
Description of "The Auxetophone," by Mr H. L. Short	89
Jan. 14th, 1907	
Paper on "The utility of cleaning blast furnace gas," by Mr H. G. Scott, Middlesbrough	93
Discussion on the above.	117
Feb. 11th, 1907	
Further discussion on "The utility of cleaning blast furnace-gas"	144
Appendix. "Heating of boilers and stoves with gas as clean as possible" by F. W. Lurmann. (Translated from 'Stahl & Eisen' of April 10 th , 1907.)	194
Mar. 11th, 1907	
Paper on "Principles and practice of foundry work," by Mr Robert Buchanan, Walsall.	201
Discussion on the above.	239
List of Members and Rules at end of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1907-1908

PRESIDENT: MR C. H. RIDSDALE

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 11th, 1907	
Annual Report and Statement of Accounts	3
Presidential address by Mr C. H. Ridsdale, North Eastern Steelworks, Middlesbrough. (Topics covered included application of science to profit and loss in the manufacture of iron and steel and importance of quality control of ores, fuel and fluxes. Process measurements and uniformity of product and quality standards.)	12
Dec. 9th, 1907	
Paper on "The limits to economy in the use of electric driving," by Mr Robert J Worth, Stockton	43
Discussion on the above	61
Jan. 20th, 1908	
Paper on "The development of the Rateau patent of exhaust steam utilisation," by Mr P J Mitchell, London	97
Discussion on the above	148
Feb. 17th, 1908	
Conversazione	177
Mr J.E. Stead demonstrated Baumann's method of measuring the quantity of sulphur in irons and steels by means of bromide paper steeped in dilute sulphuric acid. Other developments discussed included the use of graphite for oil-less lubrication, and Duddel's oscillograph for pressure and current investigations	
Mar. 9th, 1908	
Paper on "Foundry practice with special reference to marine work," by Mr William Dalrymple, South Shields	201
Discussion on the above	212
Apr. 6th, 1908	
Paper on "Electrically driven reversing rolling mills, by Mr Henry Crowe, Saltburn	229
Discussion on the above.	246
List of Members and Rules at beginnings of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1908-1909

PRESIDENT: MR E. HALL CRAGGS

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

Nov. 9th, 1908	Page No
Annual Report and Statement of Accounts, visit of ISI to Middlesbrough.	3
Presidential address by Mr E. H. Craggs, R Craggs, Shipbuilders, Middlesbrough. (Topics covered included application of science to the design of iron and steel ships and dockyard cranes.)	13
Dec. 7th, 1908	
Paper on "Foundry practice, with reference to some principles and precautions in the iron foundry," by Mr Sidney G. Smith, Chesterfield.	31
Discussion on the above.	54
Jan. 11th, 1909	
Paper on "Electricity and its application to the reduction of waste," by Mr Arnold B. Gridley, Middlesbrough.	83
Discussion on the above.	112
Feb. 8th, 1909	
Conversazione - Exhibition and discussion of new developments including alumino-thermic material and Peat's patent air valve, with contributions from C.A. Parsons and E. Lugard.	135
Mar. 1st, 1909	
Paper on "Corrosion of iron and steel," by Mr Edward Crowe, Stockton.	148
Discussion on the above.	160
Apr. 5th, 1909	
Paper on "The manufacture of lime," by Mr William Sewell, Sunderland	182
Discussion on the above.	206
List of Members and Rules at beginning of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1909-1910

PRESIDENT: MR T. GREVILLE JONES

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 8th, 1909	
Annual report and Statement of Accounts	2
Presidential address by Mr T. Greville Jones, Dorman, Long & Co., Port Clarence. (Topics covered included developments in coal industry, size, and electric winding. By-product coke ovens, new ironstone mines, new blast furnace plant and equipment; Developments in Bessemer, open hearth and electric furnace steelmaking, and electric rolling mills.)	9
Dec. 6th, 1909	
Paper on "Civil and official engineers versus contracting engineers," by Mr Malcolm Blair, Middlesbrough	45
Discussion on the above	57
Jan, 24th, 1910	
Conversazione	
Exhibition and discussion of models and new equipment including the Shore Schleroscope, screw profiler, lubrication for wagon axles, brake oil tester, valve gear for winding engines, gripping gear for coal compression, and joints for railways and tramways.	63
Feb. 7th, 1910	
Paper on "Cleveland ironstone and iron," by Mr J E Stead, Middlesbrough	75
Discussion on the above	107
Mar. 7th, 1910	
Paper on "Foundry practice," by Mr E Lansdale, Middlesbrough	121
Discussion on the above	140
Paper on "The mechanical charging of blast furnaces," by Messrs. Edgar J W Richards and Thomas Lewis, Glengarnock	151
Discussion on the above	171

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1910-1911

PRESIDENT: MR T. C. HUTCHINSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov, 7th, 1910	
Annual report and Statement of Accounts.	2
Presidential address by Mr T. C. Hutchinson, Skinningrove Iron Co. Ltd., Skinningrove. (Topics covered included origin of C.I.E., steel ships, substitution of steel for puddled iron, Bessemer and Siemens, blast furnace by-products, and on the job undergraduate training.)	8
Dec. 12th, 1910	
Paper on "The state of science respecting the origin and model of propagation of gaseous explosions," by Professor William A Bone, D.Sc., PH.D., F.R.S., of the University of Leeds.	31
Discussion on the above.	49
Jan. 9th, 1911	
Paper on "The use of electric locomotives for shunting purposes," by Mr. Albert H Marshall., M.I.E.E., Middlesbrough.	54
Discussion on the above.	108
Feb. 6th 1911	
Paper on "Resume upon coal washing," by Mr Sherwood Hunter, Manchester.	124
Discussion on the above.	136
Mar. 6th, 1911	
Paper on "The by-product coking process and its future development," by Mr Ernest Bury, Skinningrove.	148
Discussion on the above.	178
Mar. 27th, 1911	
Conversazione	
Exhibition and discussion of new equipment including Erkrath carbon blocks and a water tube boiler.	197
Apr. 10th, 1911	
Paper on "Foundry practice," by Mr Thos. D. Wilson, Middlesbrough	206
Discussion on the above.	235

