



National Cataloguing Unit for the Archives of Contemporary Scientists  
in association with the Royal Society

Catalogue of the papers and correspondence of

**FRANCIS THOMAS BACON**

(1904-1992)

Compiled by Peter Harper and Alan Hayward

Deposited in the Churchill College Archives Centre  
Cambridge

NCUACS 68/6/97

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## LIST OF CONTENTS

		Items	Page
GENERAL INTRODUCTION			
SECTION A	BIOGRAPHICAL	A.1-A.37	8
SECTION B	RESEARCH AND DEVELOPMENT	B.1-B.1360	13
SECTION C	LECTURES AND PUBLICATIONS	C.1-C.169	106
SECTION D	PATENTS	D.1-D.109	123
SECTION E	SOCIETIES AND ORGANISATIONS	E.1-E.33	128
SECTION F	VISITS AND CONFERENCES	F.1-F.38	133
SECTION G	CORRESPONDENCE	G.1-G.269	138
SECTION H	NON-PRINT MATERIAL	H.1-H.26	164
INDEX OF CORRESPONDENTS			169

## **GENERAL 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

**SECTION A**

**BIOGRAPHICAL**

**A.1-A.37**

A.1, A.2

OBITUARIES AND TRIBUTE

A.3-A.14

BIOGRAPHICAL AND BIBLIOGRAPHICAL

A.15-A.19

SCHOOL NOTEBOOKS

A.20-A.37

CAREER, HONOURS AND AWARDS

## Biographical

**A.1, A.2**                      **OBITUARIES AND TRIBUTE**                      **1992**

A.1                      Obituaries:  
*Fuel Cell Power*, Vol. 2 No. 2, May 1992.  
*The Times*, 1 June 1992.  
*Independent*, 3 and 13 June 1992.  
*The Daily Telegraph*, 8 June 1992.

A.2                      Memorial tribute by J.F. Coales, Cambridge, 16 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.7-A.14                      Press-cuttings.  
8 folders.

**A.15-A.19**                      **SCHOOL NOTEBOOKS**

Bacon was educated at Eton College 1918-1922.

A.15                      'Science Notes. Lent Half 1917. Heat'.  
  
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.

### Biographical

- 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
- Agreement between the National Research Development Corporation and Bacon in respect of work on the development of the Hydrogen/Oxygen Fuel Cells and Electrolysers. Draft dated 12 October 1959.
- 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.
- Letter from the National Research Development Corporation *re* closure of the Fuel Cells Ltd's programme and the termination of Bacon's consultancy/employment agreements with Fuel Cell Ltd, 27 July 1972.

### Biographical

- A.23-A.25 Appointment to the Order of the British Empire (OBE). 1967.  
See also G.200.
- A.23 Official correspondence *re* investiture etc, 1967, 1969.
- 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.
- A.26, A.27 Royal Aeronautical Society British Silver Medal for Aeronautics. 1969.  
  
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-A.31 Election to the Fellowship of the Royal Society. 1973.
- A.28 Correspondence *re* candidature, formal admission etc.
- A.29-A.31 Letters of congratulation. 3 folders.
- A.32-A.36 National Aeronautics and Space Administration (NASA) Award for Scientific and Technical Contribution. 1976.  
  
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.35 Later NASA correspondence found with Award correspondence, 1979-1980, 1989-1990.

**Biographical**

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

**SECTION B**

**RESEARCH AND DEVELOPMENT**

**B.1-B.1360**

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.

B.1-B.14	FUEL CELL NOTEBOOKS
B.15-B.77	PARSONS AND EARLY FUEL CELL RESEARCH
B.78-B.272	ELECTRICAL RESEARCH ASSOCIATION/ UNIVERSITY OF CAMBRIDGE
B.273-B.643	NATIONAL RESEARCH DEVELOPMENT CORPORATION/MARSHALLS OF CAMBRIDGE
B.644-B.854	ENERGY CONVERSION LTD
B.855-B.1077	RESEARCH AND DEVELOPMENT TOPICS
B.1078-B.1186	RESEARCH CENTRES, LABORATORIES AND SPONSORS
B.1187-B.1268	TECHNICAL DRAWINGS
B.1269-B.1360	BACKGROUND MATERIAL

### Research and development

- B.1-B.14**                      **FUEL CELL NOTEBOOKS**                      **1938-1958**
- 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'.
- B.2                              'Hydrogen - Oxygen Cell Volume II'. Used for record of work 25 February - 23 July 1941. Enclosed loose at front of notebook 'Hydrogen - Oxygen Cell. Report for two weeks ending 15 August 1941.'
- 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.
- B.4                              'Hydrogen - Oxygen Cell Volume IV'. Used for record of work 3 March - 5 May 1947.
- Bacon's address is given as the Department of Colloid Science, Cambridge.
- B.5                              'Hydrogen - Oxygen Cell Volume V'. Used for record of work 6 May - 6 November 1947.
- Bacon's address is given as the Department of Colloid Science, Cambridge.
- B.6                              'Hydrogen - Oxygen Cell Volume VI'. Used for record of work 7 November 1947 - 28 March 1950.
- Bacon's address is given as the Department of Colloid Science, Cambridge.

