INTRODUCTION

PROVENANCE

The papers were received from Churchill College Archives Centre, Cambridge in 1994.

OUTLINE OF CAREER OF FRANCIS THOMAS BACON

Francis Thomas Bacon was born at Ramsden Hall, Billericay, Essex on 21 December 1904. He was educated at Eton College, 1918-1922, specialising in science and winning the Moseley Physics Prize in 1922, and at Trinity College, Cambridge obtaining a third class in the Mechanical Sciences Tripos in 1925. He served an apprenticeship at C.A. Parsons & Co. Ltd, Heaton Works, Newcastle upon Tyne, 1925-1928, subsequently working in the Searchlight Reflector and Research and Development Departments at Parsons, 1928-1940. It was while at Parsons in 1932 that he first came to appreciate the potential of the fuel cell and set himself the task of carrying out the practical engineering to prepare the way for it to be considered for commercial application. In 1940-1941 he started full-time work on the hydrogen-oxygen fuel cell at King’s College London with the financial support of the consulting engineers Merz and McLellan. From 1941 to 1946 he was temporary experimental officer at H.M. Anti-Submarine Experimental Establishment, Fairlie, Ayrshire, working on ASDIC, the underwater submarine detection system.

In 1946 he resumed experimental work on the hydrogen-oxygen fuel cell at Cambridge University, first in the Department of Colloid Science, then in the Department of Metallurgy and from 1951 to 1956 in the Department of Chemical Engineering. This work was supported financially by the Electrical Research Association. In 1956 Bacon became consultant to the National Research Development Corporation (NRDC) undertaking fuel cell development work at the Cambridge engineering firm Marshalls where a 6kW forty cell battery unit was demonstrated in August 1959. From 1962 to 1971 he was principal consultant on fuel cells to Energy Conversion Ltd, the first British effort to manufacture fuel cells, first at the BP Research Centre, Sunbury on Thames, Surrey and then at Basingstoke, Hampshire. From 1971 to 1973 he was consultant on fuel cells to Fuel Cells Ltd, at the Atomic Energy Research Establishment, Harwell, Oxfordshire. In 1973 he retired though he continued to follow the development of fuel cells very closely for the rest of his life.

Although Bacon hoped to see the adoption of a high efficiency/low pollution fuel cell in everyday applications such as transport, it was in the unforeseen application of space exploration that the Bacon cell achieved its most notable success in his lifetime. In the USA the Pratt and Whitney Division of United Aircraft took out a licence on the Bacon patents and used the concept of the Bacon cell in a successful bid to provide electrical power for the Apollo moonshot. The fuel cells operated successfully in the manned moon flights and subsequent space applications, providing electricity for
the functioning of systems and the production of drinking water. Thus Bacon's pioneering work may be considered essential to the Apollo programme

Bacon was appointed to the Order of the British Empire in 1967. He was elected FRS in 1973 and became an initial Fellow of the Fellowship of Engineering in 1976. Amongst other honours and awards of note are the National Aeronautics and Space Administration Award for Scientific and Technical Contribution in 1976, the Electrochemical Society's Vittorio de Nora - Diamond Shamrock Award in 1978, an honorary degree from the University of Newcastle upon Tyne in 1980 and the first Grove medal commemorating the work of Sir William Grove in 1991. He married Barbara Papillon in 1933 (one son, one daughter, and one son deceased). He died on 24 May 1992.

DESCRIPTION OF THE COLLECTION

The material is presented in the order given in the List of Contents. The collection provides comprehensive documentation of Bacon's role in fuel cell research and development. It covers the period 1917-1993.

Section A, Biographical, includes obituaries, curricula vitae, articles about Bacon and press-cuttings. His fuel cell career is represented by agreements between Bacon and Merz and McLellan, the National Research Development Corporation and Energy Conversion Ltd and his honours and awards by letters of congratulation on the appointment to the Order of the British Empire in 1967 and the Election to the Fellowship of the Royal Society in 1973, and correspondence re the award of the National Aeronautics and Space Administration Award for Scientific and Technical Contribution in 1976. Also of interest are school notebooks from Eton College including a ‘Science Notes’ notebook used by his elder brother A.W. Bacon in 1917 and subsequently by Bacon for notes of work at C.A. Parsons Ltd 1930-1931.

Section B, Research and development, is exceptional in extent and comprehensiveness, documenting the successive stages of Bacon’s involvement with fuel cell research and development: Parsons and early fuel cell research, ERA/Cambridge University, NRDC/ Marshalls of Cambridge, Energy Conversion Ltd, and his continuing interest in fuel cell research and development after his formal retirement. The documentation takes many forms including a numbered sequence of Bacon’s fuel cell notebooks and the notebooks of his colleagues, manuscript notes, drafts, calculations and test data, reports prepared for and correspondence with principal sponsoring bodies such as the ERA and the NRDC, correspondence and papers relating to the fuel cell interests of other organisations such as government departments in the UK and companies like General Electric and Pratt and Whitney in the USA, correspondence and papers assembled by Bacon on research and development topics such as hydrogen storage and the underwater use of fuel cells, and technical drawings.
There are also a relatively few papers from the 1930s which relate to Bacon’s work at Parsons and are not concerned with fuel cells.

Section C, Lectures and publications, is extensive. There is a chronological sequence of drafts for Bacon’s lectures and publications, 1953-1984 and his publications correspondence files, 1952-1991. Bacon’s publications correspondence files include invitations for Bacon to write, lecture and broadcast and also to advise authors, editors and publishers on publications in the fuel cell area. The files also contained a number of drafts by Bacon or sent to him for comment which have been retained in the sequence with the related correspondence.

Section D, Patents, presents Bacon’s papers relating to patent applications, 1949-1967. The papers were found in a numbered sequence of binders whose contents included manuscript notes, typescript drafts of applications, specifications and related correspondence.

Section E, Societies and organisations, provides documentation of eight societies and organisations with which Bacon was associated. The Electrochemical Society which Bacon joined about 1960 and the Royal Society to whose Fellowship he was elected in 1973 are represented by the most extensive material. The Electrochemical Society papers principally relate to its Spring meeting in Seattle 1978 at which Bacon received the Society’s Vittorio de Nora - Diamond Shamrock Award and delivered the Award Address. Much of the Royal Society material relates to Bacon’s 1973 Review Lecture on the Development and Practical Application of Fuel Cells. Also represented in this section is the Aeronautical Research Council which invited Bacon to a number of its committee meetings in 1959 and 1963.

Section F, Visits and conferences, covers the period 1956-1984. Although not extensive it provides a record of Bacon’s participation as speaker at a number of international conferences such as the Fifth World Energy Conference in Vienna, Austria, in 1956 and the Fifth World Hydrogen Energy Conference in Toronto, Canada, in 1984, and of a series of visits to the USA, 1959-1971, to attend and speak at meetings and visit centres of fuel cell research and development.

Section G, Correspondence, includes much of Bacon’s most important fuel cell correspondence and covers an exceptionally extended period 1933-1993. Although Bacon kept correspondence files for a small number of named individuals such as the Cambridge University authority on metallic corrosion U.R. Evans and fuel cell associates T.M. Fry and R.G.H. Watson, most of the correspondence presented in this section was kept in three major chronological sequences: ‘fuel cell’ correspondence 1933-1991, ‘personal’ correspondence, 1952-1991, and ‘miscellaneous’ correspondence, 1953-1975. The ‘personal’ and ‘miscellaneous’ correspondence sequences also relate to Bacon’s fuel cell interests.
For long periods Bacon wrote most of his letters by hand. Nevertheless, even when writing by hand he made carbon copies and thus his correspondence is unusually complete. Bacon’s correspondence files also often include notes of telephone calls and meetings including those with visitors to his private home. There is other important fuel cell correspondence in Section B, Research.

Section H, Non-print material, is principally photographs. There are photographs of Bacon himself at a number of conferences and awards ceremonies etc., 1950s - 1991, photographs of equipment from the late 1950s, photographs used as illustrative material for Bacon’s publications and lectures, 1956-1978 and publicity photographs relating to fuel cell developments sent to Bacon by the US General Electric Company, Shell Research Ltd and Pratt & Whitney Aircraft, 1963-1968. In addition to the photographs there are photographic slides, a film relating to the fuel cell demonstration at Marshalls in 1959 and a card index box containing metal or treated metal samples and film strips which may record test results on the samples. The samples and film strips are in envelopes with manuscript inscriptions, some including dates in 1955 and 1956.

There is also an index of correspondents.

Peter Harper
Alan Hayward
Bath 1997
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A.1, A.2 OBITUARIES AND TRIBUTE 1992

A.1 Obituaries:

The Times, 1 June 1992.
The Daily Telegraph, 8 June 1992.


A.3-A.14 BIOGRAPHICAL AND BIBLIOGRAPHICAL

A.3 Curricula vitae, entry in biographical directory, lists of publications.

A.4-A.6 Articles about Bacon and his work.
3 folders.
A.6A 2 Articles about Bacon and his work [1985 and not dated] [Acc. 1188]

11 folders.

A.15-A.19 SCHOOL NOTEBOOKS

Bacon was educated at Eton College 1918-1922.

School notebook so inscribed kept by Bacon’s elder brother Anthony W. Bacon and later used by Bacon for notes of work at C.A. Parsons Ltd 1930-1931.

A.16 Notebook used by Bacon’s elder brother for history notes and by Bacon (from the rear) for draft of lecture on ‘The Steam Turbine’.

A.17 Notebook used by Bacon for physics notes, n.d.

A.18 Notebook used by Bacon for notes on heat, n.d.

A.19 Notebook used by Bacon for physics notes, Michaelmas 1920.

A.20-A.37 CAREER, HONOURS AND AWARDS 1940-1990

A.20 Agreement between the consulting engineers Merz and McLellan and Bacon in respect of Bacon’s employment as a research engineer, 27 July 1940.

A.21 Agreement between the National Research Development Corporation and Bacon in respect of work on the development of the Hydrogen/Oxygen Fuel Cells and Electrolysers. 1957


Letter from Marshalls Flying School Ltd, Aeronautical Engineers re Bacon’ s services as a consultant in respect of work on the development of the Hydrogen/Oxygen Fuel Cells and Electrolysers carried out on behalf of the National Research Development Corporation. N.d.

A.22 Agreement between Energy Conversion Ltd and Bacon for Bacon to act as consultant to the Company re research development and manufacture of fuel cells. Final draft with manuscript annotations by Bacon. 1962.

Agreement between Energy Conversion Ltd and Bacon for Bacon to act as consultant to the Company re research development and manufacture of fuel cells. 1963.

See also G.200.


A.24, A.25 ‘Personal Letters’. Contents of folder so inscribed divided into two for ease of reference: principally letters of congratulation re award of the OBE.

The medal was awarded for Bacon’s work on the hydrogen-oxygen fuel cell that led to the development and construction (by Pratt & Whitney Aircraft, USA) of fuel cell units which were being used as the auxiliary power source in the Command and Service Modules in the Apollo Space Project.

A.26 Letter informing Bacon of the award, press release, guest list for dinner on the occasion of the 58th Wilbur and Orville Wright Lecture etc.

A.27 Letters of congratulation.


A.28 Correspondence re candidature, formal admission etc.

A.29-A.31 Letters of congratulation. 3 folders.

See also G.36, G.37, H.4.

A.32-A.34 Correspondence re application, formal presentation at the American Embassy in London etc., 1974-1976. 3 folders.


A.36 Letters of congratulation on NASA Award.
A.37  Honorary degree, University of Newcastle upon Tyne. 1980.
Correspondence re arrangements etc.


A75  Pocket notebook

A76  OBE certificate  (See also A23-A25)

A77  Fellow of Royal Society Certificate (See also A28-A31)

A78  Honorary Newcastle degree book containing certificate (See also A37)

A79  Photograph of Bacon at BBC

A80  3 school accounts dated 1916 for FT & CH Bacon

This exceptionally large and comprehensive section documents the successive stages of Bacon's involvement in fuel cell research and development and his continuing interest in fuel cell research and development after his formal retirement. There are a relatively few papers from the 1930s which relate to his work at C.A. Parsons and are not concerned with fuel cells. Papers in the section cover the period 1929-1993.

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A numbered sequence of notebooks kept by Bacon recording his fuel cell work. 1938-1958.

For other fuel cell notebooks kept by Bacon and his collaborators see B.154-B.171, B.432-B.461A.

B.1 Unnumbered. Used for record of work 1938-1941.
Bacon’s address is given as ‘Acomb House Hexham’.

Bacon’s address is given as ‘King’s College, Strand, London W.C.2’.

B.3 ‘Hydrogen - Oxygen Cell Volume III’. Used for record of work at King’s College London, 24 July - 16 August 1941 and at Department of Colloid Science, University of Cambridge, 27 May - 16 December 1946.

Bacon’s address is given as the Department of Colloid Science, Cambridge.

Bacon’s address is given as the Department of Colloid Science, Cambridge.

Bacon’s address is given as the Department of Colloid Science, Cambridge.

Bacon’s address is given as the Department of Metallurgy, Cambridge.

Bacon's address is given as Department of Metallurgy, Cambridge.


Bacon's address is given as the Department of Chemical Engineering, Cambridge.


Bacon's address is given as the Department of Chemical Engineering, Cambridge.


Bacon's address is given as the Department of Chemical Engineering, Cambridge.

B.12 'H₂O₂ Cell Research (Unit 1.) Volume 12'. Used for record of work 5 February 1954 - 15 February 1955.

Bacon's address is given as the Department of Chemical Engineering, Cambridge.


Bacon's address is given as the Department of Chemical Engineering, Cambridge.

B.14 Unnumbered notebook. Used for record of work (diagrams for machine parts) 23 November 1942 - 6 May 1943 and 7 June 1946 - 12 September 1953.

Bacon's address is given as King's College Strand, W.C.2. However by November 1942 he had joined the Admiralty team at Fairlie in Scotland working on ASDIC. He resumed fuel cell research at Cambridge in 1946.