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1911-1912

PRESIDENT: MR H STONEWALL JACKSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov, 13th, 1911	
Annual report and Statement of Accounts	2
Presidential address by Mr H. S. Jackson, Westgarth & Co., Middlesbrough. (Topics covered included progress of marine engineering, engines, boilers, Parson's steam turbine, coal replacement by liquid fuel, gas engines and diesel engines.)	10
Memoir – Mr Richard Howson	26
Dec. 11th, 1911	
Paper on "Some modern developments in the electrical driving of rolling mills," by Mr C Antony Ablett, B.Sc., A.M. Inst. C.E.	30
Discussion on the above	52
Jan. 22nd, 1912	
Paper on "The electric furnace process as applied to the metallurgy of steels," by Mr Harold G. Ade Stedman, A.M. Inst. E.E.	78
Discussion on the above	117
Feb. 19th, 1912	
Demonstration of mechanicalised methods of analysis by Messrs C. H. and N. D. Ridsdale	149
Discussion on the above	159
Mar. 11th, 1912	
Paper on "Transporter bridges," by Robert Anderson, Coatham, Redcar	166
Discussion on the above	189
List of Members and Rules at beginning of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1912-1913

PRESIDENT: MR HENRY CROWE

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov, 11th, 1912	
Annual report and Statement of Accounts	2
Presidential address by Mr Henry Crowe, Dorman, Long & Co., Middlesbrough. (Topics covered included damaging strikes of past year, arbitration methods, cleaning of blast furnace gas and utilisation, steam turbine and gas engines, steam vs. electricity for rolling mills and rolling speeds and drafts.)	10
Paper on "When steel freezes," by Dr J E Stead, F.R.S.	33
Discussion on the above.	47
Dec, 2nd, 1912	
Paper on "Waste heat utilisation," by Mr I V Robinson, M.I. Mech, E., Hartlepool.	54
Discussion on the above.	70
Jan. 13th, 1913	
Paper on "The theoretical effect of increasing the oxygen of the blast supplied to blast furnaces," by Mr Charles A Edwards, M.Sc., Middlesbrough.	83
Discussion on the above.	101
Feb. 3rd, 1913	
Paper on "The permanent swelling of grey cast irons after repeated heatings or very prolonged heating," by Professor H.C.H. Carpenter, Manchester University.	120
Discussion on the above.	139
Mar. 3rd, 1913	
Social Event – Musical entertainment.	147
Apr. 7th, 1913	
Paper on "Modern practice in cleaning blast furnace and other gases," by Mr H. Stonewall Jackson, Middlesbrough.	152
Discussion on the above.	164

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1913-1914

PRESIDENT: Mr EDWARD CROWE

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

Nov, 10th, 1913	Page No
Annual report and Statement of Accounts	2
Presidential address by Mr Edward Crowe, Dorman, Long & Co., Middlesbrough (Topics covered included efficiency in iron and steelworks practice; machinery reliability; rolling mill engines; rolling speeds and heat content; Siemens basic and acid furnaces; electric furnace; gas, petrol and diesel engines.)	8
Jan, 19th, 1914	
Paper on "The application of clean blast furnace gas," by Mr D. Neustadter, London.	35
Discussion on the above.	63
Feb. 23rd, 1914	
Conversazione	81
Exhibition and discussion of models and new equipment including a laboratory electric furnace, slitting and grinding machine, arrangement of helical gears, horizontal hydraulic press, radiation pyrometer, heavy slab shears, and the Synchronoscope.	
Feb. 3rd, 1913	
Paper on "A few notes relating to the manufacture of iron and steel," by Mr Jos. H. Harrison, M. Inst.C.E.	94
Discussion on the above.	108
Apr. 6th, 1914	
Paper on "The testing of iron and steel for sulphur," by Mr J J Whiteley, Stockton.	127
Discussion on the above.	154
Paper on "Blast furnace bears and what they teach us," by Dr J E Stead, D.Sc., D.Met., F.R.S.	169
Discussion on the above	195
Addenda to above discussion. Note on "carbon hearths for blast furnaces" by Dr J E Stead, D.Sc., D Met., F.R.S.	214
Jul. 1914	
Paper on "Notes on divorcing, annealing and other features of structural coalescence in iron and steel," by Mr Henry M. Howe, LL.D., Honorary Member, Emeritus Professor of Metallurgy in Columbia University and Mr Arthur G. Levy, B. Sc., F.I.C.,	218
Discussion on the above.	248

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1914-1915

PRESIDENT: Sir THOMAS WRIGHTSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov, 10th, 1914	
Annual Report and Statement of Accounts	2
Presidential address by Sir Thomas Wrightson, Bart, Head, Wrightson & Co., Thornaby. (The President's topic for this Jubilee Celebration year for the Institution reviewed the changes during the previous 50 years in the North East and Cleveland in particular. The formation and development of the Institution was summarised, together with industrial, port and rail developments and the role of key individuals.)	8
Dec. 14th, 1914	
Paper on "A study of cast steel," by Mr J. H. Whiteley, Stockton	50
Discussion on above	69
Paper on "Metallographic methods for the detection of phosphorus in steel, and notes on 'Ghost Lines'," by Dr J. E. Stead, D. MET., D. Sc., F.R.S.	73
Jan. 18th, 1915	
Further discussion of Mr Whiteley's paper	83
Note on Ormesby blast furnace bear, by Mr A. O. Cochrane	87
Case of honeycombing in steel, by Mr Edward Crowe	89
Some particulars of a brittle ship plate, by Dr J. E. Stead	90
Feb. 8th, 1915	
Paper on "The manufacture of Electric Steel in the Stobie furnace," by Mr Victor Stobie, Sheffield	101
Discussion on above	114
Mar. 8th, 1915	
Paper on "Notes on modern Cleveland blast furnace practice," by Mr R. Sharp, Redcar	128
Discussion on above	157
Apr. 12th, 1915	
Presentation of his portrait to, Sir Thomas Wrightson	176
Paper on "A new type of large gas engine," by Mr H. F. Fullagar, M.A., Newcastle	179
Discussion on above	190
List of Members at the end of the Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1915-1916