### Research and development

- B.7 'Hydrogen - Oxygen Cell Volume VII'. Used for record of work 4 and 6 April 1950.  
Bacon's address is given as the Department of Metallurgy, Cambridge.
- B.8 'Hydrogen - Oxygen Cell Volume VIII'. Used for record of work 5 May 1950 - 18 April 1951.  
Bacon's address is given as Department of Metallurgy, Cambridge.
- B.9 'Hydrogen - Oxygen Cell Volume IX'. Used for record of work 25 April 1951 - 4 February 1953.  
Bacon's address is given as the Department of Chemical Engineering, Cambridge.
- B.10 'Hydrogen - Oxygen Cell Volume X'. Used for record of work 27 February - 23 June 1953.  
Bacon's address is given as the Department of Chemical Engineering, Cambridge.
- B.11 'Hydrogen - Oxygen Cell Volume XI'. Used for record of work 25 June 1953 - 4 February 1954.  
Bacon's address is given as the Department of Chemical Engineering, Cambridge.
- B.12 'H<sub>2</sub>O<sub>2</sub> 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.
- B.13 'H<sub>2</sub> - O<sub>2</sub> Cell Research (Unit 1) Volume 13'. Used for record of work 16 February 1954 - 28 January 1958.  
Bacon's address is given as the Department of Chemical Engineering, Cambridge.

## Research and development

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.

Report on 'Visit to the Parsons Marine Works' 28 January 1930.

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.

**Research and development**

- 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.

### Research and development

- B.33, B.34      Development and Research Department 'Report on the present position of the internal combustion turbine' by Bacon. September 1939.  
  
Report and drafts. 2 folders.
- B.35              Development and Research Department Report 'Fuel Couples by Emil Baur and Jakob Tobler. Translated from Zeitschrift fuer Elektrochemie Vol 30, No.3, 1933'. [1939].
- B.36              Development and Research Department Report 'The Hydrogen - Oxygen Cell' by Bacon.  
  
'First Edition'. December 1939.
- B.37              Annotated draft of preceding.
- B.38              Development and Research Department Report 'The Hydrogen - Oxygen Cell' by Bacon.  
  
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.41              'Proposed Electric Storage Battery'. Manuscript and typescript drafts, typescript dated 7 July 1937.

### Research and development

- 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.
- 'The Hydrogen-Oxygen Cell. Notes on Old Report, dated November 1937'. 3pp typescript signed by Bacon, 28 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.
- B.45 'Brief Report on Progress of Experiments with Hydrogen-Oxygen Cell'. 5pp typescript signed by Bacon, 2 January 1941.
- 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.

### Research and development

- B.48-B.52            'The Hydrogen-Oxygen Fuel Cell'.  
  
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.55                    'Comments on Mr Bacon's Report on his work on the Hydrogen-Oxygen Cell'. 8pp typescript signed by A.J. Allmand and dated 24 September 1941.  
  
'Professor A.J. Allmand's Comment on the Hydrogen-Oxygen Report'. 7pp typescript, 18 December 1941.
- 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.

**Research and development**

- 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.
- B.76A                            'The Hydrogen - Oxygen Cell. Report on Mr F.T. Bacon's Research (January 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.

### Research and development

**B.78-B.272**

**ELECTRICAL RESEARCH ASSOCIATION/  
UNIVERSITY OF CAMBRIDGE**

**1942-1976**

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.

**B.78-B.90**

'H - O Cell Reports I'. Contents of Bacon's binder so inscribed divided into thirteen for ease of reference: duplicated reports to British Electrical and Allied Industries Research Association Section Z: Unclassified Researches Sub-Committee F: Storage of Electrical Energy (Storage and Generation of Electrical Energy from B.81). 1946-1951.

### Research and development

- B.78 'The Hydrogen-Oxygen Cell. Summary of Mr T. Bacon's Research'. 17 January 1946.
- 'Technical Statement by Mr F.T. Bacon Concerning Proposal to Develop the Hydrogen-Oxygen Cell.' 5 February 1946.
- Programme of Research into the Properties of the Hydrogen-Oxygen Cell'. 27 March 1946.
- B.79 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report to August 1947. By F.T. Bacon'. 19 August 1947.
- See also B.181.
- B.80 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report for Year Ending August 1948. By F.T. Bacon'. 3 September 1948.
- B.81 'Research into the Properties of the Hydrogen-Oxygen Cell. Overall Technical Report for the Period from May 1946 to October 1949. By F.T. Bacon. ...'. 26 May 1949.
- B.82 'Memorandum on a High Temperature and High Pressure Hydrogen-Oxygen Cell'. 17 October 1949.
- B.83 'Research into the Properties of the Hydrogen-Oxygen Cell. Overall Technical Report for the Period from May 1946 to October 1949. By F.T. Bacon. ...'. 2 November 1949.
- See also B.85, B.116.
- B.84 'Estimation of Possible Efficiency of the Hydrogen Oxygen Fuel Cell Working on Gases Produced from Coal and Air'. 28 November 1949.
- B.85 'Research into the Properties of the Hydrogen-Oxygen Cell. Overall Technical Report for the Period from May 1946 to October 1949. By F.T. Bacon. ...'. 6 December 1949.
- Revised version of B.83. See also B.116.