B.15-B.77 PARSONS AND EARLY FUEL CELL RESEARCH 1929-1949
Bacon served his time as apprentice at C.A. Parsons & Co. Ltd., Heaton Works, Newcastle-on-Tyne from 1925-1928 and subsequently worked in the Searchlight Reflector Department and the Development and Research Department. It was while working for Parsons that Bacon’s interest in fuel cells was aroused. In 1937 he drafted a report to the directors suggesting that a workable fuel cell might be developed (see B.41). Although the report was rejected as not being relevant to the business Bacon began experimental work, first at home and then surreptitiously at Parsons. In January 1940 he submitted a second report to the directors (B.36-B.38) admitting that he had been doing fuel cell work in his employers’ time. Given an ultimatum to stop work on the fuel cell or leave, Bacon chose to leave.

After Bacon left Parsons Dr Charles Merz, founder of the consulting engineers Merz and McClellan agreed to finance his work on fuel cells and asked his friend A.J. Allmand, Professor of Chemistry at King’s College London to provide space in his laboratory. Putting to use the training of his engineering apprenticeship, Bacon was able to build his own fuel cells and embark on an experimental programme 1940-1941.

The material is presented as a roughly chronological sequence of reports, notes, drafts, calculations and data. The sequence includes some postwar fuel cell papers (to 1949) which were found in the same binder as prewar material.

As far as possible papers found in binders have been presented in the order in which they were found which was not always a strictly chronological one.

B.15

Report on ‘Deflection test on “U” steam pipe for 2163 machine’ 16 December 1929.


B.16-B.20

Contents of untitled binder divided into five by subject dividers: manuscript notes 1931-1936.

The titles of the subject dividers are used in the catalogue entries.

B.16

‘Polishing’.

B.17

‘Bending & Anneal’.

B.18

‘Grinding’.

B.19

‘Miscellaneous’.

B.20

‘Silvering’.
B.21 Untitled manuscript calculations, 31 May 1932.

B.22-B.26 ‘Special extraction pump’. Contents of binder so inscribed divided into five for ease of reference: test data, manuscript calculations, reports, memos etc, 1935, 1938-1940.

B.27, B.28 Engineering drawings related to extraction pump work. 2 folders.

B.29 Development and Research Department ‘Report on experiments carried out with a view to improving the silvering and backing of mirrors with special reference to those of the high temperature cinema projection type’ by Bacon and E.R. Elliott. December 1937.

B.30 Development and Research Department Report on ‘Schlieren experiments on fluid flow with spark photography’. 1938.

B.31 Miscellaneous shorter Development and Research Department Reports, signed by Bacon. 1938-1940.

B.32 ‘Air Raid Precautions’

Notes for ‘Lesson 1’ and ‘Lesson 4’ found with preceding. N.d.

B.33, B.34 Development and Research Department ‘Report on the present postition of the internal combustion turbine’ by Bacon. September 1939.

Report and drafts. 2 folders.


B.37 Annotated draft of preceding.


Revised and expanded version of B.36. January 1940.

B.39 Development and Research Department Report ‘Generating electricity from coal without a heat engine’ by Bacon.

Contents list and first two pages only of this report. Found with preceding. See also B.56.

B.40 Development and Research Department Report ‘Comparative tests of a standard extraction pump impeller and a Salerni impeller’ signed by Bacon. May 1940.

B.41-B.55 ‘F.T. Bacon Reports’. Contents of C.A. Parsons Ltd binder divided into fifteen for ease of reference: manuscript and typescript notes and drafts at Parsons 1937-1940, King's College London 1940-1941 and at Cambridge from 1946.


B.42 ‘Application of Proposed Electric Battery’. 12pp typescript signed by Bacon + 7pp appendix signed by Bacon. N.d.

B.43 ‘Questions to Prof. Ellingham’. 1p manuscript. N.d.

‘Points mentioned by Prof. Ellingham 15.3.40 and 17.3.40’. 6pp manuscript, 19 March 1940.

Copy of ‘Report on Visit to Professor Ellingham at Imperial College South Kensington to discuss the Proposal to develop the Hydrogen-Oxygen Cell for Commercial Use’. 1p typescript signed by Bacon.

Copy of letter from H.J.T. Ellingham to C.A. Parsons & Co. Ltd, 30 March 1940 and copy of its enclosure Ellingham’s ‘Opinion on the possibilities of a type of Hydrogen Oxygen Cell proposed by Mr F.T. Bacon’. 11pp typescript. See also B.183.

B.44 ‘Notes on Professor Ellingham’s Report on the Possibilities of the Hydrogen-Oxygen Cell’. 7pp typescript dated 24 April 1940 + 2pp ‘Conclusion’. Two copies, one signed by Bacon and one unsigned with manuscript annotation.
C.A. Parsons & Co. Ltd memo from W.D. Horsley to Bacon re ‘Hydrogen-Oxygen Cell’, 6 May 1940.


‘Qualifications of F.T. Bacon’. 1p typescript signed R. Dowson, Head of Research and Development, C.A. Parsons & Co. Ltd, Heaton Works, 3 July 1940.


Weekly reports on progress, all signed by Bacon, from report week ending 11 January 1941 to report on week ending 29 March 1941.

B.46 Reports on progress, all signed by Bacon, from report on weeks ending 8 and 12 April 1941 to report for the two weeks ending 15 August 1941.

B.47 Manuscript notes re fuel cell work, June, July and December 1946 and March 1947.


Manuscript draft comprising Contents List, Synopsis, Brief Summary of Previous Work, Experimental Method of Attack, Summary of Experimental Results and Conclusions, Proposals for Further Experiment, Conclusion, Appendices; also ‘Rewritten’ Synopsis, Introductory Remarks etc. N.d.

5 folders.

B.53 Miscellaneous shorter manuscript notes, drafts, graph including ‘Notes on Memorandum’, 16 August 1949 and ‘Work required to Separate Oxygen from the Air’, 21 September 1949.

B.54 ‘Research into the Properties of the Hydrogen-Oxygen Cell’. Manuscript draft of Bacon’s Progress Report to British Electrical and Allied Industries Research Association (Electrical Research Association) for the 6 months ending June 1949’.

Appendix 3 ‘Factors determining the efficiency of the hydrogen-oxygen fuel cell’ is by T.M. Fry.


B.56-B.60 Contents of untitled folder divided into five for ease of reference: drafts and reports relating to hydrogen-oxygen cell, 1937, 1940.

The contents relate to the contents of the C.A. Parson’s binder presented at B.41-B.55 and include some duplication.

B.56 is typescript pages 3-33 of Development and Research Department Report ‘Generating Electricity from Coal without a Heat Engine’. See also B.39.

B.61-B.72 ‘F.T. Bacon Miscellaneous & Experiments’. Contents of Bacon’s binder so inscribed divided into twelve for ease of reference: manuscript notes, test data, 1938-1942.

The papers are presented in their original order.

B.73-B.76 Contents of untitled C.A. Parsons Ltd binder divided into four for ease of reference: manuscript and typescript notes, calculations and sketches, 1938, 1940-1942.


In original binder. Addressed on front cover ‘Merz and McLellan, 32 Victoria Street, Westminster, S.W. 1’.

B.77 Printed and duplicated material re Sir Charles Parsons found with other C. A. Parsons Ltd material in the collection.

B77A Roll of technical drawings depicting details of pressure vessels, electrodes and adapter plate 1938-1939 (11 items)

B.78-B.272 ELECTRICAL RESEARCH ASSOCIATION/ UNIVERSITY OF CAMBRIDGE

The Electrical Research Association (ERA) supported a programme of research into the properties of the hydrogen-oxygen cell for ten years 1946-1956. When Bacon’s work was first supported by the ERA the full title of the organisation was the British Electrical and Allied Industries Research Association. The shorter form was first used as an alternative and then supplanted the longer title.

Bacon reported to the Association’s Section Z: Unclassified Researches Sub-Committee F: Storage of Electrical Energy. The Secretaries of the
Committee were D.V. Onslow 1946-1948 and A.P. Paton 1948-1956. The ERA Director of Research was S. Whitehead 1946-1956.

The work sponsored by the ERA was located at the University of Cambridge, first in the Department of Colloid Science, then in the Department of Metallurgy and from 1951 to 1956 in the Department of Chemical Engineering.

Although a six cell fuel battery was successfully demonstrated there was no interest from British industry and the ERA felt obliged to withdraw its support.

For papers relating to Admiralty and Ministry of Power interest in Bacon’s fuel cell work during the latter part of the ERA sponsored programme at Cambridge see B.1078-B.1089 and B.1162-B.1165 respectively

The material relating to the ERA sponsored fuel cell programme is presented as follows:

- B.78-B.126 Reports
- B.127-B.132 Agendas and minutes of meetings
- B.133-B.153 Correspondence
- B.154-B.171 Notebooks
- B.172-B.260 Notes, drafts, calculations, data
- B.261-B.272 Equipment and supplies

**B.78-B.126 Reports 1946-1962**

See also B.1274-B.1299.


See also B.181.


See also B.85, B.116.


Revised version of B.83. See also B.116.

B.86 ‘Comments on E.R.A. Reports ... (Hydrogen-Oxygen Cell) Received from Crompton Parkinson Ltd.’ 5 April 1950.


Addendum.  16 October 1950.


See also B.134.


B.99 ‘Research into the Properties of the Hydrogen-Oxygen Cell. By F.T. Bacon...’.

‘First Draft’ 12 August 1953 and ‘Final Copy’ 19 October 1953.

B.100 ‘Reduction in the Rate of Oxidation of Nickel by Use of Inhibitors. By J.E. Bowers...’. 9 December 1953.


B.113  ‘Reports’. Manuscript note by Bacon, n.d.


B.114-B.118 'Mr Bacon’s Manuscript'. Contents of binder so inscribed divided into five for ease of reference: manuscript notes and drafts etc re preparation of report or reports on fuel cell work in 1949.


Papers relate principally to period when Bacon’s work was sponsored by the National Research and Development Corporation.

B.127-B.132 Agendas and minutes of meetings 1947-1957

Agendas and minutes for the second to thirteenth meetings of Electrical Research Association Section Z: Unclassified Researches: Sub-Committee F: Storage of Electrical Energy (Storage and Generation of Electrical Energy from B.128).


B.128 29 October 1948. Unconfirmed minutes only.

8 June 1949. Unconfirmed minutes only.

29 November 1949. Unconfirmed minutes only.

B.129 13 June 1950. Agenda and unconfirmed minutes.

17 November 1950. Agenda and unconfirmed minutes.

B.130 3 August 1951. Agenda and unconfirmed minutes.

12 December 1952. Agenda and unconfirmed minutes.

B.131 27 July 1953. Agenda and unconfirmed minutes.

24 May 1954. Agenda and unconfirmed minutes.
B.132  24 February 1956. Agenda, Bacon’s manuscript ‘Notes for Committee meeting’ and unconfirmed minutes.

20 November 1957. Agenda and unconfirmed minutes.

B.133-B.153  Correspondence  1952-1976

This sequence is Bacon’s correspondence with officers of the Electrical Research Association 1952-1976 (bulk 1952-1961). His correspondents include S. Whitehead, the Director (until 1956) and A.P. Paton, Secretary of Section Z Subcommittee F. Bacon’s ERA correspondence 1946-1951 was not kept in a separate sequence and is to be found with other fuel cell correspondence in Section G.


B.133  1952 January - April.

B.134  1952 May - August.

Includes copy of draft by Paton ‘Fuel Cells - A Non-Technical Outline of their Development’. See also B.92.

B.135  1952 September - December.

B.136  1953 January - April.

B.137  1953 May - August.

B.138  1953 September - December.

B.139  1954 January - June.

B.140  1954 July - December.

B.141  1955 January - April.

Includes ‘Inventory of items, costing more than £25, bought since 1951’.
B.142 1955 May, June.
Includes memorandum on ‘High Pressure Electrolyser’.

B.143 1955 July, August.

B.144 1955 September - December.

B.145 1956 January - April.
Includes papers re expenditure on ERA contract and ‘Programme of Research and Development.

B.146 1956 May - August.

B.147 1956 September - December.
Includes lists of equipment purchased for research on the Hydrogen-Oxygen Fuel Cell.


B.148 1957 March - June.

B.149 1957 July - December.

Includes circuit diagram of electronic temperature control.

B.151 1959.
B.152 1960 - 1961 April.


B.154-B.171 Notebooks 1954-1958


B.154 ‘Cell No. 3’ Used for record of work 16 September 1954 - 29 November 1955.

B.155 ‘Cell No. 3 1-12-55’. Used for record of work 1 December 1955 - 7 August 1956 and also (not in Bacon’s hand) for work on ‘Cell No.1’ 31 January and 11 February 1958.


B.171 ‘Microsections’. N.d.

B.172-B.260 Notes, drafts, calculations, data 1942-1974

Some data from this period can be found with papers from the period of National Research and Development Corporation sponsorship at Marshalls of Cambridge.

B.172-B.214 A chronological sequence of manuscript notes by Bacon relating to the work on the Fuel Cell 1942 - 1956.
Includes notes on the literature, experimental results, calculations, ideas and reflections, programmes of work, notes re meetings, notes of telephone conversations, sketches etc


B.172
1942-1943.

B.173
1944 April - June.

B.174
1944 July - December.

B.175
1945 February - June.

B.176
1945 July - September.

B.177
1945 October.

B.178
1946 January - October.

B.179
1946 November, December.

B.180
1947 January - July.

B.181
1947 August.

B.182
1947 September, October.
B.183
1947 November, December.
Includes copy of H.J.T. Ellingham’s 1940 Report to C.A. Parsons Co. Ltd. on the possibilities of the type of Hydrogen - Oxygen Cell proposed by Bacon. See B.43.

B.184
1948 January - April.

B.185
1948 May - September.