PRESIDENT: MR WILLIAM HAWDON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 15th, 1915	
Annual Report and Statement of Accounts	3
Presidential address – Mr Wm. Hawdon, Sir B. Samuelson & Co., Middlesbrough: (Topics included the impact of the terrible war in Europe and made a plea for greater development of modern industry through scientific and technical education; also the need for integration of blast furnace and steel plant to minimise heat losses.)	13
Dec. 13th, 1915	
Paper on “The handling of material in ironworks,” by Mr R. H. Archer Coulson, Middlesbrough.	30
Discussion on above.	40
Jan. 10th, 1916	
Paper on “German shells, and the influence of certain elements on the physical properties of steel,” by Dr J. E. Stead, F.R.S.	51
Discussion on above.	64
Feb. 14th, 1916	
Conversazione	75
Conversazione and Lecture by Dr J. E. Stead on “The heat treatment of steel,” illustrated by lantern slides.	79
Mar. 13th, 1916	
Communication from the Iron & Steel Institute regarding the Carnegie Research Scholarship Fund	91
Paper on “Fuel economy,” by Professor William A. Bone, D.Sc., PH.D., F.R.S., London, S.W.	95
Discussion on above	115
Apr. 17th, 1916	
Statement by the President on the proposed Research Laboratory and Technical College.	134
Paper on “The precipitation of free carbon in irons and steels,” by Dr W. H. Hatfield, Sheffield	135
Discussion on above	146
List of Members at the end of the Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1916-1917

PRESIDENT: MR WILLIAM HAWDON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 22nd, 1916	
Annual Report and Statement of Accounts	3
Lecture on "The romance and realities of steel," by Professor Arnold followed by discussion.	14
Dec. 11th, 1916	
Lecture on "Cast Iron," by Professor Thomas Turner, Birmingham	23
Jan. 15th, 1917	
Lecture on "Science in the Smithy and Forge," by Mr William H. Cathcart, Glasgow	36
Feb. 14th, 1917	
Lecture on "Metallurgy in relation to warfare," by Professor Henry Louis	48
Mar. 12th, 1917	
Conversazione	57
Administrative matters	
Light refreshments, cigars and musical selections given by the Mills-Francis Orchestra.	
Apr. 30th, 1917	
Paper on "The respective merits of gas engines and steam turbines as applied to modern iron and steelworks practice," by Mr Douglas L. Cooper, Middlesbrough	65
Discussion on the above	80
List of Members at the end of the Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1917-1918

PRESIDENT: MR J. H. HARRISON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 19th, 1917	
Annual Report and Statement of Accounts	1
Presidential address by Mr J. H. Harrison, Consulting Engineer, Middlesbrough. (Brief address including reference to the use and recycling of waste products e.g. use of blast furnace slag for tar macadam. Also waste heat utilisation.)	17
Visit to Teesdale Ironworks	30
Dec. 10th, 1917	
Paper on "The burning of steel," by Mr W. H. Cathcart, Glasgow	39
Discussion on the above	56
Jan. 21st, 1918	
Paper on "Tilting metal mixers and steel furnaces," by Mr H. Stonewall Jackson, Middlesbrough	73
Discussion on the above	81
Feb. 18th, 1918	
Paper on "Rolling mills and their electrical equipments," by Mr G. M. Brown, Rugby	91
Discussion on the above	119
Mar. 5th, 1918	
Conversazione	125
Hosted by Mr J.H. Harrison, President. The conversazione included a paper entitled "Historical Side of Iron and Steelmaking" This paper is not reproduced in the Proceedings.	
Mar. 18th, 1918	
Paper on "Grabs and their application," by Mr R. H. Archer Coulson, A.M.I. Mech. E., Middlesbrough	131
Discussion on the above	156
Memoir – Mr L. F. Gjers	163
Apr. 15th, 1918	
Paper on "The practical metering of air," by Mr John L. Hodgson, B.Sc., Assoc. M. Inst. C.E.	165
Discussion on the above	175
List of Members and Rules at the end of the Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1918-1919

PRESIDENT: MR J H HARRISON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 18th, 1918	
Annual Report and Statement of Accounts.	3
Paper on "Blast furnace slag in concrete and reinforced concrete," by Dr J. E. Stead, F.R.S.	12
Discussion on the above.	56
Memoirs – Mr T. Greville Jones and Mr T. C. Hutchinson.	79
Dec. 9th, 1918	
Paper on "Electric iron and steel furnaces," by Mr J. Bibby, London	83
Discussion on above.	112
Jan. 13th, 1919	
Paper on "The practical management of blast furnace plants in Cleveland," by Major H. G. Scott, Middlesbrough	120
Discussion on above.	140
Feb. 10th, 1919	
Paper on "Notes on the determination of phosphorus in steel and iron," by Mr N. D. Ridsdale, F.C.S., Middlesbrough.	155
Discussion on above.	167
Mar, 10th, 1919	
Conversazione	175
The conversazione included remarks by the President and Dr Stead regarding the setting up of the Cleveland Technical Institute.	
Apr. 7th, 1919	
Paper on "Installation and working of large horizontal gas engines," by Mr Henry Pilling, Manchester.	189
Discussion on above.	206
List of Members and Rules at the end of the Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1919-1920