### Research and development

- B.86 'Comments on E.R.A. Reports ... (Hydrogen-Oxygen Cell) Received from Crompton Parkinson Ltd.' 5 April 1950.
- 'Programme of Research into the Properties of the Hydrogen-Oxygen Cell'. 2 June 1950.
- 'Energy Losses in the Hydrogen-Oxygen Cell. By T.M. Fry'. 29 September 1950.
- B.87 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report for the Six Months Ending June 1950. By F.T. Bacon. ...'. 9 June 1950.
- B.88 'Research into the Properties of the Hydrogen-Oxygen Cell. Condensed Progress Report for the Period Commencing November 1949 and ending September 1950. By F.T. Bacon. ...'. 29 September 1950.
- B.89 'The Properties of a Hydrogen-Oxygen Cell. An Account of Research from May 1946 to October 1949. By F.T. Bacon ...'. 11 October 1950.
- Addendum. 16 October 1950.
- B.90 'Programme of Research on the Hydrogen Oxygen Cell'. 11 July 1951.
- 'A Theory of the Diffusion Gas Electrode. By T.M. Fry ...'. 16 July 1951.
- 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report for the Six Months Ending June 1951. By F.T. Bacon ...'. 24 July 1951.
- B.91-B.113 'H - O Cell Reports II'. Contents of Bacon's binder so inscribed divided into twenty-three for ease of reference: duplicated reports to British Electrical and Allied Industries Research Association Section Z: Unclassified Researches Sub-Committee F: Storage and Generation of Electrical Energy. 1951-1960.
- B.91 'Programme of Research on the Hydrogen Oxygen Cell for 1952'. 7 December 1951.

### Research and development

- B.92 'Fuel Cells. A Non-Technical Outline of their Development. By A.P. Paton...'. 14 August 1952.  
  
See also B.134.
- B.93 'Research into the Properties of the Hydrogen-Oxygen Cell. The Oxidation of Nickel in Alkaline Solutions at High Temperatures and Pressures. By R.G.H. Watson...'. 25 August 1952.
- B.94 'Research into the Properties of the Hydrogen-Oxygen Cell. The Preparation of Porous Nickel Electrodes. By J.E. Bowers...'. 3 December 1952.
- B.95 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report for the Period of July, 1951 to November, 1952. By F.T. Bacon...'. 9 December 1952.
- B.96 'Research into the Properties of the Hydrogen-Oxygen Cell. The Corrosion Resistance of Pre-Oxidised Nickel. By J.E. Bowers...'. 16 July 1953.  
  
'Research into the Properties of the Hydrogen-Oxygen Cell. The Preparation of Porous Nickel Electrodes. By J.E. Bowers...'. 16 July 1953.
- B.97 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report for the Period of December 1952 to June 1953. By F.T. Bacon...'. 17 July 1953.
- B.98 'Research into the Properties of the Hydrogen-Oxygen Cell. Electrochemical Studies. By R.G.H. Watson...'. 17 July 1953.
- 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.

### Research and development

- B.101 'Research into the Properties of the Hydrogen-Oxygen Cell. The Preparation of Porous Nickel Electrodes. By J.E. Bowers...'. 12 May 1954.
- B.102 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report for the Period of July, 1953 to April, 1954. By F.T. Bacon...'. 13 May 1954.
- B.103 'Research into the Properties of the Hydrogen-Oxygen Cell. Electrochemical Studies. By R.G.H. Watson...'. 19 May 1954.
- B.104 'Notes on Conference at Cambridge on 4th August, 1954, Regarding Position of the Hydrogen-Oxygen Cell Research'. 15 September 1954.  
  
'Continuation of Research on the Hydrogen-Oxygen Cell. Calendar Year 1955.' 2pp typescript found with 1954 reports, n.d.
- B.105 'Programme of Research on Fundamental Aspects of the Bacon Cell'. 'First draft', 22 July 1955.  
  
Research into the Properties of the Hydrogen-Oxygen Cell. Interim Report on miscellaneous experiments involving the use of polytetrafluoroethylene (flouon). By William J. Davis'. Manuscript draft, n.d.
- B.106 'The Hydrogen Oxygen Fuel Cell. A Summary of the Metallurgical Problems. By J.E. Bowers...'. 22 September 1955.
- B.107 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report for the Period of May 1954 to September 1955. By F.T. Bacon...'. 14 October 1955.
- B.108 'The Electrochemistry of the Hydrogen-Oxygen Cell'. Report of Work Carried out During 1954-55. By R.G.H. Watson...'. 3 November 1955.

### Research and development

- B.109 'A Technical Assessment of Selected Applications of the Bacon Hydrogen-Oxygen Cell in its Present State of Development'. 14 November 1955.
- 'Research into the Properties of the Hydrogen-Oxygen Cell. Formation, Properties and Corrosion of the Oxygen Electrode. By William J.Davis...'. 18 November 1955.
- 'The Hydrogen-Oxygen Fuel Cell. A Modified Oxygen Electrode. By J.E. Bowers...'. 23 November 1955.
- B.110 'An Appreciation of the Technical Assessment of the Bacon Cell... . By F.T. Bacon, R.G.H. Watson and J.E. Bowers'. 9 January 1956.
- 'The Possibilities of the Bacon Hydrogen-Oxygen Cell when used in Association with Wind Power'. 20 January 1956.
- 'The Hydrogen-Oxygen Fuel Cell. Progress Report on Electrode Researches for the Period September 1955 to January 1956. By J.E. Bowers...'. 3 April 1956.
- B.111 'The Electrochemistry of the Hydrogen-Oxygen Cell. Report of Work Carried out During 1955-56. By R.G.H. Watson...'. 27 November 1956.
- 'Research into the Properties of the Hydrogen-Oxygen Cell. Progress Report for the Period of October 1955 to September 1956. By F.T. Bacon...'. 10 December 1956.
- B.112 'The Properties of the Hydrogen-Oxygen Fuel Cell. Overall Report of Research up to September 1956. By F.T. Bacon...'. 27 September 1957.
- B.113 'Reports'. Manuscript note by Bacon, n.d.
- 'Copy of Letter of 18th November, 1957, From Dr J.N. Agar'. 19 November 1957.
- 'The Hydrogen-Oxygen Fuel Cell. Report of Research up to September 1956. By F.T. Bacon...'. 8 December 1958.
- 'Fuel Cells (1938-1960)'. June 1960.