B.186
1948 October - December.

B.187
1949 January, February.

B.188
1949 March - May.

B.189-B.205 Contents of Bacon’s binder: notes 1949 - 1953.

B.189
1949 June - October.

B.190
1949 November.

B.191
1949 December.

B.192
1950 January, February.

B.193
1950 March, April.

B.194
1950 May, June.

B.195
1950 June - October.
B.196 1950 November, December.

B.197 1951 January - March.

B.198 1951 April - June.

B.199 1951 July, August.

B.200 1951 September - December.

B.201 1952 January, February.

B.202 1952 March, April.


B.203 1952 May - August.

Includes ‘Fuel Cell Programme’, 1p typescript.

B.204 1952 September - December.


B.205 1953 January - July.


B.206 1953 July - September.

Includes ‘Programme 1953’, 3pp typescript.

B.207 1953 November, December.
B.208  1954 January, February.

B.209  1954 March, April.

B.210  1954 May.

B.211  1954 June - August.

B.212  1954 September - December.


B.215  1947 July.

Includes 'Notes on the Hydrogen - Oxygen Cell' by Fry, 20pp typescript, 1 July 1947. See also B.181.

B.216  1947 September, October.

B.217  1948 January - June.

B.218  1948 July - December.

B.219  1949.

B.220  1950.
B.221 1951.

B.222 1952.

B.223 1953.

B.224 1954.

B.225 1955.


Includes ‘Technological forecasting for energy’, draft paper by Fry for National Conference on Technological Forecasting, Harrogate, 4 and 5 July 1968.

B.229-B.235 ‘Sketches’. Contents of binder so inscribed divided into seven for ease of reference: sketches of equipment, apparatus, etc. ca 1948 - ca 1960.
Kept in original order (not strictly chronological).

B. 236, B.237 Sketches, technical drawings, n.d.
2 folders.


B.238 1952.
B.239 1953-1954.


B.241 1957.


B.243-B.245 ‘Discussion on Fuel Cells 25.4.52’. Contents of folder so inscribed divided into three for ease of reference: list of members, duplicated papers, Bacon’s manuscript notes.

The discussion was held at the British Electricity Authority Research Laboratories, Leatherhead, Surrey.

B.246-B.249 ‘Self-Spaced Electrodes (Bowen)’. Contents of binder so inscribed divided into four for ease of reference: manuscript and typescript notes and drafts, data etc. 1951-1953.

B.250 ‘Physical constants. Solubilities, etc.’ Contents of binder so inscribed: manuscript and typescript notes, data, etc. 1952.


1965 item (see B.251) is reprint by U.R. Evans from Corrosion Science.

B.256 ‘Corrosion Tests @ 200 $^\circ$C and 600 p.s.i.’ Contents of binder so inscribed: test data, 1954.

B.257 ‘Corrosion Tests @ 300 $^\circ$C’. Contents of binder so inscribed: test data, n.d.

When the Electrical Research Association withdrew its financial support for Bacon’s fuel cell work, he was able to interest Lord Halsbury, Managing Director of the National Research Development Corporation (NRDC), in the fuel cell. The NRDC gave final approval to support the fuel cell project in the spring of 1956 and the work moved to the Cambridge engineering firm of A.G.G. Marshall (with J.C. Frost of Marshalls as project manager). Although
Bacon was able to demonstrate a 6kW forty cell battery to a variety of interested people in August 1959. There was still no commercial interest in the UK, and the NRDC felt obliged to close down the project. However, in October 1961, three leading British companies—British Petroleum, British Ropes, and the Guest, Keen, Nettlefolds Group—joined with the NRDC to form a new company—Energy Conversion Limited. The aim of the new company was to promote research into the development of fuel cells which could be produced commercially. The NRDC had already made licensing arrangements in the USA with the Leesona Corporation who, in turn, associated themselves with the United Aircraft Corporation. Leesona and the Pratt and Whitney Division of United Aircraft carried out a joint fuel cell research and development programme most notably in connexion with the US space programme.

The longer title of the Cambridge company which housed the project was Marshalls Flying School Limited.

For Bacon’s Energy Conversion Ltd papers see B.644-B.854.

For papers relating to Leesona and Pratt and Whitney see B.1132-B.1147.

The material relating to the NRDC sponsored fuel cell programme at Marshalls and continuing NRDC interest in fuel cell activities (to 1991) is presented as follows:

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**B.273-B.342**  
Correspondence

**B.273-B.287**  

Bacon’s NRDC correspondents include H.J. Crawley, D. Hennessey and Lord Halsbury (Managing Director 1949-1959).

The sequence includes manuscript and typescript notes and drafts by Bacon.

**B.273**  
1956 February - July.

**B.274**  
1956 August - December.
Includes ‘Details of Research and Development Work for the Hydrogen - Oxygen Cell, leading up to the Construction of a Unit of about 10kw’, by Bacon, 10pp manuscript.

B.275 1957 January - March.
Includes ‘Details of Research and Development Work for the Hydrogen - Oxygen Cell, leading up to the Construction of a Unit of about 10kw’, by Bacon, 9pp typescript with manuscript annotation.

B.276 1957 April - May.
Includes ‘Details of Research and Development Work for the Hydrogen - Oxygen Cell, leading up to the Construction of a Unit of about 10kw’, by Bacon, 7pp typescript.

B.277 1957 June - July.

B.278 1957 August - October.

B.279 1957 November - December.


B.281 1958 April - June.

B.282 1958 July - December.

B.283 1959 January - March.
Includes list of firms and other organisations engaged on fuel cell research, list of recent fuel cell patents and draft article on the hydrogen-oxygen fuel cell for the NRDC Bulletin.

B.284 1959 April - June.
B.285 1959 July - September.

B.286 1959 October - December.


Bacon’s NRDC correspondents include H.J. Crawley, K.E.V. Willis (Electrical Engineering Group) and J.C. Duckworth (Managing Director 1959-1970). Correspondence 1982 is with the NRDC’s successor organisation British Technology Group.

The sequence includes manuscript and typescript notes and drafts by Bacon, lists of Bacon’s expenses etc.


B.289 1960 April - June.

B.290 1960 February, July - September.

B.291 1960 October - December.


B.293 1961 July - September.

B.294 1961 October - December.


B.296 1962 April - November.


B.299 1969.

Principally re dinner given in Bacon’s honour by the NRDC.

Includes Bacon’s speech of thanks which enumerates the major turning points in the fuel cell work since 1932.


B.301 1972 January - June.

Includes ‘Brief Statement on the Possible Production of Hydrogen from Nuclear Energy and Water’ by Bacon.

B.302 1972 July - November.


Includes ‘Fuel Cell Work at Harwell. (Progress Report by Dr W.C. Marshall)’.


Bacon’s correspondents include A.B. Parker (BTG Science Investment and Operations Division).


The principal correspondent from Marshalls is J.C. Frost, the Project Supervisor. Most of Bacon’s correspondence with the NRDC for this period is to be found at B.276-B.282. The NRDC correspondents include D. Hennessey and H.J. Crawley.

B.309 1957 May - December.


B.311 1958 April - June.

B.312 1958 July - August.


The principal Marshalls correspondent is J.C. Frost though the sequence includes a number of carbons from Bacon. H.J. Crawley is the principal NRDC correspondent.

B.313 1958 September - December.


B.315 1959 April - May.

Includes note by Bacon on the concentration cell effect and two draft schedules re ‘Contract for the Development of Oxygen/Hydrogen Fuel Cell and Construction of a Working Fuel Cell Unit’.
B.316 1959 June - July.

B.317 1959 August.

B.318 1959 September - October.
Includes ‘Report on Visit to the United States from 10th to 24th September’ by Frost and ‘Suggested Programme for 1960 by Mr H.J. Crawley - October 6th’.

B.319 1959 November - December.
Includes ‘Visitors to H.O.C. Section. From 25th August 1959’ and papers re future programme of work.


The principal Marshall’s correspondent is J.C. Frost. NRDC correspondents include H.J. Crawley and K.E.V Willis of the Electrical Engineering Group.


B.321 1960 March

B.322 1960 April - June.
Includes ‘Visitors to H.O.C. Section From 25 August, 1959 to 18th April, 1960’.

B.323 1960 July - December.
Includes lists of visitors.

B.324-B.330 ‘Letters January 1959 to June 1959’. Contents of binder so inscribed divided into seven for ease of reference: miscellaneous Marshalls fuel cell section correspondence with suppliers, etc.
In addition to Bacon, Marshalls correspondents include J.C. Frost, P.W. Jones, H.J.H. Perry, H.J. Young.

B.324 1959 January.

B.325 1959 February.

B.326 1959 March.

B.327 1959 April.

B.328 1959 May.

B.329 1959 June (1).

B.330 1959 June (2).

B.331-B.342 ‘Letters from 1/7/59’. Contents of binder so inscribed divided into twelve for ease of reference: miscellaneous Marshalls fuel cell section correspondence with suppliers, etc. July - December 1959.

In addition to Bacon, Marshall’s correspondents include J.C. Frost, P.W. Jones, H.J.H. Perry, H.J. Young.

B.331 1959 July (1).

B.332 1959 July (2).

B.333 1959 August.

B.334 1959 September.

B.335 1959 October (1).
B.336 1959 October (2).

B.337 1959 November (1).

B.338 1959 November (2).

B.339 1959 December (1).

B.340 1959 December (2).

B.341 1959 December (3).

B.342 1959 December (4).

B.343-B.431A Notes, drafts and reports 1957-1991


B.343 1957 January - February.

Includes letter from Marshall inviting Bacon to discuss his project with him, 7 January and 'Summary of the Initial Requirements and Provisional Programme for the BACON DEVELOPMENT PROJECT - 21st January 1957'.

B.344 1957 April - November.

B.345 1958.

B.346 1959.

Includes papers re press visit to Marshalls, 24 August.

Includes ‘Inventory of Documents, Materials and Equipment’ in respect of the Fuel Cell Development Contract.


Include correspondence and papers re account of fuel cell work for Marshalls company history.

2 folders.


B.352, B.353  1957.

2 folders.


2 folders.

B.356  1959.

B.357, B.358  N.d.

2 folders.


B.366 1957 April - June.

B.367 1957 July - September.

B.368 1957 October - December.


B.370 1958 April - June.

B.371 1958 July - December.


B.373 1958 April - June.

B.374 1958 July - September.

B.375 1959 October - December.


B.376 1957 April - May.

Includes ’Preliminary Notes on N.R.D.C Project at Marshalls Cambridge Week Minus 1’, 29 April.
B.377 1957 June - July.
Includes record of first quarterly meeting held 1 July. Representatives of the NRDC, Ministry of Fuel and Power and Marshalls attended.

B.378 1957 August - September.

B.379 1957 October - December.

Includes record of quarterly meeting held 13 February. Representatives of the NRDC, War Office and Marshalls attended.

B.381 1958 March - April.

B.382 1958 May - June.

B.383 1958 July - August.

B.384 1958 September - October.

B.385 1958 November - December.

B.386 1959 January - February.

B.387 1959 March - April.

B.388 1959 May - June.

B.389 1959 July - August

B.390 1959 September - October.
B.391  1959 November - December.

B.392  1960 January.

B.393  1960 January - February.

B.394-B.396  'WEEKLY NOTES'. Contents of binder so inscribed divided into three for ease of reference: manuscript notes of 'Weekly Meetings', 'Notes on Work in Hand', etc. May, September 1957 - January 1962.

B.397-B.405  'Quarterly Reports'. Contents of binder so inscribed divided into nine for ease of reference: duplicated reports, manuscript and typescript notes and drafts, etc. April 1957 - October 1959.

B.397  First Quarterly Report 23 April - 29 June 1957.
       Second Quarterly Report 1 July - 19 October 1957.


Tenth Quarterly Report 20 July - 19 October 1959.


Enclosed at front of report is manuscript ‘Notes on Terminal Report’. 9 April 1960.

In Marshalls Flying School Limited binder.

Marshalls Flying School Limited binder containing:


‘Special Report The Activation of Hydrox Oxygen Electrodes with Silver and Gold’.

‘Special Report Operation of Gold-Activated Oxygen Electrodes’.

Marshalls Flying School Limited binder containing:


‘Special Report Analysis of Permeability Test Results for 101 Electrodes of the Type 5E Mod. III’.

Marshalls Flying School Limited binder containing:


‘Special Report Some Recent Estimates of Hydrogen Production Costs’.

‘Special Report Endurance Tests on Ten-Inch Multicell Packs’.

Marshalls Flying School Limited binder containing:


‘Special Report The Performance of 2 3/4-Inch Diameter Electrodes Manufactured from I.C.I. Pre-Sintered Sheet’.

‘Special Report Plate-Type Ten-Inch Electrodes - Analysis of Some Variations in Manufacture’.
B.411  Marshalls Flying School Limited binder containing:


‘Special Report Fabrication of Hydrox Fuel Electrodes from Porous Sheet’.

B.412  Marshalls Flying School Limited binder containing:


‘Special Report Some Autoclave Corrosion Tests of Pre-Oxidised Nickel Specimens’.

B.413  Marshalls Flying School Limited binder containing:


‘Report on Ten-Inch Fuel Consumption’.

‘Special Report Study of Electrode Polarisation by Current-Interruptor Technique’.

B.414  Marshalls Flying School Limited binder containing:


‘Special Report Measurements of Electrolyte Conductivity by Current-Interruptor Technique’.

B.415  Marshalls Flying School Limited binder containing:


‘Special Report Exploratory Experiments with Porous Silver Plug Electrodes at Room Temperature and Pressure’.

B.416  Marshalls Flying School Limited binder containing:


‘Notes on Design Study for 20KW Hydrox Battery’. 


‘Fuel Cell Research in the Federal Republic German Report No. 85 25.2.58’


‘Notes of Meetings during week 25th - 29th January 1960’.


‘High Pressure Electrolysis Report on visit to Lonza, Visp., Switzerland 18th May, 1960’.