PRESIDENT: MR FRED P. WILSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 10th, 1919	
Annual Report and Statement of Accounts	3
Presidential address by Mr Fred P. Wilson, Tees Iron Works: (Topics included in this wide ranging address included manning, homes and environmental issues facing industry and the country. Tributes were also given to eight members of the Institution who gave their lives in the Great War in which 37 members were known to have served.)	14
Dec. 15th, 1919	
Paper on "By-product development in the iron and steel industry," by Messrs Ernest Bury and O. Ollander, Saltburn.	42
Discussion on above.	67
Jan. 12th, 1920	
Paper on "Standard marine engines," by Mr Hall-Brown, Middlesbrough.	83
Discussion on the above.	93
Feb. 9th, 1920	
Paper on "Phosphorus in hematite iron: its exact determination and commercial importance," by Mr N. D. Ridsdale, Middlesbrough	109
Discussion on the above	131
List of Members and Rules as at November 1920 are included at the end of the Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1920-1921

PRESIDENT: MAJOR H. G. SCOTT

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 15th, 1920	
Annual Report and Statement of Accounts	5
Presidential address by Major H. G. Scott, Cochranes, Ormesby Works, Middlesbrough: (Topics covered included competition of American financial combines; new ore fields; blast furnace gas cleaning and potash fertiliser recovery; gas engines; quality control of blast furnace raw materials; blast furnace hot metal for castings; advantages of Open Hearth over Bessemer; emergence of electric furnace; electricity vs. steam in rolling mills; universal plate mill; reduction of waste; pulverised fuel firing of soaking pits and reheaters; and Teesside associated industry.)	15
Dec. 13th, 1920	
Paper on "The welding of steel, - in relation to the occurrence of pipe, blow-holes and segregates in ingots," by Mr Harry Brearley, Sheffield	47
Discussion on above	70
Jan. 10th, 1921	
Paper on "Large gas engines," by Mr Fred Kraft de la Saulx, Chief Engineer of the Societe Anonyme John Cockerill, Belgium	91
Discussion on above	109
Feb. 7th, 1921	
Paper on "The electrostatic precipitation of dust from blast furnace gas and the extraction of potash therefrom," by Messrs Ernest Bury, Arnold Bury, O. Ollander and F. Bainbridge	131
Discussion on above	147
Mar. 7th, 1921	
Abstract of a paper on "Alcohol from coke oven gas," by Mr C. F. Tidman, B.Sc., F.C.S.	169
Discussion on above	174
Apr. 4th, 1921	
Paper on "Foreign methods of roll design," by Mr H. R. Ronnebeck, B.Sc. Saltburn	190
Discussion on above	217
Memoir – The late Sir Thomas Wrightson, Bart., J.P. D.L.	230
List of Members at end of Proceedings	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1921-1922

PRESIDENT: MR R. H. ARCHER - COULSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS*

	Page No
Nov. 7th, 1921 *	
Annual Report and Statement of Accounts	7
Presidential address – Mr R. H. Archer-Coulson, Skinningrove Iron Co. Ltd., inducted the district's 'New House of Technical Science'. (The subject of the address covered trade depression; fuel and labour costs; effect of blast furnace raw material impurities on flux and coke requirements and heat efficiencies: coke and ore quality requirements; slag and flux control in O.H. vs. yield; refractories quality; ingot yield and waste; and rolling mill reliability.)	16
Dec. 5th, 1921	
Paper on "The formation of pearlite in steel," by Mr J. H. Whiteley, Saltburn	37
Discussion on above	59
Jan. 9th, 1922	
Paper on "Treatment of gas poisoning cases," by Mr G. W. Hewson, A.I. Mech. E.	71
Discussion on the above	78
Feb. 6th, 1922	
Paper on "The future of blast furnace practice in Cleveland," by Mr Richard Sharp	122
Discussion on the above	134
Mar. 6th, 1922	
Paper on "The mechanical handling of iron ore and similar bulk material," by Mr F. G. Smith	161
Discussion on the above	178
Apr. 3rd, 1922	
Paper on "Open hearth furnaces and auxiliary plant," by Mr A. V. Kemp, London	193
Discussion on the above	212
List of Members at end of Proceedings.	

**The meetings of the 1921-1922 Session and all subsequent meetings were held in the newly opened Cleveland Technical Institute, Corporation Road, Middlesbrough.*

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1922-1923

PRESIDENT: MR R. H. ARCHER- COULSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 13th, 1922	
Annual Report and Statement of Accounts	2
Paper on "Some aspects of cleaning coal by froth flotation," by Mr L. A. Wood, London	13
Discussion on the above	24
Dec. 4th, 1922	
Paper on "The dephosphorisation of iron in the basic furnace," by Mr J. H. Whiteley, F.I.C., Stockton-on-Tees	36
Discussion on the above	55
Jan. 8th, 1923	
Paper on "The principal iron ore deposits of the world," by Mr Herbert K. Scott, M.I.M.M., London	69
Discussion on the above	102
Feb. 5th, 1923	
Paper on "The basic open hearth process," by Mr J. T. Wright, Brotton	121
Discussion on the above	143
Mar. 5th, 1923	
Paper on "Stainless steel – its properties and some of its engineering applications," by Mr J. H. G. Monypenny, Sheffield	155
Discussion on the above	173
Apr. 9th, 1923	
Paper on "Physical properties of a new alloy allied to bronze," by Mr E. Hall Craggs, M.A., M. Inst. C.E., London	191
Discussion on the above	212
List of Members at end of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1923-1924