### Research and development

- 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.
- B.116 includes Bacon's manuscript draft of 'Research into the Properties of the Hydrogen-Oxygen Cell. Overall Technical Report for the Period from May 1946 to October 1949'. See also B.83, B.85.
- B.119-B.126** 'E.R.A. F.C. Reports. Papers etc by F.T. Bacon (Old)'. Contents of folder so inscribed divided into eight for ease of reference: miscellaneous typescript, duplicated and printed papers, 1954-1962.
- 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.127** 28 November 1947. Agenda, memorandum from A.J. Allmand on the research on the Hydrogen-Oxygen Cell, unconfirmed minutes (two copies, one heavily annotated by Bacon).
- 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.



**Research and development**

- 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.  
Includes 'aide memoire' by Paton 'Some Aspects of Hydrogen Oxygen Fuel Cell Research and 'Outline of Research Proposed for 1956 (if work remains in Cambridge)' by R.G.H. Watson.
- 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-B.153 'E.R.A. II'. Contents of binder so inscribed divided six into for ease of reference. 1957-1976.
- B.148 1957 March - June.

**Research and development**

- B.149 1957 July - December.
- B.150 1958 January - November.  
Includes circuit diagram of electronic temperature control.
- B.151 1959.
- B.152 1960 - 1961 April.
- B.153 1971, 1976.
- B.154-B.171 Notebooks 1954-1958**
- B154, B.155 Notebooks kept by Bacon 1954 -1956.
- 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.156-B.164 Notebooks kept by R.G.H. Watson 1952 - 1956.
- B.156 'CELL 2 & Electrode flows'. Used for record of work 21 January 1952 - 23 February 1954.
- B.157 'CELL UNIT 1'. Used for record of work 15 March 1952 - 27 October 1952.
- B.158 'POT'. Used for record of work 17 July 1952 - 2 February 1954.

**Research and development**

- B.159 'Practical Chemistry Results'. Largely Nickel Oxide experiments. Used for record of work 27 October 1953 - 28 March 1956.
- B.160 'OBVERSE: CELL 2. REVERSE: POT'. Used for record of work 5 February - 17 August 1954.
- B.161 'Cell 2. Aug '54 - '. Used for record of work 17 August 1954 - 20 January 1955.
- B.162 'POT August '54 - '. Used for record of work 10 August 1954 - 23 April 1955.
- B.163 Untitled. Used from the front for record of work 5 May 1955 - 12 December 1955, 17 February 1955 [possibly in error for 1956] - 12 March 1956 [possibly in continuation of B.162]. Used from the back for work 19 July 1955 - 6 July 1956 including work from September 1955 'from Cell 2 book cont.' and from 8 February 1956 'ELECTROLYSIS'.
- B.164 'CELL 4'. Used for record of work 3 June 1956 - 18 July 1956.
- B.165-B.171 Notebooks kept by J.E. Bowers 1952-1956.
- B.165 'Porous Nickel Electrodes Book 1'. Graphs and text *re* work in 1952-1954.
- B.166 'Porous Nickel Electrodes Book 2'. Graphs and text *re* work in 1954.
- B.167 'Porous Nickel Electrodes Book 3'. Graphs and text *re* work in 1954.
- B.168 'Bubble Tests & Displacement Tests on Electrodes'. Used for record of work 30 October 1953-26 October 1955.
- B.169 'The Preparation of Pure Nickel Electrodes for the Hydrogen - Oxygen Cell'. Used for record of work 2 November 1953 - 8 March 1956.

**Research and development**

- B.170 'Experiments on the Permeability of Porous Nickel'. 1p only dated 25 February 1955.
- 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-B.188 Contents of Bacon's binder: notes 1942 - 1949.
- 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.

**Research and development**

- B.178                    1946 January - October.  
  
Includes 'Technical Statement Concerning Proposal to Develop the Hydrogen - Oxygen Cell', 5pp typescript.
- B.179                    1946 November, December.
- B.180                    1947 January - July.
- B.181                    1947 August.  
  
Includes 'Appendix II Notes on the Hydrogen - Oxygen Cell', 20pp typescript by T.M. Fry (see B.215) and manuscript draft of 'Research into the Properties of the Hydrogen - Oxygen Cell. Progress Report to August 1947' by Bacon (see B.79).
- 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.

**Research and development**

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.

**Research and development**

- B.202                    1952 March, April.  
  
Includes 'Analysis of materials', 1p typescript and 'Sintering furnaces', 2pp typescript.
- B.203                    1952 May - August.  
  
Includes 'Fuel Cell Programme', 1p typescript.
- B.204                    1952 September - December.  
  
Includes 'Basis of the Fuel Cell Programme', 2pp typescript.
- B.205                    1953 January - July.
- B.206-B.214            'Miscellaneous'. Contents of binder so inscribed: notes 1953 - 1956.
- 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.