‘Visit of P.W. Jones to Edwards High Vacuum Ltd, Crawley, on 5th October, 1960’.


‘Visit to Chloride Electric Storage Company, Clifton Junction on 4th November, 1960’.
B.422-B.427 Miscellaneous manuscript and typescript notes and drafts. 1957-1960 and n.d.

B.422 1957 (1).

B.423 1957 (2).

B.424 1958 (1)

B.425 1958 (2).

B.426 1959-1960

B.427 N.d.

B.428 ‘Demonstration notes and data’. Contents of folder so inscribed: papers relating to demonstration of fuel cell to interested parties in August 1959.


B.432-B.461A Notebooks 1957-1961

For related technical drawings see B.1237-B.1259.


B.445-B.461A  Small format notebooks.


The books are lettered A - J.


B.452  26 March - 21 July 1959.

B.453  22nd July - 22nd October 1959.


B.461A Untitled. N.d.

B.462-B.599 Data 1951-1961

Includes some data from period of Electrical Research Association sponsorship.


The last test sheet is dated 27 June 1958.


B.523 ‘Test and performance data sheets for Electrodes in 5in Cell’. Contents of folder so inscribed. N.d.

B.524, B.525 Contents of untitled folder divided into two for ease of reference: test sheets re cell assembly. 1957-1959.


B.566, B.567 ‘Tabular Performance of electrodes as function of time. 5in. cell. 10in. cell’. Contents of folder so inscribed divided into two for ease of reference. 1957-1959.

B.568, B.569 ‘Graphical performance of Electrodes as function of time 5in. in front 10in. behind.’ Contents of binder so inscribed divided into two for ease of reference.


P.W. Jones was a member of the Fuel Cell Section at Marshalls.

**B.600-B.634 Equipment and supplies 1957-1961**

B.600-B.618
Bacon's folders relating to equipment and supplies arranged alphabetically by folder title.
Include correspondence with suppliers, technical literature, technical drawings, etc.


B.610, B.611 ‘Hydrogen etc circulation by water powered ejector (Mitchell, Chempumps, Gresham & Craven, Hydromechanics Res. Ass.). Contents of folder so inscribed divided into two for ease of reference.


B.619-B.634 Correspondence with suppliers arranged alphabetically by supplier 1957-1961.

Include technical literature, technical drawings etc.

B.619  A.

B.620  B.

B.621  C.

B.622  D.

B.623, B.624  E.

2 folders.

B.625  F, G.

B.626  I.

B.627  J.

B.628, B.629  M.

2 folders.

B.630  N.

B.631  P.

B.632  R, S.
B.633 T.

B.634 W.

B.635-B.643 Visitors 1957-1969

B.635-639 ‘Visitors’. Contents of binder so inscribed divided into five for ease of reference: correspondence and manuscript notes re visitors to Marshalls (until 1961) and thereafter to the Sunbury-on-Thames, Middlesex headquarters of Energy Conversion Limited or Bacon’s private address near Cambridge. 1957-1965.


B.636 1959 January - June.

B.637 1959 July - December.

B.638 1960.

B.639 1961-1965


B.640 1959.

B.641 1960.


In October 1961 British Petroleum, British Ropes, and the Guest, Keen, Nettlefolds Group, joined with the National Research Development Corporation to form a new company - Energy Conversion Limited. The aim of the new company was to promote research into the development of fuel cells which could be produced commercially. Bacon acted as a consultant to ECL and a successor company Fuel Cells Ltd which was based at the Atomic Research Establishment, Harwell and ceased operations in 1973.

Bacon's ECL material is presented as follows:

- **B.644-B.666** Correspondence
- **B.667-B.671** Programmes of work and forward planning documents
- **B.672-B.779** Reports
- **B.780-B.837** Notes
- **B.838-B.854** Miscellaneous

### B.644-B.666 Correspondence 1962-1974


Include Bacon's manuscript notes of expenses, telephone calls, meetings, visits etc.

Correspondence for the period September 1964 - June 1968 was not found.

- **B.644** 1962 March - June.
- **B.645** 1962 July - September.
  
  Includes ‘Note on Fuel Cell to Power Main-Line Locomotive’, 4pp typescript.
- **B.646** 1962 October - December.
  
  Includes ‘Advantages of the Bacon Type Cell’, 19pp typescript.
- **B.647** 1963 January - February.

B.648 1963 March - April.

B.649 1963 May - June.

B.650 1963 July - August.

B.651 1963 September - October.

B.652 1963 November - December.
Includes ‘Note on Possible Applications for Methanol Fuel Cells’, 14pp manuscript.

B.653 1964 January - February.

B.654 1964 March - April.

B.655 1964 May - June.
Includes papers for patents meeting.

B.656 1964 July - August.

B.657 1968 July - December.


B.659 1969 April - June.

B.660 1969 July - August.
B.661 1969 October - December.


B.663 1970 July - September.

B.664 1970 October - December.
Includes ‘Note on Regenerative Hydrogen-Oxygen Fuel Cell Systems’, manuscript and typescript drafts.


B.667-B.671 Programmes of work and forward planning documents 1963-1969


B.668 ‘Draft Research Programme Proposals for 1965’.

B.669 Three forward planning documents in the area of standby power, 12 and 16 June and 10 July 1969.

In original binder.

In original binder.

B.672-B.779 Reports 1961-1971
B.672-B.679 ‘F.T.B. Reports (E.C.L.).’ Contents of folder so inscribed divided into eight for ease of reference: manuscript, typescript and duplicated typescript versions of papers prepared by Bacon for the ECL.


‘Visit by Mr. F.T. Bacon and Mr. K.E.V. Willis of N.R.D.C. to Fuel Cell activities in the U.S.A. - July 1961’.

B.673 ‘Possible Replacement of Palladium-Silver Cathode by a Cheaper Material’ by Bacon, July 1963.

B.674 ‘Note on Possible Application for Methanol Fuel Cell’ by Bacon, September 1963.

In original binder.

B.675 ‘Note on Methanol/Oxygen-Air Fuel Cell System’ by Bacon, 10 January 1964.

‘Note on Visit to Dr. E.C. Wadlow at the Admiralty, Whitehall, on Friday, 17th January 1964’, by Bacon.

‘Note on Possible use of Oxygen or Air Electrodes in the Alkali-Chlorine Process’ by Bacon, 26 March 1964.

B.676 ‘Note on Reasons for wanting to start work on a cell based on the Cyclohexane/Benzene Reaction (or Decalin/Tetralin etc)’ by Bacon, 24 September 1964.

B.677 ‘Note on Future Development Programme at E.C.L.’ by Bacon, 14 December 1964.

B.678 ‘Visit to Admiralty Materials Laboratory, Holton Heath, Poole, Dorset, on 22nd December, 1965’ by Bacon, 1 February 1966.

‘Reason for the Original Choice of the Hydrogen-Oxygen Cell, working at medium temperature, in preference to other types of cell’ by Bacon, 12 January 1967.

‘Report on a visit to Professor Justi at the Institute for Technical Physics of the Technical University, Braunschweig, Western Germany, November 17th to 19th 1971’ by Bacon.

‘Safety Precautions Advisable when using Methanol/Air Battery’ by Bacon. N.d.


In original binders.

B.680  No.1  June 1963.

B.681  No.2  1963 1 July - 31 August.

B.682  No.3  1963 1 September - 13 December.

B.683  No.1  1964 1 January - 29 February.

B.684  No.2  1964 1 March - 30 April.

B.685  No.3  1964 1 May - 31 [sic] June.

B.686  No.4  1964 1 July - 31 August.

B.687  No.5  1964 1 September - 31 October.

B.687A  No.6  1964 1 November - 31 December.

B.688  No.1  1965 1 January - 28 February  Part One.

B.689  No.1  1965 1 January - 28 February  Part Two.

B.690  No.2  1965 1 March - 30 April.
B.691 No.3  1965 1 May - 30 June.

B.692 No.4  1965  1 July - 31 August.

B.693 No.5  1965 1 September - 30 October.

B.694 No.6  1965 1 November - 31 December.

B.695 No.1  1966 1 January - 30 April.

B.696 No. 2 1966 1 May - 30 June.

B.697 No.3  1966  1 July - 31 August.

B.698 No.4  1966 1 September - 31 December.

In original binders.

B.699 No.2  1963  July - December.

B.700 No.3  1964 January - March.

B.701 No.4  1964 April - July.

B.702 No.5  1964 August - October.

B.703 No.6  1964 November - December.

B.704 No.1  1965 1 January - 31 March.
B.705 No.2  1965  1 April - 31 May.

B.706 No.3  1965  1 June - 31 July.

B.707 No.4  1965  1 August - 1 November.

B.708 No.5  1965  1 November - 31 December.

B.709 No.1  1966  1 January -28 February.

B.710 No.2  1966  1 March - 30 April.

B.711 No.3  1966  1 May - 30 June.

B.712 No.  4  1966  1 July - 31 August.

B.713 No.  5  1966  1 September - 31 October.

B.714 No.6  1966  1 November - 31 December.


B.715-B.719 Series A: Methanol/Air Cell.

In original binders.

B.715 No.1  1965  16 March - 15 May

B.716 No.2  1965  16 May - 15 August.
B.717  No. 3  1965 16 August - 1966 15 February.

B.718  No.4  1966 16 February - 15 May.

B.719  No.5  1966 16 May -15 August.

B.720-B.722  Series B: Cyanamid Cell.
  In original binders.

B.720  No.1  1965.


B.722  No.3  1966 16 February -15 May.

B.723  Series C:  Low Temperature Hydrogen-Air Cell.
  No.1  1965 November - 1966 10 June.


B.725  ‘Preliminary report on Regenerative fuel cell systems  Special Report no.4’ by T.M. Fry, 17 April 1964.
  In original binder.

  In original binder.

B.727  ‘Special Report No.7  Voltage-current characteristics of high temperature cells at constant fuel utilisation’ by T.M. Fry, 15 July 1964.


B.732 Figures for preceding.


2 folders.


B.744 No.58 ‘Hydriding Titanium by Electrolysis’ by P.C. Jones, 7 August 1968 [sic].

In original binder.


B.746 'Visit to Leesona-Moos and Pratt & Whitney March 16th - 20th 1964' by A.D.S. Tantram.

In original binder.


In original binder.


B.751 'Visit Report VR 93 Report on a Visit to A Fuel Cell Exhibition at the University of Paris ... 15th December 1965 - 16th January 1966'.


'Visit Report VR 105 by Dr D.P. Gregory, 12th July, 1966. Visit to BX Plastics Research Laboratories ... on 7th July, 1966'.


Visit Report VR 133 Visit to I.E.E. Colloquium ... London, on April 21st, 1967 by Dr. H.R. Espig and Mr E.G. Orpet. 1st May 1967.


Bacon visited Leesona Moos Laboratories, Pratt & Whitney Aircraft, General Electric, Schnectady and Lynn, the U.S. Army Electronics Command, Fort Monmouth, the University of Pennsylvania and the State University of New York.
The primary object of Bacon’s visit to the USA was to deliver the Edgar Fahs Smith Memorial Lecture at the University of Pennsylvania. See C.64-C.67.

B.761


B.762

‘Visit to Batelle Institute London office 8th February 1968 by Dr D.P. Gregory’.


B.763


B.764


B.765

‘Visit Report No.163 to Admiralty Materials Laboratory Holton Heath 11th November 1968 by Mr C.G. Clow’.


B.766


‘Visit Report 177 The following German firms were visited in connection with Long Range Planning: A.E.G., Bosch, Siemens and Varta. Dr P.D. Power 21st May 1969’.

B.767  
‘Visit Report 181  Power Sources Conference and to Industrial Firms in U.S.A. Concerned with Forward Planning Exercise. 19th May to 4th June, 1969’.

B.768  


B.769  

B.770  

B.771  


B.772  


B.773  


B.774-B.779  

B.774  

B.775  


B.777 ‘A Survey of Vehicles to assess their Suitability as Applications for the Fuel Cell’ by P.R. Hall and A.E. James, October 1966.

In original binder.


In original binder.

B.779 ‘Submarine Power Sources’ by C.G. Clow, April 1971.

B.780-B.837 Notes 1965-1970


B.780, B.781 1965 July-August.

2 folders.

B.782, B.783 1965 September-October.

2 folders.

B.784 1965 November.

B.785 1965 December.

B.786 1966 January.
B.787 1966 February.

2 folders.

B.790 1966 May.

B.791 1966 June.

B.792 1966 July.

B.793 1966 August.

B.794, B.795 1966 September.
2 folders.

B.796-B.799 1966 September - October.
4 folders.

B.800 1966 December.

B.801 1967 January.

B.802-B.805 Duplicated ECL 'Research Activity Notes'. 1967.

B.802 1967 February.

B.803 1967 March.

B.804 1967 April.
B.805  1967 May.


B.806  1967 January.

B.807  1967 February.

B.808  1967 March.


B.809  1967 January.

B.810  1967 February.

B.811  1967 March.

B.812  1967 April.

B.813  1967 May.


                                          No.5 ‘Notes on CO₂ and Alkaline Cells’ by C.G. Clow, 4 May 1966.


No.15. ‘Economics of the Brown, Boverie Cell’ by T.M. Fry, 10 January 1967.

No.18. ‘Materials for High-Temperature Molten Carbonate Fuel Cells’ by B.S. Harris. N.d.


No.25. ‘Titanium hydride - air battery’ by F.T. Bacon, October 1967.

No.34. ‘Water Removal from Air Cathodes’ by J.G. Bannochie.

Corrections only to technical note no.34, 20 September 1968.

No.42. ‘Electrolyte concentration polarisation at fuel cell electrodes in different electrolytes at low temperatures’ by J.G. Bannochie, 31 May 1968.


No.45. ‘Hydrogen-generating reactions for small scale applications’ by T.M. Fry, 17 July 1968.