PRESIDENT: MR H. B. TOY

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 12th, 1923	
Annual Report and Statement of Accounts	3
Presidential address – Mr H. B. Toy, British Chilled Roll & Engineering Co. Ltd., Middlesbrough. (This address reviews ironmaking developments in Cleveland from 1855. Comparisons are made with American practice and the impact on costs. Other topics considered are the impact of war-time requirements on the development of special steels; development of copper containing steels; plate mill developments; and chilled iron roll production.)	12
Dec. 10th, 1923	
Paper on “The low temperature treatment of coal with by-product recovery,” by Mr W. Beswick and Mr A. T. Grisenthwaite	41
Discussion on the above.	65
Visit of the Cleveland Institution of Engineers to Redcar Steelworks and Rolling Mills on Friday, November 16, 1923	79
Memoir – Dr J. E. Stead.	83
Jan. 14th, 1924	
Paper on “Friction and lubrication,” by Mr D. Sillars, South Bank	87
Discussion on the above.	118
Feb. 11th, 1924	
Paper on “Iron Portland cement,” by Mr E. H. Lewis, M.A., Wishaw.	139
Discussion on the above	149
Mar. 3rd, 1924	
Paper on “Engineers and the interpretation of chemical specifications for iron and steel in relation to analytical accuracy,” by Mr C. H. Ridsdale, Middlesbrough.	167
Discussion on the above.	204
Apr. 7th, 1924	
Paper on “Some effects of casting temperature and rate of cooling on the properties of metals and alloys,” by Professor Thomas Turner, Birmingham.	219
Discussion on the above.	227
Apr. 14th, 1924	
Paper on “The furnace equipment of mills and forges,” by Mr H. Southern, Assoc. Mem. A.M. SOC. M.E., Sheffield.	241
Discussion on the above.	265
List of Members and Rules at end of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1924-1925

PRESIDENT: MR H. B. TOY

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Oct. 9th, 1924	
Lecture on the "Sydney Harbour Bridge" by Dr J. J. C. Bradfield, M.I.M.E., Australia.	1
Nov. 7th, 1924	
Social Event - Whist drive and dance.	14
Nov. 10th, 1924	
Annual Report and Statement of Accounts.	21
Paper on "The practical management of blast furnace plants in Cleveland," by Major H. G. Scott, T.D., Marton.	29
Discussion on the above.	61
Dec. 8th, 1924	
Paper on "Electrical developments in rolling mill work," by Mr L. Rothera, London.	83
Discussion on the above.	101
Dec. 12th, 1924	
Visit to Messrs. Steel, Peech & Tozer's Templeborough Works, Rotherham.	117
Jan. 12th, 1925	
Paper on "The cleaning of blast furnace gas," by Mr A. E. Rowe, Erith, Kent.	127
Discussion on the above.	162
Feb. 9th, 1925	
Paper on "Description of some recent mechanical chargers for blast furnaces," by Mr J. M. Ringquist, M.I. Mech. E., Thornaby-on-Tees	176
Discussion on the above.	208
Mar. 9th, 1925	
Paper on "Special steel," by Professor J. H. Andrew, D.Sc, Glasgow	223
Discussion on the above "	234
Apr. 6th, 1925	
Special Evening – Question Night prefaced by Mr Harold E. Wright, Newport, Middlesbrough, on the "Bearing of Elastic Limit tests on steel"	255
List of Members and Rules of the Association given at the end of the Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1925-1926

PRESIDENT: MR ARTHUR DORMAN

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 16th, 1925	
Annual Report and Statement of Accounts	2
Presidential address, by Mr Arthur Dorman, Managing Director, Dorman Long & Co., (Topics covered included progress of the basic open-hearth processes including Bertrand-Thiel, Talbot, Monell, and Bessemer duplex; sulphur and silicon control by passive and active mixers versus consistent blast furnace practice; improving fuel efficiencies and aim of fuelling steelmaking through to rolling using process off-gas.)	12
Dec. 7th, 1925	
Paper on "The application of American practice to the British Coke Industry," by Mr Thos. Biddulph Smith, F.C.S.	41
Discussion on the above	60
Jan, 11th, 1926	
Paper on "Mining explosives and their use," by Mr Wm. Cullen, L.L.D., M.Inst.,M.M., M.Inst. Chem. E.	73
Discussion on the above	93
Feb. 8th, 1926	
Paper on „The treatment and properties of carbon steels,“ by Professor J. H. Andrew, D.Sc.	99
Discussion on the above	110
Mar. 8th, 1926	
Paper on "Coke for blast furnace purposes," by Mr Edgar C. Evans	123
Discussion on the above	158
Mar. 22nd, 1926	
Paper on "The application of the gas engine to the manufacture of iron and steel," by Messrs J. E. James and C. Cook	184
Discussion on the above	203
Apr. 12th, 1926	
Paper on "Rolling mills for medium and small sized products," by Mr T. W. Hand, M.I. Mech. E.	233
Discussion on the above	255
List of Members and Rules at end of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1926-1927