**Research and development**

- B.213 1955 January - July.
- B.214 1956 January - July.
- B.215-B.228 'T.M. Fry Calculations etc'. Contents of binder so inscribed: notes, drafts, correspondence, calculations 1947-1959, 1965-1968, 1974.
- 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.

### Research and development

- B.225 1955.
- B.226 1956 - 1959.
- B.227 1965, 1966.  
Includes Energy Conversion Limited Technical Note no. 9 'Current Distribution over a Screen Electrode with High Resistance Catalyst' by Fry, 15 July 1966.
- B.228 1968, 1974.  
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-B.242 Programmes of work: manuscript and typescript drafts 1952 - 1961.
- B.238 1952.
- B.239 1953-1954.
- B.240 1955-1956.
- B.241 1957.

### Research and development

- B.242 1960-1961.
- 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.
- B.251-B.255 Contents of untitled binder divided into five for ease of reference: corrosion test data etc. 1951-1952, 1965.  
  
1965 item (see B.251) is reprint by U.R. Evans from *Corrosion Science*.
- B.256 'Corrosion Tests @ 200 °C and 600 p.s.i.' Contents of binder so inscribed: test data, 1954.
- B.257 'Corrosion Tests @ 300 °C'. Contents of binder so inscribed: test data, n.d.
- B.258, B.259 'J.E. Bowers William J. Davis Oxidation of Nickel in the Presence of Lithium Salts'. Contents of binder so inscribed divided into two for ease of reference: data, 1955.
- B.260 'J.E. Bowers Some Tests on the Compression of Fluon @ 300 °C'. Contents of folder so inscribed: data etc., 1955.

**Research and development**

<b>B.261-B.272</b>	<b>Equipment and supplies</b>	<b>1952-1965</b>
B.261-B.272	Contents of binder: correspondence, manuscript notes, technical drawings, etc., arranged by type of equipment. 1952-1959, 1964-1965.	
B.261	'Laboratory equipment'. 1957-1959.	
B.262	'Instruments'. 1952-1954, 1957.	
B.263	'Heaters and Resistances'. 1952-1959.	
B.264	'Insulated Terminals'. 1954-1955.	
B.265	'Furnaces'. 1952-1953, 1956-1958.	
B.266	'Refractories'. 1952-1955, 1957.	
B.267-B.270	'Valves and Level Gauges'. 1952-1958, 1964-1965.	
B.271	'Protective Coatings and Plating. Contents of binder so inscribed: correspondence etc., 1952-1956, 1958.	
B.272	Correspondence etc <i>re</i> nickel products, 1952-1953, 1957-1958.	

## Research and development

**B.273-B.643**

### **NATIONAL RESEARCH DEVELOPMENT CORPORATION/ 1951-1991 MARSHALLS OF CAMBRIDGE**

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 Leeson Corporation who, in turn, associated themselves with the United Aircraft Corporation. Leeson 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 Leeson 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:

B.273-B.342	Correspondence
B.343-B.431A	Notes, drafts and reports
B.432-B.461A	Notebooks
B.462-B.599	Data
B.600-B.634	Equipment and supplies
B.635-B.643	Visitors

**Research and development**

- | <b>B.273-B.342</b> | <b>Correspondence</b>   | <b>1956-1988</b> |
|--------------------|---|------------------|
| B.273-B.287        | <p>'N.R.D.C. I' Contents of binder so inscribed: Bacon's correspondence with the National Research Development Corporation. 1956-1960.</p> <p>Bacon's NRDC correspondents include H.J. Crawley, D. Hennessey and Lord Halsbury (Managing Director 1949-1959).</p> <p>The sequence includes manuscript and typescript notes and drafts by Bacon.</p> |                  |
| 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.   |                  |
|                    | Includes 'Contract for the Development of Oxygen/Hydrogen Fuel Cells and Electrolysers and the Construction of a Working Fuel Cell Unit'.   |                  |
| B.278              | 1957 August - October.  |                  |
| B.279              | 1957 November - December.   |                  |

**Research and development**

- B.280 1958 January - March.
- 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.
- B.287 1960 January - February.
- B.288-B.304 'NRDC II'. Contents of binder so inscribed: Bacon's correspondence with the National Research Development Corporation. 1959-1982.  
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.288 1959 August, 1960 February - March.
- B.289 1960 April - June.

**Research and development**

- B.290 1960 February, July - September.
- B.291 1960 October - December.
- B.292 1961 January - June.
- B.293 1961 July - September.
- B.294 1961 October - December.  
Includes 'Report on Visit to Rome, from August 24th-31st, 1961, for United Nations Conference on New Sources of Energy' by Bacon.
- B.295 1962 January - March.
- B.296 1962 April - November.
- B.297 1963-1966.
- B.298 1967-1968.
- 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.300 1970-1971.

**Research and development**

- 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.
- B.303                    1973.  
  
Includes 'Fuel Cell Work at Harwell. (Progress Report by Dr W.C. Marshall)'.
- B.304                    1974-1976, 1978, 1982.
- B.305-B.308            'NRDC/BTG'. Contents of binder so inscribed: Bacon's correspondence with the National Research Development Corporation, 1972, 1975-1976 and its successor organisation British Technology Group, 1983-1988.  
  