In original binder.


In original binder.

No.51. ‘Note on Proposed Rechargeable Potassium Air Cell’ by F.T. Bacon. N.d.
B.827 No.52. “INTER4” a computer programme for interpolation by Lagrange’s Method’ by T.M. Fry, 7 November 1968.

B.828 No.54. ‘Electrolyte Polarisation at the anode of low temperature fuel cells due to foreign anions in KOH electrolyte’ by J.G. Bannochie. N.d.

In original binder.

B.829 No.55. ‘The feasibility of using a low temperature alkaline electrolyte fuel cell as its own electrochemical electrolyte regenerator’ by J.G. Bannochie. N.d.

In original binder.


In original binder.


B.834 No.102. ‘Some Physical Properties of Molten Potassium and Sodium Hydroxides’ by B.S. Harris. N.d.


B.838-B.854 Miscellaneous 1965-1969


See also E.6.

B.839-B.850 Lectures on fuel cells by ECL staff.


B.840-B.848 Lectures given as part of a course on fuel cells, Leicester, September 1965.


B.842 ‘Lecture 3’ ‘Rate-controlling factors’ by J.M. Parry.


B.845 ‘Lecture 8’ ‘Medium Temperature fuel cells’ by T.M. Fry.


‘How does a fuel cell work’ by T.M. Fry, 23 September 1965.
Inscribed ‘Foreword’ on first page and possibly related to lecture course given at Leicester in September 1965.


‘The Use of Fuel Cells on and under the Sea’ by H.R. Espig and T.M. Fry.

Other papers by ECL staff 1966-1969 and n.d.
4 folders.


The topics have been identified from the titles of Bacon’s binders and have been arranged in chronological order as far as possible. They may cover extended periods of time, span more than one of the sponsored programmes of research with which Bacon was associated and demonstrate his continuing interest in fuel cell matters right to the end of his life.


‘Electrodes and Materials’. Contents of binder so inscribed divided into eleven for ease of reference: manuscript notes etc. ca 1944-1953.

‘Electrodes’. Contents of binder so inscribed divided into eight for ease of reference: manuscript notes, correspondence etc. 1948-1983.
B.897, B.898 'Theoretical E.M.F.'. Contents of binder so inscribed divided into two for ease of reference: manuscript notes, correspondence etc. 1948-1977.

B.899-B.902 'Electrolyte'. Contents of binder so inscribed divided into four for ease of reference: manuscript notes, printed material etc. 1949-1972.

B.903-B.909 'Pump, Circulating H₂'. Contents of binder so inscribed divided into seven for ease of reference: manuscript notes, graphs, technical drawings, correspondence, printed material. 1950-1965.

B.910, B.911 'Analysis'. Contents of binder so inscribed divided into two for ease of reference: manuscript notes, correspondence. 1950-1959.


B.914, B.915 'Automatic Control Calculations'. Contents of binder so inscribed divided into two for ease of reference: manuscript notes. 1950-1955.

B.916 'Batteries, Primary'. Contents of binder so inscribed: correspondence etc. 1951-1968.

B.917-B.927 'Supply of Nickel'. Contents of binder so inscribed divided into eleven for ease of reference: supply orders, correspondence, manuscript notes, printed material etc. 1951-1973.


B.936 'Asbestos etc'. Contents of binder so inscribed: correspondence, manuscript notes. 1952-1971.

B.937-B.941 'Batteries, storage'. Contents of binder so inscribed divided into five for ease of reference: correspondence, manuscript notes, patent specifications etc. 1952-1975.


B.947-B.957  ‘Hydrogen Production’. Contents of binder so inscribed divided into eleven for ease of reference: correspondence, manuscript notes, printed and duplicated material etc. 1952-1983.


See also B.1028.

B.961-B.968  ‘Joints & Packing’. Contents of binder so inscribed divided into eight for ease of reference: correspondence, manuscript notes, printed material etc. 1952-1965.


B.979, B.980  ‘Electrodes, Slurry and Fluidised Bed’. Contents of binder so inscribed divided into two for ease of reference: manuscript notes, duplicated and typescript papers including ‘Note on the present position in the fuel cell field, with special reference to regenerative cells’ by Bacon. 1953-1970.


B.996-B.999 ‘Larger Unit’. Contents of binder so inscribed divided into four for ease of reference: manuscript notes and drafts, technical drawings, printed material. 1955-1959.


B.1015-B.1017 ‘H₂-O₂ Regenerative Fuel Cells’. Contents of binder so inscribed divided into three for ease of reference: correspondence, manuscript notes, typescript and duplicated papers including ‘Note on regenerative hydrogen-oxygen fuel cell systems’ by Bacon, printed material. 1958-1971.


B.1026, B.1027  \( \text{C}_6\text{H}_6 \rightarrow \text{C}_6\text{H}_{12} \) Cell’. Contents of binder so inscribed divided into two for ease of reference: manuscript and typescript notes and drafts, printed material etc. 1961-1964.


See also B.958-B.960.

B.1029-B.1033  ‘Fuels (Fossil etc.)’. Contents of binder so inscribed divided into five for ease of reference: correspondence, manuscript notes. 1963-1981.


B.1049, B.1050  ‘Hydrazine and ammonia’. Contents of binder so inscribed divided into two for ease of reference: duplicated papers, correspondence, manuscript notes etc. 1966-1975.


Includes earlier printed material.


B.1078-B.1186 RESEARCH CENTRES, LABORATORIES AND SPONSORS 1952-1992

Arranged alphabetically by title of company, organisation or government department undertaking, sponsoring or expressing interest in fuel cell research and development.


Investigations were carried out on the Bacon Cell for the Admiralty under contract with the Electrical Research Association at the Department of Chemical Engineering, University of Cambridge 1954-1956. R.G.H. Watson who worked with Bacon in Cambridge subsequently joined the Admiralty Materials Laboratory (AML), Holton Heath, Poole, Dorset. Discussion meetings on fuel cells were held at the AML in April 1966 and October 1967.


‘Fuel Cells (American Cyanamid)’. Contents of binder so inscribed divided into three for ease of reference: manuscript notes, typescript and duplicated papers. 1963-1974


Bacon's correspondent is K.D. Beccu of the Batelle Centre de Recherche de Genève.


Bacon's principal correspondent is F.J. Salzano, Head, Energy Storage and Conversion Division.


Bacon's principal correspondent is A.B. Hart of the Central Electricity Generating Board Research and Development Department and CEGB Central Electricity Research Laboratories, Leatherhead, Surrey.


Bacon was appointed as a Consultant to the EEC Hydrogen Programme (161-76-11 EH UK) for one year with effect from 1 March 1978.

Bacon's correspondent is A.C.C. Tseung, Director of the Chemical Energy Research Unit at the City University, London. Before taking up an appointment at the City University Tseung had been Leader of the Materials Group at ECL, 1963-1967.


Bacon corresponded with officials and scientists at the Department of Energy Energy Technology Division and the Energy Technology Support Unit at AERE Harwell about the EEC research and development programme 1979-
1983 which covered amongst other areas of interest the production and utilisation of hydrogen.


Bacon's correspondents are E.P. Hawthorne and J. Lamborn of the Hawker Siddeley Nuclear Power Company Ltd.

B.1110-B.1116 ‘I.C.I & I.M.I and Fluon (or Teflon)’. Contents of folder so inscribed divided into seven for ease of reference: correspondence, manuscript notes etc. 1956-1978.

Bacon approached ICI (Imperial Chemical Industries Ltd) in 1956 with the view to interesting the company in the development stage of the hydrogen-oxygen fuel cell. ICI did not undertake the development work but Bacon was given permission to go at any time to the Research Directors of the various divisions of the company and ask for any advice he might need.


The sequence was initiated when Johnson Matthey invited Bacon to an exhibition on ‘Johnson Matthey Technology Worldwide’ and a fuel cell demonstration day. In November 1984 Bacon entered into a formal consultancy with Johnson Matthey in respect of their fuel cell work. Johnson Matthey was a sponsor of the second Grove Symposium in September 1991 at which the first Sir William Grove Memorial Medal was presented to Bacon.

Bacon's association with Johnson Matthey dated from the 1930s when they supplied activated metal gauzes for his own early fuel cell work.


The correspondence is with the Patterson Moos Division of the Universal Winding Company, subsequently Patterson Moos Research Division of the Leesona Corporation and then Leesona Moos Laboratories of the Leesona Corporation, and the Pratt & Whitney Aircraft Division of United Aircraft Corporation.


The NRDC made licensing arrangements in the USA with the Leesona Corporation who, in turn, associated themselves with the United Aircraft Corporation. Leesona and United Aircraft carried out a joint fuel cell research and development programme of considerable magnitude most notably in connexion with the US space programme.
Bacon was informed in a telegram (B.1142) from A.M. Moos that ‘Pratt and Whitney have been awarded the contract by Grumm [sic] Aircraft to deliver the Bacon Fuel Cell for the Lunar Excursion Module. All of the electrical power that will ensure that success of the moon excursion program and the survival of the first astronauts to the moon will be provided by the Bacon Cell’.

See also B.1148, B.1149, B.1150-B.1152, B.1301-B.1323.

B.1148, B.1149

B.1150-B.1152

B.1153-B.1156
‘London Electricity Board’. Contents of binder so inscribed divided into four for ease of reference: correspondence, manuscript notes, printed material, paper by Bacon ‘Preliminary notes on proposal of London Electricity Board for 500 kW Fuel Cell Units in Substations’ etc. 1963-1970.

B.1157, B.1158
‘Merz and McLellan’. Contents of binder so inscribed divided into two for ease of reference: correspondence, Merz and McLellan papers re a proposed high and low speed electric passenger transit system (HALSEPT) etc. 1970-1975.

Bacon’s principal correspondent is W.W. Campbell whose *Times* obituary is included at B.1158.

The consulting engineers Merz and McLellan had sponsored Bacon’s fuel cell work at King’s College London 1940-1941.

B.1159-B.1161

MEXE, Christchurch, Hampshire was interested in the hydrox cell for tractor application.

B.1162-B.1165
‘M. of P. and C.E.A.’ Contents of binder so inscribed divided into four for ease of reference: correspondence, manuscript notes. 1952-1962.

Bacon’s correspondence is with the Ministry of Fuel and Power/Ministry of Power and the British Electricity Authority/Central Electricity Authority. In May 1956 Bacon was informed formally by Sir David Brunt, Chairman of the CEA that ‘the question of supporting further work on the hydrogen/oxygen
fuel cell, under the aegis of the Central Electricity Authority, has been considered and the Authority has decided not to support the work’.


Bacon’s correspondence is with the Ministry of Technology re its Fuel Cell Working Party 1966-1967 and with the Ministry of Energy re EEC interest in projects demonstrating energy saving or for the exploitation of alternative energy sources 1978. At the Ministry of Technology’s request Bacon prepared a paper for the Fuel Cell Working Party ‘Note on the present position in the fuel cell field, with special reference to regenerative cells’.


B.1172-B.1175 ‘Sondes Place Research Institute’. Contents of folder so inscribed divided into four for ease of reference: correspondence, laboratory reports, printed material etc. 1959-1969.

In addition to sponsoring work on the hydrogen/oxygen (Bacon) cell the NRDC sponsored a programme of work on high temperature carbonaceous fuel cells at the Sondes Place Research Institute (Sones Place Research Laboratories Limited), Dorking, Surrey.

See also B.1324-B.1333.


Bacon was a consultant to Fuel Cells Ltd and visited Harwell regularly 1971-1973 while fuel cell work was being carried out there.


Research on fuel cells was carried out at the Department of Scientific and Industrial Research Warren Spring Laboratory, Stevenage, Hertfordshire.

See also B.1335.

B.1186


Bacon visited Weir Pumps Ltd, Cathcart, Glasgow to discuss the fuel cell situation with Weir Group personnel.

B.1187-B.1268 TECHNICAL DRAWINGS ca 1935-1961

For notebook used (in part) as Drawing Register at Marshalls of Cambridge see B.432.

B.1187-B.1197

‘Drawings (Old)’. Contents of envelope so inscribed divided into eleven for ease of reference: technical drawings, figures, proposed laboratory layout (Cambridge University Metallurgy Department) etc. ca 1935-1947.

Includes drawings from Department of Science and Industrial Research Chemical Research Laboratory, Teddington, Middlesex, Merz and McLellan, Richard Klinger Ltd and University of Cambridge Estates Department.

B.1198-B.1208


B.1209-B.1231


B.1232-B.1236


B.1232 includes drawing from Sunvic Controls Ltd, Harlow, Essex.

B.1237-B.1259 Marshalls of Cambridge drawings found loose and arranged by drawing number (see Drawing Register at B.432), some with manuscript annotation and amendment. 1957-1960.

23 folders.
B.1260  Marshalls of Cambridge drawings of ‘H.O.C. Section - No. 6 Hangar’. N.d.

B.1261  Drawings from Patterson Moos Division of University Winding Company, Jamaica, New York. Nd.

B.1262-B.1268  Miscellaneous drawings. 1957, 1959 (most undated).
7 folders.

B.1269-B.1360  BACKGROUND MATERIAL
1933-1980

B.1269-B.1335  Fuel Cell reports
B.1336-B.1360  Miscellaneous

B.1269-B.1335  Fuel Cell reports
1945-1967


B.1270, B.1271  British Petroleum Research Centre. 1962.
2 folders.

B.1272  C.A. Parsons & Company Nuclear Research Centre. 1960

B.1273  Central Electricity Research Laboratories. 1962.
Folder also includes 1p manuscript notes by Bacon, 27 April 1963 and two photographs found with CERL Report.


B.1274-B.1276  Published reports by A.P. Paton 1952 and Bacon 1953 and 1958. 3 folders.

These reports are papers for Sub-Committee Z/F: Storage of Electrical Energy. See also B.78-B.126.


These reports are papers for Sub-Committee Z/F: Storage of Electrical Energy. See also B.78-B.126.