PRESIDENT: MR. DANIEL SILLARS

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 8th, 1926	
Annual Report and Statement of Accounts	3
Presidential address, by Mr D. Sillars, Chief Chemist, Bolckow, Vaughan & Co., South Bank, (Topics covered included microscopical methods for the examination of metals; metallurgical aspects of the processing of Cleveland ores; and the need for a steel industry wide modern research laboratory funded by the Department of Scientific and Industrial Research.)	15
Dec. 6th, 1926	
Paper on "Some notes on waste heat recovery and the utilisation of surplus industrial gas," by Major W. Gregson, B.Sc. (Eng.), A.M.Inst.C.E., A.M.I.Mech.E.,	45
Discussion on the above.	61
Jan, 10th, 1927	
Foreword by Mr F. H. Rosencrants, London, on development of pulverised fuel use in furnaces.	84
Paper on "Powdered coal and its influence on modern boiler design," by Mr E. Kilburn Scott, A.M.Inst., C.E.	90
Discussion on the above.	112
Feb. 7th, 1927	
Paper on "New uses of coal, with special reference to the hydrogenation process," by Mr J. A. Roelofsen, Ph.D, Saltburn.	135
Discussion on the above.	157
Feb. 24th, 1927	
Visit to Messrs Bolckow, Vaughan & Co.'s Cleveland Iron and Steel Works, South Bank.	173
Paper on "Impressions of a visit to Continental Steel Works," by Mr James S. Kerr.	177
Mar. 7th, 1927	
Paper on "Refractories for the blast furnaces and the open hearth," by Mr W. G. Rees, B.Sc, F.I.C. Sheffield (<i>not in Proceedings</i>).	199
Apr. 4th 1927	
Paper on "The flow of gases in mains and culverts," by Mr W. Goldbrough, Middlesbrough.	203
Discussion on the above.	213

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1927-1928

PRESIDENT: MR HAROLD E. WRIGHT

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 14th, 1927	
Annual Report and Statement of Accounts	3
Presidential address by Mr Harold E. Wright, Dorman Long & Co. Ltd., Middlesbrough: (Topics covered included fuel savings and capital costs of achieving same; loss of heat efficiency in coke oven by-products; heat content of blast furnace gases dependent on ore quality, coke rate, and output rates; blast furnace practices to reduce coke consumption; heat loss during blast furnace gas cleaning; and heat-efficiency advantage of gas engine blowing plant.)	12
Dec. 5th, 1927	
Paper on "The manufacture of steel wire," by Mr G. A. Alder, Middlesbrough.	37
Discussion on the above.	60
Jan. 9th, 1928	
Paper on "The uses and manufacture of bars, sections and tubes in brass and other alloys by the extrusion process," by Mr J. E. Newson, M. Met.	73
Discussion on the above.	97
Feb. 6th, 1928	
Paper on "The synthesis of ammonia from coke oven gas by the fixation of the hydrogen with atmospheric nitrogen," by Mr T. Biddulph-Smith, F.C.S., A.M.I.C.E., Middlesbrough.	109
Discussion on the above.	127
Mar. 5th, 1928	
Paper on "Open hearth furnaces: Comparison of tilting and fixed types," by Mr A. Vincent Kemp, London.	140
Discussion on the above.	158
Mar. 29th, 1928	
Visit to Messrs Dorman, Long & Co's Britannia Works, Middlesbrough.	173
Apr. 2nd, 1928	
Paper on "Automatic combustion control," by Mr J. E. O'Brien, London.	178
Discussion on the above.	193
List of Members and Rules at end of Proceedings.	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1928-1929

PRESIDENT: MR HAROLD E. WRIGHT

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 12th, 1928	
Annual Report and Statement of Accounts	3
Alteration of rules	9
Paper on "Recent developments in the economical generation of steam by blast furnace gas," by Mr A. E. Leek, Wigan	12
Discussion on the above	30
Dec. 10th, 1928	
Paper on "A comparison of the 'Micum' Trommel test and the shatter test as methods of determining the mechanical strength of coke," by H. V. A. Briscoe, A.R.C.S., D.Sc., D.I.C., F.I.C., W. K. T. Braunholtz, PH.D., M.A., F.I.C. and G. M. Nave, M.Sc., A.I.C.	39
Discussion on the above	74
Jan. 10th and 14th, 1929	
Meeting of the proposed Associate Members	87
Paper on "Some matters of importance in the rolling of steel sections," by Mr S. Stansfield, M.Sc., A.M.Inst.C.E.	97
Discussion on the above	112
Feb. 11th, 1929	
Paper on "Machinery for coke oven plant," by Mr F. G. Smith, London	125
Discussion on the above	133
Mar. 11th, 1929	
Paper on "The low temperature carbonisation of coal," by Mr Thos. Biddulph Smith, F.C.S., A.M.I.G.E.	140
Discussion on the above	157
Apr. 8th, 1929	
Paper on "The blast furnace and its economic position," by the President, Mr Harold E. Wright, Middlesbrough	172
Discussion on the above	194

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1929-1930

PRESIDENT: MR ERNEST W. JACKSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 4th, 1929	
Annual Report and Statement of Accounts	3
Presidential Address by Mr Ernest W. Jackson, F.I.C., F.G.S., Pattinson & Stead, Middlesbrough. (Topics covered included statistics relating to world production of iron and steel, and information on iron ores imported into the Tees.)	12
Dec. 2nd, 1929	
Paper on "The training of engineering apprentices," by Dr Douglas H. Ingall, D.Sc., F.I.C., Middlesbrough.	30
Discussion on the above.	47
Jan. 6th, 1930	
Paper on "The application of correct gas flow principles in furnaces," by Mr Edward W. Plumley, London.	75
Discussion on the above.	98
Feb. 3rd, 1930	
Paper on "Carbon and alloy steels," by Professor J. H. Andrew, D.Sc., Glasgow.	102
Discussion on the above.	115
Mar. 3rd, 1930	
Lecture on "Properties of mild steel," by Dr C. A. Edwards, Swansea (<i>unpublished</i>).	128
Apr. 7th, 1930	
Paper on "The science of geology with special reference to the beds of the Cleveland Ironstone and adjacent strata," by Mr A. H. Askew, Boulby.	133
Discussion on the above.	163