Bacon's correspondents include A.B. Parker (BTG Science Investment and Operations Division).
- B.305                    1972, 1975-1976.
- B.306                    1983-1984.
- B.307                    1985.
- B.308                    1986-1988.
- B.309-B.312            'N.R.D.C. Letters May 1957 - Aug 58'. Contents of binder so inscribed divided into four for ease of reference: copies of correspondence between Marshalls and the National Research Development Corporation.  
  
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.

**Research and development**

- B.309 1957 May - December.
- B.310 1958 January - March.
- B.311 1958 April - June.
- B.312 1958 July - August.
- B.313-B.319 'Letters to and from N.R.D.C. 2nd file'. Contents of binder so inscribed divided into seven for ease of reference: copies of correspondence between Marshalls and the National Research Development Corporation. September 1958 - December 1959.
- 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.314 1959 January - February.
- 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.

**Research and development**

- 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.
- B.320-B.323 Contents of untitled binder divided into four for ease of reference: copies of correspondence between Marshalls and the National Research Development Corporation. January - December 1960.  
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.320 1960 January - February.
- 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.

**Research and development**

- 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).

**Research and development**

- 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-B.351 'Marshalls'. Contents of binder so inscribed divided into nine for ease of reference: correspondence with A.G.G. Marshall (later Sir Arthur Marshall), manuscript and typescript notes and drafts *re* fuel cell project at Marshalls, 1957-1961, later correspondence principally with Marshall, 1973-1991.
- 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.

**Research and development**

- |              |  |
|--------------|--|
| B.347        | 1960.  |
| B.348        | 1961.<br><br>Includes 'Inventory of Documents, Materials and Equipment' in respect of the Fuel Cell Development Contract.  |
| B.349        | 1973, 1974, 1980, 1984-1986, 1989, 1990.<br><br>Includes newspaper profile on Marshall on the occasion of his retirement at the age of 86 ( <i>Cambridge News</i> , 12 December 1989). |
| B.350, B.351 | 1991.<br><br>Include correspondence and papers re account of fuel cell work for Marshalls company history.<br><br>2 folders.   |
| B.352-B.358  | 'General 1957 - Aug 1959 G1'. Contents of binder so inscribed divided into seven for ease of reference: miscellaneous manuscript and typescript notes and drafts.                      |
| B.352, B.353 | 1957.<br><br>2 folders.  |
| B.354, B.355 | 1958.<br><br>2 folders.  |
| B.356        | 1959.  |
| B.357, B.358 | N.d.<br><br>2 folders.   |

**Research and development**

- B.359-B.365 'General 1959 - Dec. 1959 G2'. Contents of binder so inscribed divided into seven for ease of reference: miscellaneous manuscript and typescript notes and drafts. Not in chronological order.
- B.366-B.375 'INTERNAL NOTES'. Contents of binder so inscribed divided into ten for ease of reference: duplicated and typescript Marshalls internal staff memoranda *re* fuel cell project. April 1957 - December 1959.
- B.366 1957 April - June.
- B.367 1957 July - September.
- B.368 1957 October - December.
- B.369 1958 January - March.
- B.370 1958 April - June.
- B.371 1958 July - December.
- B.372 1958 January - March.
- B.373 1958 April - June.
- B.374 1958 July - September.
- B.375 1959 October - December.
- B.376-B.393 'Weekly Reports'. Contents of binder so inscribed divided into eighteen for ease of reference: typescript 'Daily Report Notes on the Progress of Hydrogen/Oxygen Cell Section' (prepared for each week of the project),

**Research and development**

April 1957 - January 1960, duplicated weekly progress reports, January - February 1960.

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.

B.380

1958 January - February.

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.

**Research and development**

- 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.
- B.398                    Third Quarterly Report 21 October 1957 - 18 January 1958.
- B.399                    Fourth Quarterly Report 19 January 1958 - 18 April 1958.
- B.400                    Fifth Quarterly Report 19 April - 19 July 1958.

### Research and development

- B.401 Sixth Quarterly Report 20 July - 19 October 1958.
- B.402 Seventh Quarterly Report 20 October 1958 - 19 January 1959.
- B.403 Eighth Quarterly Report 20 January - 19 April 1959.
- B.404 Ninth Quarterly Report 20 April - 19 July 1959.
- B.405 Tenth Quarterly Report 20 July - 19 October 1959.
- B.406 'The Hydrox Fuel Cell Terminal Report on Work Undertaken by Marshalls Flying School for the National Research Development Corporation'.  
January 1960.  
  
Enclosed at front of report 1p manuscript 'Notes on Terminal Report'. 9 April 1960.  
  
In Marshalls Flying School Limited binder.
- B.407 Marshalls Flying School Limited binder containing:  
  
' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section, March 1960'.  
  
'Special Report The Activation of Hydrox Oxygen Electrodes with Silver and Gold'.  
  
'Special Report Operation of Gold-Activated Oxygen Electrodes'.

### Research and development

- B.408 Marshalls Flying School Limited binder containing:
- ' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section, April 1960'.
  - 'Special Report Analysis of Permeability Test Results for 101 Electrodes of the Type 5E Mod. III'.
- B.409 Marshalls Flying School Limited binder containing:
- ' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section', May 1960.
  - 'Special Report Some Recent Estimates of Hydrogen Production Costs'.
  - 'Special Report Endurance Tests on Ten-Inch Multicell Packs'.
- B.410 Marshalls Flying School Limited binder containing:
- ' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section', June 1960.
  - '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:
- ' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section', July 1960.
  - 'Special Report Fabrication of Hydrox Fuel Electrodes from Porous Sheet'.
- B.412 Marshalls Flying School Limited binder containing:
- ' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section, August 1960.
  - 'Special Report Some Autoclave Corrosion Tests of Pre-Oxidised Nickel Specimens'.