These papers are translations of Direct conversion of chemical energy of fuel into electrical energy by O.K. Davtyan, Moscow, 1947.


These papers are from the Patterson Moos Division of the Universal Winding Company, subsequently Patterson Moos Research Division of the Leesona Corporation and then Leesona Moos Laboratories of the Leesona Corporation, and the Pratt & Whitney Aircraft Division of United Aircraft Corporation.

B.1324-B.1333 Sondes Place Research Institute, Dorking, Surrey. 1954-1960.

B.1334 U.S. Army Engineer Research and Development Laboratories. 1959


B.1336-B.1360 Miscellaneous 1933-1980


B.1339-B.1346 ‘Fuel Cell Articles (Shell)’. Contents of folder so inscribed divided into eight for ease of reference: articles, patent specifications, conference papers,
manuscript notes etc. re fuel cell work of “Shell” Research Ltd’s Thornton Research Centre, Chester. 1960-1980.

B.1347-B.1355 Contents of untitled folder divided into nine for ease of reference: printed and duplicated material etc. re fuel cell developments in the USA. 1963-1974.

B.1356-B.1360 Printed, duplicated and typescript background material. 1933-1979. 5 folders.
For further material relating to Bacon’s lectures and publications see Section E Societies and Organisations and Section F Visits and conferences.
A chronological sequence of drafts and related material for Bacon's lectures and publications.

C.1
‘Colloquium 5 - 2 - 53’.
3pp manuscript notes.

C.2
Lists of slides only for lectures, 11 and 13 February 1956.

C.3, C.4
Manuscripts and typescript drafts etc. 2 folders.

C.5-C.8

See also C.143.

C.5
Correspondence re preparation and publication of paper.

C.6, C.7
11pp duplicated typescript + references and figures. 2 folders.

C.8
Manuscript notes and drafts.

C.9-C.14

The substance of the discourse was also published in Nature, Lond. 186 (1960).

See also C.145.

C.9
Correspondence re arrangements for lecture.

C.10-C.13
Typescript drafts for lecture and publication. 4 folders.
C.14 Manuscript notes for lecture.


C.15, C.16 Correspondence and papers re arrangements. 2 folders.

C.17-C.19 Manuscript and typescript drafts of paper. 3 folders.

C.20 Manuscript notes re preparation of paper.

C.21 Manuscript and typescript drafts of report on visit to Rome for United Nations Conference.


See also C.150.

Typescript and manuscript drafts. 2 folders.


C.24-C.26 Correspondence and papers re arrangements. 3 folders.

C.27-C.29 Manuscript and typescript drafts of paper. 3 folders.


See also F.16.

C.30, C.31 Correspondence and papers re arrangements. 2 folders.
C.32 20pp duplicated typescript + figures.

C.33 Manuscript draft of paper.


‘Book on fuel cells’. Contents of Bacon’s binder so inscribed divided into eleven for ease of reference: correspondence with editor, publisher and collaborator (A.M. Adams), drafts, figures, manuscript notes etc. 1960-1964.


C.45 31pp duplicated typescript + list of slides.

C.46 23pp manuscript draft + list of slides.


K.E.V. Willis of the National Research Development Corporation gave a paper on energy storage to the Institution and Bacon contributed to the discussion by preparing some notes on the subject of hydrogen storage. See C.60-C.62.

Correspondence re arrangements, manuscript notes, manuscript and typescript drafts of Bacon’s contribution.


C.48 Correspondence 1964-1965.

C.49 30pp typescript + references.


See also F.18-F.22.
C.50 Correspondence re arrangements.

C.51 Manuscript drafts.


C.52 Correspondence re arrangements.

C.53 Manuscript and typescript drafts.

C.54 Lecture on fuel cells at United Kingdom Atomic Energy Authority, Capenhurst, 24 March 1966.


Bacon contributed a lecture on the hydrogen/oxygen fuel cell in a short course on fuel cells organised by the University of Sheffield for Royal Air Force personnel, 28 March - 1 April 1966.

He was also asked to advise and lecture in a short course on unconventional electrical power sources at Lanchester College of Technology, Coventry, May 1966 and give a lecture to the G.E.C. Wembley Engineering Society, April 1967.


C.55, C.56 Correspondence and papers re arrangements for Sheffield course including programme, summaries of lectures and copy of lecture by T.M. Fry on fuel cell technology ‘for Sheffield’. 2 folders.

C.57 18pp typescript of Bacon’s lecture for Sheffield with manuscript additions and corrections.

C.58 Manuscript draft of Bacon’s Sheffield lecture; manuscript notes.
C.59 Correspondence re Coventry and G.E.C. invitations.


This colloquium was organised by K.E.V. Willis who invited Bacon to present a short paper based on the notes he had prepared for the occasion of Willis's paper on energy storage in 1965. See C.47.

C.60 Correspondence re arrangements, programme and summaries of papers.

C.61, C.62 Manuscript and typescript drafts.


Bacon was invited to attend and contribute to the discussion.

Invitation, abstract of introductory remarks by D.P. Gregory, Bacon's notes of meeting.


See also F.23, F.24, H.17.

C.64 Correspondence re arrangements.

C.65 Letters of thanks, correspondence arising re fuel cells, publication of lecture, etc.

C.66 24pp typescript of lecture + list of slides.

C.67 Manuscript draft; manuscript notes re lecture.


Bacon was invited to attend and contribute to the discussion.
Correspondence re arrangements, colloquium ‘digest’ with programme and summaries of papers, Bacon’s manuscript notes of meeting.

C.69  ‘Beckoning star of stored power’ _The Times_, supplement on the National Research Development Corporation, 28 April 1967.

Correspondence with _The Times_, typescript and manuscript drafts of article under title ‘Fuel Cells: prospects of development’, press-cutting and photocopy of published article.


C.70 Correspondence re arrangements, programme and participants, information about City University Chemistry Department, correspondence arising from meeting.

C.71  18pp typescript of lecture with manuscript additions and corrections.

C.72  Manuscript draft and notes re lecture.

C.73  Bacon's manuscript notes on meeting.


See also C.154.

13pp duplicated typescript.


C.75  Correspondence re arrangements, programme.

C.76  44pp typescript of lecture.
| C.77    | Correspondence re arrangements, programme, list of participants, manuscript notes on meeting etc. |
| C.78    | 25pp typescript draft of lecture. |
| C.79, C.80 | Manuscript drafts. 2 folders. |
| C.81    | Invitations declined:  
To lecture on Fuel Cells to the physical chemistry group at Imperial College London 1969.  
To chair a session and give a review paper on recent advances in fuel cell technology at symposium ‘Electrochemistry 70’, University of Surrey, Guildford, April 1970. |
| C.82    | Correspondence re arrangements. |
| C.83    | Correspondence arising from lecture. |
| C.84    | Press summary of Bacon’s lecture; Selections from Press Cuttings of the Annual Meeting Swansea 1971 (printed booklet). |
| C.85-C.89 | Typescript and manuscript drafts of Bacon’s lecture. 5 folders. |
| C.90    | Correspondence re arrangements; conference information. |
| C.91    | Correspondence arising from lecture. |
C.92 21pp typescript of lecture + references and list of slides; manuscript notes re lecture.

C.93 Figures.


In addition to giving the Institute’s Melchett Lecture for 1973 Bacon was awarded the Melchett Medal in recognition of his outstanding contribution to fuel technology by the development of the hydrogen-oxygen fuel cell as used for power supplies in the Apollo spacecraft.

See also G.34, H.18.

C.94 Correspondence re arrangements.

C.95 Correspondence arising from lecture.

C.96 Incomplete typescript of lecture.

C.97 Manuscript draft of lecture.


For Bacon’s notes on proceedings see F.30.

C.98 Correspondence re arrangements, programmes, symposium information etc.

C.99 13pp typescript + references, list of slides, slides (photocopies).

C.100 Manuscript draft of lecture.

Manuscript draft of lecture; brief correspondence 1975.


C.102 Correspondence re article for Journal of the Royal United Services Institute for Defence Studies.

C.103 20pp typescript + references; 7pp typescript ‘Fuel Cells: prospects of development’ found with typescript of RUSI article.

C.104 Manuscript draft of article.

C.105 Photocopy of manuscript draft with manuscript additions and corrections by Bacon in blue ink and ‘comments and suggestions’ in another hand in red ink.


C.106 Correspondence re arrangements with W.A. Mair, Head of University Engineering Department; notice about lecture series for Cambridge Reporter.

C.107 25pp typescript with manuscript additions and corrections + list of slides.

C.108 Press-cutting; manuscript notes on the literature, August, October-December 1974.

C.109 Proposal for an Energy Research Group in the Cavendish Laboratory, Cambridge sent to Bacon by Mair.

C.110 ‘Fuel Cells and Nuclear Power’, talk at a nuclear technology colloquium, Department of Chemical Engineering and Chemical Technology, Imperial College London, 21 February 1975.

Correspondence re research at Imperial College, arrangements for colloquium, notice etc.

Bacon also gave a lecture at Perth during his Australian visit.

For photographs taken at the conference see H.4.

C.111-C.117 Correspondence re arrangements. 2 folders.

C.113 Letters of thanks, correspondence arising from lecture and visit to Australia.

C.114 Conference information: programme, list of registered delegates, list of contributors to conference proceedings etc.

C.115 Abstract and 28pp typescript with manuscript additions and corrections and manuscript pages intercalated + references.

C.116 22pp typescript draft + references.

C.117 Manuscript notes re conference lecture and lecture at Perth, etc.

C.118-C.120 ‘Fuel Cells’, lecture for Department of Mechanical Engineering, Queen Mary College, University of London, 28 February 1979.

C.118 Correspondence re arrangements.

C.119 19pp typescript + list of slides.

C.120 Manuscript draft of lecture etc.

C.121-C.123 ‘The Development and Practical Application of Fuel Cells’, lecture for South Coast Section Institute of Energy (joint meeting with the Portsmouth and District Chemical Society), Portsmouth Polytechnic, 14 February 1980.

C.121 Correspondence re arrangements.
C.122  24pp typescript + list of slides.

C.123  Typescript of lecture for Queen Mary College (C.103-C.105) with manuscript additions and corrections and intercalated pages for Portsmouth.


Correspondence re arrangements only.

C.125  Miscellaneous unidentified drafts.

C.126, C.127  Figures. 2 folders.

C.128-C.163  CORRESPONDENCE  1952-1991

The contents of Bacon’s ‘Publications’ files including invitations for Bacon to write, lecture and broadcast and also to advise authors, editors and publishers on publications in the fuel cell area. The files also contained a number of drafts by Bacon or sent to him for comment which have been retained in this sequence with the related correspondence. 1952-1991.


C.130  1954 April - June.

C.131  1954 July - September.

C.132  1954 October, December. Includes typescript draft report on the hydrogen oxygen fuel cell for Consulting Engineer with Bacon’s manuscript alterations.

C.134 1955 July - December.

C.135 1956 January. Includes typescript draft of article by Bacon for Times Science Review.

C.136 1956 February - June.

C.137 1956 July - December.

C.138 1957.

C.139 1958.

C.140 1959 January - June.

C.141 1959 July - August. Includes typescript draft of article for New Scientist.

C.142 1959 September. Typescript drafts etc for talk by Bacon in BBC Radio series Science Survey.

C.143 1959 October - December. Includes typescript draft of talk for BBC transcription service (see C.144) and condensed version of American Chemical Society paper on the hydrogen oxygen fuel cells (see C.5-C.8).

C.144 1960 January - February. Includes typescript draft of talk for BBC transcription service (see C.143).

1960 January - June. Includes typescript drafts of article for Nature based on Bacon’s Royal Institution evening discourse (see C.9-C.14).


1961 January - June. Includes Bacon’s typescript ‘Contribution to the discussion on Dr Chambers’ paper on Fuel Cells’ for the Transactions of the North East Coast Institution of Engineers and Shipbuilders.


1962 January - March.

1962 March. Copies of lecture by Bacon to Institution of Plant Engineers on fuel cells and discussion arising (December 1961) revised by Bacon and returned for publication. See C.22, C.23.

1962 May - September. Includes drafts for Bacon’s article in World Energy, a Financial Times Survey.


1966-1968. Includes draft of article on Bacon and his fuel cell work for Achievement International sent to Bacon for comment, October 1966 and typescript of Cambridge News profile article on Bacon, April 1967.

1969 February - June. Includes transcription from a recording for BBC Radio entitled ‘To the moon and back’ (see C.74).

1969 July - September. Principally arising from BBC broadcasts that featured Bacon.
C.156 1969 July - December. Includes script for BBC World Service 'Off the Record' programme.


C.157 1970. Includes typescript draft with manuscript revisions of chapter 5 'Bacon's "magic battery" ' of book written by P. Fairley in connexion with the 21st anniversary of the National Research Development Corporation.


C.161 1980.

C.162 1981.


C.164-C.168 OFF-PRINTS 1954-1984


5 folders.

C.169 BACKGROUND MATERIAL

C.169 Printed, photocopied and typescript material possibly used by Bacon in the preparation of his lectures and papers.
Section D presents Bacon’s papers relating to patent applications, 1949-1967. D.1-D.102 were found in a numbered sequence of folders whose contents included manuscript notes, typescript drafts of applications, specifications and related correspondence. The applicants were usually either Bacon or the body sponsoring the research. The inventor for each patent is Bacon unless otherwise stated in the entries. D.103-D.109 consists of miscellaneous patents material.


The British patent specification is entitled ‘Improvements relating to galvanic cells and batteries’. The application date is given as 8 June 1949.


The British patent specification is entitled ‘Improvements relating to electric batteries’. The application date is given as 16 January 1953.


The British patent specification is entitled ‘Improvements relating to hydrogen-oxygen cells particularly for use as electrolysers’. The application date is given as 23 August 1956.