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1930-1931

PRESIDENT: MR ERNEST W. JACKSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 3rd, 1930	
Annual Report and Statement of Accounts	3
Paper on "Gas flow in open hearth furnaces for increased production," by Mr Edward W. Plumley, London	11
Discussion on the above	20
Dec. 1st, 1930	
Paper on "Effects of impurities in plain carbon steels," by Mr G. Glenn, Sheffield	41
Discussion on the above	66
Jan. 5th, 1931	
Paper on "Modern methods of testing and blending coals for coking," by Mr Thos. Biddulph-Smith, F.C.S., A.M.I. GAS. E., Middlesbrough	83
Discussion on the above	94
Feb. 2nd, 1931	
Paper on "The elastic limit of steel plates," by Dr R. H. Greaves, Woolwich	110
Discussion on the above	126
Mar. 2nd, 1931	
Paper on "The strength of structural steelwork," by Dr Ewart S. Andrews, B.Sc., London	139
Discussion on the above.	151
Apr. 13th, 1931	
Paper on "Steel sleepers, past and present," by Mr T. P. Cargill	159
Discussion on the above	193
May, 11th, 1931	
Joint meeting with the Iron & Steel Institute, Chair – Mr Arthur Dorman. "Production Economy in Iron and Steel Works" by O. Cromberg "The Melting Shop of the Appleby Iron Co. Ltd", by A Robinson. Papers not reproduced in Proceedings. (Source - Annual Report, Session 1931-32)	

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1931-1932

PRESIDENT: MR R. E. COWELL

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 9th, 1931	
Annual report and statement of accounts	2
Presidential address by Mr R. E. Cowell, Babcock & Wilcox, Middlesbrough: (Topics include the need for the Engineer to work with other disciplines; the recession; the huge National Debt; advantages of small works; the need for apprentices; lost reserves of Durham coal; out of date Patent law; and manipulation of industry's financial reports.)	12
Dec. 7th, 1931	
Paper on "Some notes on iron and steel works practice," by Mr Vernon Harbord, London.	25
Discussion on the above.	48
Jan, 4th, 1932	
Paper on "Recent developments in the application of electric arc welding," by Mr E. P. S. Gardner, B.Sc., A.M.I. Mech.E.	81
Discussion on the above.	90
Feb. 1st, 1932	
Paper on "The modern blast furnace," by Mr Geo. B. Butler, F.C.S., A.M.I.Chem.E., Marton-in-Cleveland.	98
Discussion on the above.	130
Mar. 7th, 1932	
Paper on "Production of oil from coal by hydrogenation," by Mr K. Gordon, Billingham.	149
Discussion on the above.	164
Apr. 4th, 1932	
Paper on "The significance of refractory materials in the Iron and Steel industries," by Mr A. T. Green, F. Inst. P., A.I.C. Assistant Director of Research, British Refractories Research Association.	173
Discussion on the above.	254

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1932-1933

PRESIDENT: MR WELDON HANSON

SECRETARY: WILLIAM H. BURNS

PROCEEDINGS

	Page No
Nov. 14th, 1932	
Annual report and statement of accounts	2
Presidential address by Mr Weldon Hanson. Clarence Steelworks, Port Clarence. (Because of the recession, the aim of the President was to reduce costs to C.I.E. of presentations with slimmer, less costly Proceedings. Topics covered in the address included amalgamation of societies; the need for international economic co-operation; loss of Britain's lead in ore, iron and steel production; economic advantage of basic open hearth over the Bessemer process; rationalisation of plants; and the taxation burden.)	14
Dec. 12th, 1932	
Paper on "Steelworks on the continent," by Mr J. Sinclair Kerr, Director of The Lancashire Steel Corporation, LD., and Chairman of The Institute of Fuel (North Western section).	33
Discussion on the above.	50
Jan. 9th, 1933	
Paper on "A review of the factors influencing the life of blast furnace linings," by Mr A. T. Green, F.I.C., F.Inst.,P., and Mr. W. Hugill, M.Met. (British Refractories Research Association).	61
Discussion on the above.	77
Feb. 6th, 1933	
Paper on "Heat losses from furnace walls," by Mr John H. Wright, Middlesbrough.	93
Discussion on the above.	110
Mar. 6th, 1933	
Paper on "Sidelights on steel wire manufacture," by Mr J. Dennis Robinson.	131
Discussion on the above.	151
Apr. 3rd, 1933	
Paper on "The hot blast in iron smelting : A new theory" by Mr W. McConnachie.	164
Discussion on the above.	179

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1933-1934

PRESIDENT: LIEUT-COL W. ROUTLEDGE

SECRETARY: R. E. COWELL

PROCEEDINGS

	Page No
Nov. 6th, 1933	
Annual General Meeting.	1
Annual Report, and Statement of Accounts.	8
Presidential address – “The modern development of industry,” by Lieut-Col., Wm. Routledge, Bolckow Vaughan & Co., South Bank. (This is a well researched address covering industrial development from the 14 th Century through to the 17 th Century with claimed industrial leadership. The development of steam power and railways were important factors influencing industrial expansion with merging of companies having a major effect. Comment is also made on the balance between unrestricted competition and monopoly, and the importance of staff development and teamwork.)	12
Dec. 4th, 1933	
General meeting (Joint meeting with the Iron and Steel Institute)	39
Paper on “Recent developments in American blast furnace design and practice,” by Mr W. A. Haven (Cleveland, Ohio, U.S.A.)	43
Discussion on above.	83
Memoir – Mr W. H. Burns.	96
Jan. 8th, 1934	
Paper on “Large scale power generation in the Iron and Steel industry,” by Mr A. F. Webber, B.Sc., A.C.G.I., A.M.I.E.E.	99
Discussion on above.	160
Feb. 5th, 1934	
Paper on “The economic use of surplus coke oven gas for public purposes,” by Mr Thomas Biddulph Smith, F.C.S., A.M.I. GAS E.	187
Discussion on above.	207
Mar. 5th, 1934	
Paper on “High speed gas engines,” by Mr J. G. Goodenough.	245
Discussion on above.	253
Some notes on “Gas turbine pioneering,” by Mr Pocnogradsky.	277
Apr. 16th, 1934	
Paper on “The heat value of one ton of coke in the manufacture of iron and steel,” by Mr F. H. B. Gough, Scunthorpe.	285
Discussion on above.	293