**Research and development**

- B.413 Marshalls Flying School Limited binder containing:  
' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section', September 1960.  
'Report on Ten-Inch Fuel Consumption'.  
'Special Report Study of Electrode Polarisation by Current-Interruptor Technique'.
- B.414 Marshalls Flying School Limited binder containing:  
' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section', October 1960.  
'Special Report Measurements of Electrolyte Conductivity by Current-Interruptor Technique'.
- B.415 Marshalls Flying School Limited binder containing:  
' "Bacon" Project Monthly Report of the Hydrogen/Oxygen Fuel Cell Section', November 1960.  
'Special Report Exploratory Experiments with Porous Silver Plug Electrodes at Room Temperature and Pressure'.
- B.416 Marshalls Flying School Limited binder containing:  
'Special Report Trials of Hydrogen/Oxygen Cell with Potassium Hydrogen Carbonate Electrolyte'.  
'Notes on Design Study for 20KW Hydrox Battery'.
- B.417 'Progress Report of the Hydrogen-Oxygen Cell Section for the Period 1st December, 1960 to 28th February, 1961'.
- B.418-B.421 'Miscellaneous Reports'. Contents of folder so inscribed divided into four for ease of reference: typescript and duplicated notes, drafts and reports. 1957-1961.

### Research and development

- B.418 'Hydrogen Recirculation Emergency Programme, 22 November 1957.  
'Report on a Visit to Telegraph Construction Co. Ltd. Crawley', Sussex, 9 December 1957.  
'Hydrox Cell for Tractor Application', 7 January 1958.  
'Fuel Cell Research in the Federal Republic German Report No. 85 25.2.58'  
'Optimum Pressure for Bacon Cell', 27 May 1958.
- B.419 'Hydrox Fuel Cell Operation of the Silverised Oxygen Electrodes', 27 December 1959.  
'The Hydrox Fuel Cell Electrode Manufacture at Marshalls Flying School' January 1960.
- B.420 'Notes of Meetings during week 25th - 29th January 1960'.  
'Notes on Visit of P.W. Jones to Mond Nickel Co. Ltd., Development and Research Laboratory, Birmingham 16 on 9th March, 1960'.  
'Notes on Visit of Representatives of Marshall's Flying School Ltd to ICI Metals Division', 28 March 1960.
- B.421 'High Pressure Electrolysis Report on visit to Lonza, Visp., Switzerland 18th May, 1960'.  
'The Electrolysis of Water under Pressure' by A. Ewald Zdansky (translation of article from book published in 1959).  
'The Oxidation of Nickel in the Bacon Cell', 6 September 1960.  
'Visit of P.W. Jones to Edwards High Vacuum Ltd, Crawley, on 5th October, 1960'.  
'Single-Step Pre-Oxidation Process' and 'Multiple-Stage Pre-Oxidation Process'. 13 January 1961.  
'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.

**Research and development**

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.429, B.430	'G.C. Smith'. Contents of binder so inscribed divided into two for ease of reference: papers <i>re</i> consultancy work of G.C. Smith, principally Bacon's manuscript notes 1957-1963 and correspondence with Smith 1965-1967.	
B.431	'Automatic Controls Hymatic'. Contents of folder so inscribed: undated typescript 'Notes on Design Study for 20KW Hydrox Battery', duplicated typescript paper 'Trials of Hydrogen-Oxygen Cell with Potassium Hydrogen Carbonate Electrolyte', 2 March 1961.	
B.431A	Manuscript 'Notes on Design Study for 20KW Hydrox Battery'. Undated but written on verso of sections of technical drawings, 1957-1958.	
<b>B.432-B.461A</b>	<b>Notebooks</b>	<b>1957-1961</b>
B.432	'H.O.C. Section. Existing Material & Equipment Record Drawing Register'. In use 1957-1961.	
	For related technical drawings see B.1237-B.1259.	

**Research and development**

- B.432A '5in Cell Assembly'. Used for record of work 31 January 1958 - 17 February 1959.
- B.433 '10in Cell Assembly'. Used for record of work 10 March 1958 - 18 June 1960.
- B.434 '10" Cell'. Used for record of work 9 June 1958 - 18 September 1958.
- B.435 'Daily Sintering Book'. Used for record of work 19 October 1958 - 26 April 1959.
- B.436 'Daily Sintering Log'. Used for record of work 13 November 1959 - 20 July 1960.
- B.437 Untitled. Used for record of sintering programme, programme of electrode manufacture etc. 19 March 1960 - 27 January 1961.
- B.438 '2 3/4" H<sup>2</sup> Electrode'. Used for record of work 8 May 1958 - 15 December 1960.
- B.439 '2 3/4" O<sub>2</sub> Electrode'. Used for record of work 13 May 1958 - 12 January 1961.
- B.440 'Electroliser Plates'. Used for record of work 8 May 1958 - 2 September 1960.
- B.441 'Electrode Investigations'. Used for record of work 13 June 1958 - 14 November 1960.
- B.442 'H.O.C. [Hydrogen Oxygen Cell] Night Order Book'. Used for record of work 17 February 1959 - 10 March 1960.