The British patent specification is entitled ‘Improvements relating to electric cells of the hydrogen-oxygen Type’. The application date is given as 23 August 1956.


The provisional specification is entitled ‘Improvements relating to electric cells. The application dates from 1957.’

The British patent specification is entitled ‘Improvements relating to electrical batteries’. The application date is given as 3 May 1957.


The British patent specification is entitled ‘Improvements relating to electrical cells of the oxygen-hydrogen type’. The application date is given as 19 June 1958.


The British patent specification is entitled ‘Improvements relating to electrical cells of the oxygen-hydrogen type’. The application date is given as 24 October 1958.


The British patent specification is entitled ‘Improvements relating to electrodes for electrical fuel cells’. The inventor is given as H.J.H. Perry and the application date as 30 June 1959.


The provisional specification is entitled ‘Improvements relating to fuel cells’. The inventors are given as Bacon and R.G.H. Watson and the specification is dated, 25 August 1959.


The provisional specification is entitled ‘Improvements relating to fuel cells’. The inventors are given as Bacon and J.N. Agar and the specification is dated 9 September 1959.

The British patent specification is entitled ‘Improvements relating to fuel cells’. The application date is given as 11 September 1959.


The British patent specification is entitled ‘Improvements relating to electrical fuel cells’. The inventor is given as H.J.H. Perry and the application date as 13 October 1959.


The British patent specification is entitled ‘Improvements relating to electric fuel cells’. The inventor is given as H.J. Young and the application date as 25 January 1960.


The British patent specification is entitled ‘Improvements relating to fuel cells’. The inventors are given as Bacon and J.C. Frost and the application date as 17 October 1960.


The British patent specification is entitled ‘Improvements relating to hydrogen/oxygen cells’. The application date is given as 24 July 1961.

‘17 Patent Improved pre-oxidation’. Contents of binder so inscribed, divided into eight for ease of reference.

The British patent specification is entitled ‘Improvements relating to fuel cells’. The inventors are given as Bacon, G.C. Smith and P.W. Jones and the application date as 28 February 1961.
D.87-D.90


The provisional specification is entitled ‘Improvements relating to fuel cells’. The inventor is given as J.C. Frost and the specification is dated 17 February 1961.

D.91-D.94


There are two provisional specifications entitled ‘Improvements relating to fuel cells’. The first is dated 29 December 1961 and the other 1 August 1963.

D.95-D.100


The British patent specification is entitled ‘Improvements relating to fuel cells’. The application date is given as 29 December 1961.

D.101


The provisional specification is entitled ‘Improvements in and relating to electricity supply systems’. The application dates from 1963.

D.102


The provisional specification is entitled ‘Improvements relating to current carrying members’ and dated, 27 October 1966.

D.103-D.109

Miscellaneous patents material.

D.103-D.106


Includes papers, 1964-1967, relating to the opposition by the Leesona Corporation of a British patent application by the Societe des Accumulateurs Fixes et de Traction. Bacon advised the Leesona Corporation on technical aspects of the opposition.

D.107


D.108, D.109

‘Fuel cell patents’. Contents of binder so inscribed, divided into two for ease of reference.
<table>
<thead>
<tr>
<th>Code</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.1-E.5</td>
<td>AERONAUTICAL RESEARCH COUNCIL</td>
</tr>
<tr>
<td>E.6, E.7</td>
<td>COUNCIL OF ENGINEERING INSTITUTIONS</td>
</tr>
<tr>
<td>E.8-E.16</td>
<td>ELECTROCHEMICAL SOCIETY, INC.</td>
</tr>
<tr>
<td>E.17</td>
<td>INSTITUTE OF FUEL</td>
</tr>
<tr>
<td>E.18-E.20</td>
<td>INSTITUTION OF MECHANICAL ENGINEERS</td>
</tr>
<tr>
<td>E.21</td>
<td>ROYAL INSTITUTION</td>
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<td>E.22-E.32</td>
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<td>E.33</td>
<td>ROYAL SOCIETY OF ARTS</td>
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</tbody>
</table>
E.1-E.5  AERONAUTICAL RESEARCH COUNCIL  1958-1963

E.1, E.2  Correspondence, agendas, manuscript notes etc. re meetings of ARC committees 1958-1960, 1963.

Bacon was invited to attend meetings of the Propulsion Committee, 10 March 1959, Engine Sub-Committee, 15 December 1959 and Engineering-Physics Sub-Committee, 27 September 1963.

E.3-E.5  Papers by Bacon circulated to ARC Committees, 1959.

3 folders.

E.6, E.7  COUNCIL OF ENGINEERING INSTITUTIONS  1969-1976


See also B.838.


Bacon was invited to be an initial Fellow.

E.8-E.16  ELECTROCHEMICAL SOCIETY, INC.  1977-1985

At its Spring Meeting in Seattle May 1978 Bacon received the Society’s Vittorio de Nora - Diamond Shamrock Award Medal and Prize and delivered the Vittorio de Nora - Diamond Shamrock Award Address on ‘The Fuel Cell: Some thoughts and recollections’.

In 1985 Bacon indicated that he felt it was time to resign from the Society but having been a member for 26 years he was invited to continue his association with the Society as an emeritus member.

E.8-E.10  Correspondence re arrangements for visit to Seattle 1977-1978.

3 folders.

E.11  26pp typescript of Award Address + list of slides.

E.12  Manuscript draft of Address.
E.13 Bacon's manuscript notes of discussions during and after the Seattle meeting, May 1978.

2 folders.


E.17 INSTITUTE OF FUEL 1973-1978

E.17 Correspondence and papers, 1973-1978.
Includes papers re meetings in 1976 and 1978.


E.18 Correspondence and papers re meeting on Fuel Cells, 1964.

E.19 Correspondence and papers re the award to Bacon of the S.G. Brown Award and Medal for his work in the development of fuel cells, 1965.

Includes papers re meeting on Fuel Cells, 1968.

E.21 ROYAL INSTITUTION 1973-1990

Bacon was elected a Member of the Royal Institution in 1973.

E.21 Correspondence and papers, 1973-1990.
Includes correspondence with Directors of the Royal Institution, G. Porter and J.M. Thomas.


E.22, E.23 Correspondence re arrangements for lecture including publication, 1972-1974.

2 folders.

E.24-E.28 Manuscript and typescript drafts of Review Lecture.

5 folders.


E.33 ROYAL SOCIETY OF ARTS 1970-1984

Bacon was elected a Fellow of the Society in 1970.


Includes papers re Symposium on Renewable Sources of Energy in 1976.
Bacon was invited to contribute a paper (jointly with J.S. Forrest, Director of the Laboratories, Central Electricity Authority) on ‘Recent Research in Great Britain on Fuel Cells’.

F.1-F.7 Correspondence and papers re arrangements, preparation of conference paper etc.

F.1 1955 May - June.

F.2, F.3 1955 July. 2 folders.
Include manuscript and typescript notes and drafts for paper.

F.4 1955 August - December.

F.5 1956 January - April.

F.6 1956 May.

F.7 1956 June.


F.9, F.10 Visit to USA, September 1959.
Bacon visited the USA to give a paper at a meeting of the American Chemical Society (see C.5-C.8). He also visited a number of research laboratories including G.E.C. Schenectady, New York and the National Carbon Company, Parma, Ohio.

F.9 Invitations to visit research laboratories, background information re fuel cell interests of the Universal Winding Company, Cranston, Rhode Island.

F.10 Bacon's manuscript and typescript notes on his visit.
F.11-F.15 Visit to USA, 14 - 31 July 1961.

Bacon visited the US to see the state of development of fuel cells. The organisations visited were:
Batelle Memorial Institute, Columbus, Ohio;
Research Laboratories Union Carbide, Parma, Cleveland, Ohio;
Research Laboratories General Electric Company, Schenectady, New York;
Leesona-Moos Laboratories, New York;
Pratt & Whitney, East Hartford, Connecticut;
General Electric Company Aircraft Accessory Turbine Department, West Lynn, Massachusetts.

F.11 Brief correspondence, manuscript notes re arrangements.


F.12 24pp typescript by Bacon.

F.13 Manuscript draft of report.

F.14 Typescript notes on ‘S/M Power Plant’ with manuscript note at head of first page ‘Typed out for J.CH.H[art], from visit to U.S.A in July, 1961’.

F.15 Notebook used by Bacon during US visit.

F.16 Visit to USA, March 1963.

Bacon visited the USA to give a paper at a meeting of the American Institute of Chemical Engineers (see C.30-C.33). He also visited a number of firms and organisations including Leesona-Moos and Batelle Memorial Institute.

Notebook used by Bacon during US visit.

F.17 Invitation declined:

Visit to the USA, September 1965

Bacon visited the USA to give a paper at an American Chemical Society symposium (see C.50, C.51). He also visited a number of firms and organisations including Leesona-Moos and Pratt & Whitney.

Correspondence re arrangements.

Letters of thanks.

Manuscript notes re arrangements, American Chemical Society meeting, etc; business cards received by Bacon during visit.

Small format notebook used for ‘Sep. 1965 Miscellaneous Notes’.

Small format notebook used for ‘Notes for Speech’.

Visit to the USA, March 1967.

Bacon visited the US to deliver the Edgar Fahs Smith Memorial Lecture at the University of Pennsylvania (see C.64-C.67). He also visited a number of firms and organisations including Leesona-Moos, Pratt & Whitney and the General Electric Company.

Correspondence re arrangements, correspondence arising.

Small format notebook used for ‘Miscellaneous Notes Visit to U.S.A. March 1967’.


Correspondence re arrangements, programme, attendance list etc.

Folder also includes manuscript notes re AGARD meeting to be held in Brussels, October 1967.

Visit to USA, 27 February - 6 March 1971.
Bacon visited Pratt & Whitney, Institute of Gas Technology, Chicago and the Argonne National Laboratory.

F.26 ‘Preliminary Conclusions drawn from visit to U.S.A., 27.2.71 to 6.3.71’. 5pp manuscript by Bacon.

F.27 Bacon's manuscript notes on his visit to the USA.


Bacon’s manuscript notes on conference papers or abstracts of papers, dated 24 October 1972.

Bacon gave a paper of the production of hydrogen by hydrolysis (see C.98-C.100).
Bacon's manuscript notes on proceedings.


F.31 Brief correspondence, programme, list of participants, Newsletter of the Electrochemistry Group of the Chemical Society (Spring 1975) with report on meeting.

F.32 Bacon's manuscript conference notes.

F.33 Invitation declined:
Ninth World Energy Conference, [Detroit, Michigan, ? September 1975].
Brief correspondence, list of participants, Bacon's manuscript notes on proceedings.

Bacon gave the keynote address for the Conversion and Utilisation Division.

F.35, F.36  Correspondence re arrangements. 2 folders.

F.37  Correspondence arising.

F.38  Bacon's manuscript 'notes taken during reading of papers'; miscellaneous conference information.
This section includes much of Bacon’s most important fuel cell correspondence and covers an exceptionally extended period 1933-1993.

For long periods Bacon wrote most of his letters by hand. Nevertheless even when writing by hand he made carbon copies and thus his correspondence is unusually complete. His correspondence files also often include notes of telephone calls and meetings including those with visitors to his private home.

There are other important fuel cell correspondence files in Section B Research.

The correspondence in this section is presented as follows:

- G.1-G.43A ALPHABETICAL BY CORRESPONDENT
- G.44-G.185 FUEL CELL CORRESPONDENCE
- G.186-G.221 PERSONAL CORRESPONDENCE
- G.222-G.251 MISCELLANOUS CORRESPONDENCE
- G.252-G.259 REFERENCES AND RECOMMENDATIONS
Contents of Bacon’s files with named individuals.


Evans was Emeritus Reader in the Science of Metallic Corrosion, Cambridge University.

In 1967 he became a Consultant to Energy Conversion Ltd.

Correspondence re fuel cells and general energy questions including copies of Evans’s correspondence and reports written in connexion with his consultancy work and Bacon’s notes of meetings with Evans.

**G.1**

1965 July - December.

**G.2**


**G.3**

1966 March. Includes draft report ‘Fuel Cell Prospects’ by Evans, Bacon’s manuscript notes on Evans’s proposals and Evans’s report ‘An Economic Fuel Cell’ sent to Waller of the NRDC.

**G.4**


**G.5**

1966 July - December. Includes copy of paper by Evans ‘Corrosion Cells and Fuel Cells’ which was also sent to A.D.S. Tantram of Energy Conversion Ltd (ECL).

**G.6**


**G.7**

1968 January. Includes copies of Evans’s report ‘A Near-Neutral Fuel Cell with Special Reference to a Total-Energy System’ and copies of his letters to Tantram.

G.9 1968 April - June. Includes copies of Evans's report 'Choice of Fuel for Primary Cells' and copies of his letters to Tantram; also photocopy of his Nature paper (see G.6).


G.11 1968 October - December. Includes copies of Evans's reports 'Pit-Mouth Fuel Cell' and 'Basic Requirements of a Compact Accumulator' and copies of his letters to Tantram, A.B. Hart and Lord Energlyn of the Nottingham University Geology Department.

G.12 1969 January - March. Includes copies of Evans's reports 'Possible Improvement of Shift-Reaction Catalysis' and 'Cause of Sudden Improvement of Performance of Oxygen Electrode at High Alkali Concentrations' and copies of letters from R. Weck to Evans and Evans to Tantram.

G.13 1969 April - August. Includes invitation from King's College Cambridge to a luncheon in honour of the eightieth birthday of Evans and 'Two Eightieth Birthdays' article from Br. Corros. J. re Evans (and W.H.J. Vernon); also copies of Evans's letters to Tantram and correspondence between Evans and J.P. Hoare of the General Motors Corporation Research Laboratories.

G.14 1969 September - December.

G.15 1970 January - June. Includes draft report by Evans 'Mechanism of the Cathodic Reduction of Oxygen'.