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1934-1935

PRESIDENT: LIEUT-COL W. ROUTLEDGE

SECRETARY: R. E. COWELL

PROCEEDINGS

	Page No
Nov. 12th, 1934	
Annual General Meeting	1
Annual Report, Statement of Accounts	6
Paper on "A brief description of some lift bridges," by Mr J. M. Ringquist, M.I. Mech.E.	22
Discussion on the above.	53
Dec. 3rd, 1934	
General meeting (Joint meeting with the Iron and Steel Institute)	65
Paper on "Flexibility as a factor in the economic exploitation of rolling mills and some technical means for its realisation," by Mr Geo. A. V. Russell, WH.Ex., Assoc.M.Inst.C.E., Birmingham.	69
Discussion on above.	199
Jan. 14th, 1935	
Paper on "Blast furnace practice in Belgium and Luxembourg," by Mr Geo. B. Butler, F.C.S., A.M.I.Chem.E.	227
Discussion on above.	270
Feb. 4th, 1935	
Paper on "Some notes on the use of silica refractories in open hearth furnaces," by Mr E. Craddock and Mr E. M. Myers	295
Discussion on above	321
Feb. 22nd, 1935	
Social Event - First Annual, Dinner and Dance (speeches, toasts and dance at the Grand Hotel until 2.00 a.m.)	355
Mar. 4th, 1935	
Address on "Steam turbines, their manufacture and some applications," by Mr C. D. Gibb, C.A. Parsons & Co., Newcastle.	373
Discussion on above	375
Apr. 8th, 1935	
Paper on "Recent developments in the chemical industry affecting the metallurgical industry," by Dr J. L. Pearson, B.A.,etc.	381
Discussion on above	425

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1935-1936

PRESIDENT: MR FRANK BAINBRIDGE

SECRETARY: R. E. COWELL

PROCEEDINGS

	Page No
Nov. 12th, 1935	
Annual General Meeting	1
Annual Report, Statement of Accounts	4
Presidential Address: "Fuel economy, with special reference to iron and steel works," by Frank Bainbridge, Esq., Skinningrove Iron & Steel works. (This address is an extremely thorough and quantitative paper on energy usage and heat balances in an integrated works.)	19
Jan. 6th, 1936	
Paper on "Strength of welded joints in structural steel," F. Roberts, Esq	51
Discussion on the above	69
Jan. 20th, 1936	
General meeting (Joint meeting with Iron and Steel Institute)	79
"Waste heat boiler report," by A. F. Webber, Esq.	81
Discussion on the above	184
Feb. 3rd, 1936	
Paper on "Fluid flow and heat transmission," by C. J. Gray, Esq.	199
Discussion on the above	270
Feb. 21st, 1936	
Social Event, Second Annual Dinner and Dance (speeches, toasts and dance, Grand Hotel, Middlesbrough until 2.00 a.m.)	289
Mar. 2nd, 1936	
Paper on "Experiments in the heating of large ingots" by W. B. Baxter, Esq.	311
Discussion on the above	335
Apr. 6th, 1936	
Paper on "Blast furnace practice in the light of recent research," by R. H. Hacking, Esq., Chief Metallurgist, Park Gate Works, Rotherham.	345
Discussion on the above	367

CLEVELAND INSTITUTION OF ENGINEERS

SESSION 1936-1937

PRESIDENT: MR F. W. BOWDEN

SECRETARY: R. E. COWELL

PROCEEDINGS

	Page No
Nov. 16th, 1936	
Annual General Meeting.	1
Annual Report, Statement of Accounts.	15
Presidential Address by Mr F. W. Bowden, Power Gas Corporation. Stockton, on "The application of welding to industry". (This address covered the importance of electric-arc welding and flame cutting in fabrication, and the metallurgy and protection of welds.)	19
Dec. 7th, 1936	
General meeting (Joint meeting with the Iron and Steel Institute)	33
Paper on "The development of the Astronomical telescope" by Mr Cyril Young, F.R.A.S., Parsons & Co., Newcastle on Tyne.	35
Discussion on the above.	44
Jan. 11th, 1937	
General meeting (Joint meeting with Iron and Steel Institute)	51
Paper on "The constitution of blast furnace slags in relation to the manufacture of pig iron," by Mr T. P. Colclough, London.	55
Discussion on the above.	82
Feb. 1st, 1937	
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Paper on "Refractories in industrial service," by Mr W. J. Rees, M.Sc.Tech., F.I.C., Dept. of Refractory Materials, University of Sheffield.	87
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Paper on "Modern engineering as it affects rolling mill practice and design," by Mr. E. T. Judge, Dorman Long, Middlesbrough.	183
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Paper on “Refractories research in the steel works,” by Mr J. H. Chesters, United Steel Co’s Refractory Research Dept., Stocksbridge.	103
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A paper on "Material handling plant for storing and shipping iron ore," by the late Mr Wodehouse S. Edwards, M.I. Mech. E., A.M.I.E.E. was scheduled to have been presented by Mr. O. Thomas and Mr. A. R. Gilchrist, but owing to the nature of the paper being such that it may have been useful to war-time enemies, the Censor prohibited its publication.	
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Paper on "A critical survey of present day methods in the manufacture of very hard chilled rolls," by Mr Atkin.	119
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SECRETARY: F. G. E. WEBSTER

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Publication of the Institution's Proceedings ceased in 1942.