G.16 1970 July, August. Includes copies of Evans's reports 'Basic requirements of a compact accumulator' and 'Possibility of using compact metal in electrodes where porous metal is used at present.'


1980 item is obituary of Evans from The Times.


Fry and Bacon were colleagues at the Admiralty Experimental Establishment, Fairlie, Ayrshire during the Second World War. Fry was one of Bacon’s oldest associates in the fuel cell work, helping him in the role of scientific adviser during the early years of the fuel cell development when the work was based at Cambridge University. Fry worked at the Atomic Energy Research Establishment, Harwell, and was subsequently a Consultant to Energy Conversion Ltd. 1964-1971 and then Scientific Adviser to Associated Nuclear Services, consulting engineers.

See also B.215-B.228.


G.30 1972 February - April. Includes correspondence and Bacon’s manuscript notes re article for New Scientist on non-fossil chemical fuels.


G.34 1973. Continuing correspondence re Royal Society Review Lecture, correspondence and papers re Bacon’s Melchett Lecture for Institute of Fuel (see C.94-C.97) and draft of Fry’s article for Financial Times, which was to form part of a supplement on power storage.

G.35 1974. Includes correspondence re paper on fuel cells for 9th World Energy Conference. The initial invitation was to Bacon who suggested Fry as speaker.

G.36 1975. Includes letter of support from Fry in connexion with application by Bacon for a NASA award for scientific and technical contribution (see A.32-A.36, G.37).
G.37  1976. Includes correspondence re Bacon's Bruno Breyer Memorial Lecture at the Fourth Australian Electrochemistry Conference (C.111-C.117), the NASA award, etc


Marshall was head of the Cambridge engineering firm Marshalls of Cambridge Ltd where development work on the fuel cell was carried out in association with the National Research and Development Corporation.

Bacon's letters to Sir Arthur Marshall February - October 1991 sent to K.R. Williams (Bacon's Royal Society memorialist) to show that Bacon 'retained his interest in fuel cells right up to the end'. Bacon died 24 May 1992.

1993 item is letter from Marshall to Williams enclosing copies of letters from Bacon to J. Huntridge, July, August 1988.

Huntridge was the boss of J. C. Frost, the Marshalls of Cambridge Ltd engineer in charge of the fuel cell project during Bacon's time with the Company.

G.40-G.43A  Watson, R.G.H.  1956-1971

Watson was an electrochemist who joined the fuel cell team in November 1951 when it was based at the Department of Chemical Engineering, Cambridge University. He later worked at the Admiralty Materials Laboratory, Poole, Dorset and did consultancy work in respect of the fuel cell project.


G.41  1958-1959. Includes Bacon's notes re meetings with Watson, advice from Watson.

G.42  1960-1962. Includes Bacon's notes re meetings with Watson, advice from Watson.

G.43A Papers found with Watson correspondence including 'Loss Analysis Charts' and 'The Oxidation of Nickel in the Bacon Cell' by Watson, n.d.

G.44-G.185 FUEL CELL CORRESPONDENCE 1933-1991

Contents of Bacon’s correspondence files inscribed ‘Fuel Cell’. In chronological order.

This is Bacon’s principal sequence of fuel cell correspondence. After 1951 Bacon appears to have divided his fuel cell correspondence into a number of chronological sequences and there is a gap of three years 1952-1954 in the ‘Fuel Cell’ sequence presented here. See, however, the ‘Personal’ correspondence which begins in 1952 (G.186-G.221) and the ‘Miscellaneous’ correspondence which begins in 1953 (G.222-G.251) Both these sequences relate to Bacon’s fuel cell interests.

Up to 1951 the ‘fuel cell’ sequence includes Bacon’s correspondence with sponsors of his fuel cell work such as Merz and McLellan and the Electrical Research Association and suppliers such as Johnson Matthey & Company Ltd and the Mond Nickel Company Ltd. Later correspondence with the ERA, 1952-1976, and other sponsors such as the National Research Development Corporation is to found in Section B Research.

G.44, G.45 Lists of expenses, receipts, 1933-1942.

2 folders.

G.46 1937 August - December.

G.47 1938 January - September.

G.48 1938 October - December.

G.49 1939 January - February.

G.50 1939 March - May.
G.51 1939 June - July.

G.52 1939 August.

G.53 1939 September - October.

G.54 1939 November - December.

G.55 1940 January - March.

G.56 1940 April - June.

G.57 1940 July - August.

G.58 1940 September - December.

G.59 1941 January - March.

G.60 1941 April - July.

G.61 1941 August - December.


G.63 1942 March.

G.64 1942 April.

G.65 1942 May - July.
G.66 1943 June - December.

G.67 1944 January - June.

G.68 1944 July - September.

G.69 1944 October - December.

G.70 1945 January - March.

G.71 1945 April - June.

G.72 1945 July, August.

G.73 1945 September - December.

G.74 1946 January.

G.75 1946 February - April.
Includes manuscript list of firms, research institutions and individuals approached by Bacon in respect of the hydrogen - oxygen cell and notes on his proposed research.

G.76 1946 May - June.

G.77 1946 July - September.
G.78 1946 October - December.

Includes list of ‘sundry expenses’ incurred by Bacon November 1946 - March 1947.

G.80 1947 April - June.

G.81 1947 July - September.

G.82 1947 October - December.

G.83 1948 January - February.
Includes drawings of equipment.

G.84 1948 March - April.
Includes drawings of equipment.

G.85 1948 May.

G.86 1948 June - August.

G.87 1948 September - October.

G.88 1948 November.
Includes list of expenses, August - November 1948.

G.89 1948 December.
Includes list of expenses, November - December 1948.

G.90 1949 January - February.
Includes drawings of equipment.

G.91 1949 March - April.
Includes list of expenses, December 1948 - April 1949.

G.92 1949 May.
Includes ‘Application for Provisional Patent on Bacon’s H₂-O₂ Cell’, 3pp typescript and ‘Comments by Mr Bacon on Draft of the Proposed Patent Concerning H₂-O₂ Cell Electrodes’, 3pp typescript.

G.93 1949 June.
Includes ‘Some Notes on Crystallographic Work on Oxides Collected at the Conversazione at G.E.C. Research Laboratories on June 21st’, 4pp typescript sent to Bacon by the Electrical Research Association and notes of discussion at the Electrical Research Association Laboratory, 29 June 1949, on Bacon’s work on the hydrogen oxygen fuel cell, 4pp typescript.

G.94 1949 July.
Includes list of expenses, April - July 1949.

G.95 1949 August.
Includes printed material re compressed gases.

G.96 1949 September - October.

G.97 1949 November.

G.98 1949 December.
Includes list of expenses, October - December 1949.


G.100 1950 February.

G.101 1950 March.

G.102 1950 April.

G.103 1950 May.

G.104 1950 June.
Includes list of expenses December 1949 - June 1950.

G.105 1950 July - August.

G.106 1950 September.
Includes account of fuel cell exhibit at British Association meeting.

G.107 1950 October.

G.108 1950 November.

G.109 1950 December.

G.110 1951 January.
Includes list of expenses, June 1950 - January 1951.

G.111 1951 February.
G.112 1951 March.

G.113 1951 April - May.

G.114 1951 June.

G.115 1951 July.
Includes list of expenses, January - July 1951.

G.116 1951 August - September.

G.117 1951 October.
Includes list of expenses, July - September 1951.

G.118 1951 November.

G.119 1951 December.
Includes research data.

G.120 1955 - 1957.
Includes duplicated and typescript papers re fuel cells.

G.121 1958.

G.122 1959.

G.123 1960 January - June.

G.124 1960 July - December.
Includes notes on visits and meetings.

G.125 1961 January - June.
Includes notes on the literature, notes on visits and meetings.

G.126 1961 July - December.
Includes notes of visits and meetings.

Includes notes on the literature, notes on visit to B.P. Research Centre, notes re lectures, papers re fuel cell exhibit at Royal Society Conversazione, etc.

G.128 1962 July - December.
Includes notes on visits and meetings.

G.129 1963 January - March.
Includes notes on visits and photograph of a ‘trailer for liquid Helium’.

G.130 1963 April - June.

G.131 1963 July - September.
Includes notes on the literature etc.

G.132 1963 October - November.
Includes notes on visits.

G.133 1964 January - June.

G.134 1964 July - December.
Includes notes on the literature and notes on visits and meetings including ‘Demonstration at Admiralty, Min. Defence.’
G.135  1965.


G.137  1967.
   Includes notes on the literature.

G.138  1968.

G.139  1969.


G.141  1970 July - December.


G.143  1971 November - December.
   Includes programme and manuscript notes and draft report on ‘Visit to
   Professor Justi at the Institute for Technical Physics at the Technical
   University, Braunschweig, Western Germany, November 17th to 19th, 1971,
   by F.T. Bacon’.

G.144  1972 January - April.

G.145  1972 May - August.
   Includes biographical details of Bacon, list of published papers and
   ‘Accomplishments in the field of Electrochemical Science and Corrosion’.

G.146  1972 September - December.
Includes Bacon’s manuscript notes of Royal Society meeting on ‘Prospects for Industrial Electrochemistry’, 10 and 11 December 1980.

G.175 1985 July - December.


G.177 1987 January - April.

G.178 1987 May - August.

G.179 1987 September - December.


G.183 1990 January - June.

G.184 1990 September - December.

G.185 1991


Contents of Bacon's correspondence files inscribed 'Personal'.

Despite the designation 'Personal' these files relate to a very considerable degree to Bacon's fuel cell interests.

G.187 1954.

G.188 1955 January - August.

G.189 1955 September - December.

G.190 1956-1957.


G.192 1960.


G.194 1962.
Includes correspondence re Bacon’s ‘Service Agreement’ with Energy Conversion Limited.


G.196 1965 January - May.

G.197 1965 June - December.
Includes letters of congratulation on the award of the S.G. Brown Award and Medal by the Royal Society.

G.198 1966 January - June.

G.199 1966 July - December.

Includes letters of congratulation on appointment to the Order of the British Empire (OBE). See also A.23-A.25.

G.201 1967 April - December.

G.202 1968.


G.204 1969 July - October.

Includes correspondence re visit of Apollo 11 astronauts to the UK.

G.205 1969 November - December.

Includes notes for Bacon’s speech for senior staff Christmas Dinner, Marshall of Cambridge.

G.206 1970.

G.207 1971.

Includes notes for Bacon’s speech at Prize-Giving at All Hallows Junior School, 22 October.

G.208 1972 January - September.

Includes notification of award of the Churchill Gold Medal Award by the Society of Engineers.

G.209 1972 October - December.

Includes correspondence and papers re presentation of Churchill Gold Medal Award including Bacon’s speech of thanks.

Includes notes on ‘Visit to Cape Kennedy for the launch of Apollo 17 on 6th December 1972’.

G.211 1973 March - December.

G.212 1974.

G.213 1975.


G.216 1978.

Includes copy of questionnaire on the education and training of engineers, with Bacon’s answers.


G.222-G.251 MISCELLANEOUS CORRESPONDENCE 1953-1973

Contents of Bacon’s correspondence files inscribed ‘Miscellaneous’.

These files relate to Bacon’s fuel cell interests and include requests for information, requests for reprints, invitations for Bacon to write, lecture etc.
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Principally correspondence and papers re British Hydromechanics Research Association Open Days.


G.238 1961 October - December.


G.240 1962 May - December.


G.242 1963 July - December.

G.243 1964 January - June.

G.244 1964 July - December.

G.245 1965.

G.246 1966.


G.249 1969 July - December.

G.250 1970.
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Bacon appears in almost all of the following photographs, both on his own and in the company of others.

H.1 Photographs [taken during visit to USA], ca.1965.

H.2 1969.

H.3 Photographs taken at a Society of Engineers Dinner, 1972.

H.4 Photographs taken at the 4th Australian Electrochemistry Conference (see also C.111-C.117); photographs of the presentation of the National Aeronautics and Space Administration Award for Scientific and Technical Contribution to Bacon (see also A.32-A.36). 1976.

H.5 Photograph album, including intercalated photograph, [?re visit to Johnson Matthey], ca 1980s.

H.7  Undated photographs, including photographs from 1950s.

H.7A  Folder of photographs of Bacon at various dates including: Cambridge scientific groups [1950's], with Dave Scott, Commander of Apollo 15, with American ambassador; portraits, at formal functions with Queen Elizabeth II and the Duke of Edinburgh. [1950's - 1980's]


H.8-H.11  Photographs and drawings of equipment, identified by annotations on envelopes, labels etc.


H.9-H.11  N.d.

3 folders.

H.12-H.14  Unidentified photographs.

H.14A  Photos of equipment including fuel cells and Pratt and Whitney fuel cell units in space.

2 folders

H.12  May 1957.

H.13, H.14  N.d.

2 folders.

H.15-H.19  Lectures and publications  1956-1978

Photographic materials relating to lectures and publications by Bacon. The annotations on the envelopes in which they were found have been reproduced in the entries below where relevant.

H.15  Photographs and diagrams for article in *The Times Science Review*, 1956.
H.16 Small proofs for American Chemical Society lecture, June 1959.

H.17 Photograph for Philadelphia lecture, [16 March 1967].

See also C.64-C.67.


See also C.94-C.97.


See also E.8-E.16.


This material consists of photographs demonstrating fuel cell development. They have been arranged according to the organisations which sent them.


2 folders


H.24 Card index box of metal or treated metal samples and film strips. Each sample and film strip is in an envelope with manuscript identification, sometimes including date. 1955-1956.

H.25 35mm film in metal tin labelled ‘40 cell demo’, August 1959, with additional notes. Please notify staff at least 5 working days in advance if you would like to consult this material as it will need to be removed from freezer storage.
H. 26 Box of slides, n.d.


H. 28 Photographs, cartoons and publicity material relating to NASA Kennedy Space Centre and Apollo 8, Apollo 11 and Apollo 18. 1968-72.
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See also B.113, B.145, C.83, G.127, G.134, G.161, G.230

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