### Research and development

- B.443 'H.O.C. [Hydrogen Oxygen Cell] Section Night Orders 14th March 1960 Book No.2'. Used for record of work 14 March 1960 - 19 May 1960.
- B.444 'Oscillograms'. Used for record of work 16 July - 6 October 1960.
- B.444A Untitled. Used by H.J. Young in 1959.
- B.445-B.461A Small format notebooks.
- B.445-B.449 Five 'Rough Notes' books used by P.W. Jones 9 September 1957 - 2 July 1960.
- B.445 9 September 1957 - 18 March 1958.
- B.446 18 March - 13 October 1958.
- B.447 14 October 1958 - 15 May 1959.
- B.448 15 May 1959 - 19 September 1959.
- B.449 19 September 1959 - 2 July 1960.
- B.450-B.459 Ten 'Day Books' used by H.J. Perry to record work 23 June 1958 - 2 January 1961.  
The books are lettered A - J.
- B.450 23 June - 11 October 1958.
- B.451 12 October 1958 - 25 March 1959.
- B.452 26 March - 21 July 1959.

**Research and development**

- B.453 22 July - 22 October 1959.
- B.454 23 October 1959 - 16 January 1960.
- B.455 18 January - 28 March 1960.
- B.456 26 March - 16 June 1960.
- B.457 17 June - 5 September 1960.
- B.458 6 September - 23 November 1960.
- B.459 24 November 1960 - 2 January 1961.
- B.460 '2 3/4" Cell (i) Hot Hours (ii) Assembly (iii) Uniselecter Note Book'. Used by A. Head for record of work 23 September 1958 - 21 July 1960.
- B.461 Untitled. Used by H.J. Young in 1958.
- B.461A Untitled. N.d.
- B.462-B.599 Data 1951-1961**
- Includes some data from period of Electrical Research Association sponsorship.
- B.462-B.464 'Characteristics. Cell I'. Contents of binder so inscribed divided into three for ease of reference. 1951-1958.

### Research and development

- B.465-B.474 'Characteristics Cell I 2.' Contents of binder so inscribed divided into ten for ease of reference. 1957-1960.
- B.475-B.479 'Cell characteristics III'. Contents of binder so inscribed divided into five for ease of reference. ca 1954-1960.
- B.480-B.484 '10 inch Cell Characteristics'. Contents of binder so inscribed divided into five for ease of reference. 1958-1960.
- B.485-B.490 'Test Results'. Contents of binder so inscribed divided into six for ease of reference. 1954-1960.
- B.491-B.497 'Microsections'. Contents of folder so inscribed divided into seven for ease of reference. 1954, 1958-1961.
- B.498-B.503 Contents of untitled folder divided into six for ease of reference. 1957-1960.
- B.504-B.511 '5" Test Sheets I (5:7:57-30:6:58)'. Contents of binder so inscribed divided into eight for ease of reference. 1957-1958.  
The last test sheet is dated 27 June 1958.
- B.512-B.517 '5" Test Sheets 2 (30:6:58- )'. Contents of binder so inscribed divided into six for ease of reference. 1958-1959.
- B.518-B.521 '5 Inch'. Contents of binder so inscribed divided into four for ease of reference: test sheets. 1959-1960.
- B.522 '5" Cell H.O.C. Section Electrical Tests.' Contents of folder so inscribed. 1959-1960.
- B.523 'Test and performance data sheets for Electrodes in 5in Cell'. Contents of folder so inscribed. N.d.

### Research and development

- B.524, B.525 Contents of untitled folder divided into two for ease of reference: test sheets re cell assembly. 1957-1959.
- B.526, B.527 'Assembly Record 10".' Contents of folder so inscribed divided into two for ease of reference. 1958-1959.
- B.528-B.536 '10" Test Sheets'. Contents of binder so inscribed divided into nine for ease of reference. 1958-1959.
- B.537-B.543 '10 inch Cell Data Sheets XR22-XR41A'. Contents of binder so inscribed divided into seven for ease of reference. 1959-1960.
- B.544-B.547 '10" cell data sheets XR42-'. Contents of binder so inscribed divided into four for ease of reference. 1960-1961.
- B.548-B.550 'Unserviceable Electrodes 10" H<sub>2</sub>'. Contents of binder so inscribed divided into three for ease of reference. 1958-1960.
- B.551-B.554 'Unserviceable electrodes 10" Folder III O<sub>2</sub>'. Contents of binder so inscribed divided into four for ease of reference. 1959-1960.
- B.555-B.557 '10" O<sub>2</sub> Electrodes Serviceable'. Contents of folder so inscribed divided into three for ease of reference. 1959-1960.
- B.558-B.562 'Electrodes in 10" Rig'. Contents of binder so inscribed divided into five for ease of reference. 1959-1960.
- B.563 '10" Cell HOC Section Electrical Tests'. Contents of binder so inscribed. 1959.
- B.564 '10 inch Hydrogen electrodes ready for use in cell'. Contents of binder so inscribed. 1959-1960.

### Research and development

- B.565 '10 inch oxygen electrodes ready for use in cell'. Contents of binder so inscribed. 1959-1960.
- 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.
- B.570 'Dismantling conditions 5in. and 10 in.' Contents of binder so inscribed. 1958-1959.
- B.571-B.575 '2 3/4 in. cell'. Contents of folder so inscribed divided into five for ease of reference: test data sheets. 1959-1960.
- B.576-B.578 '2 3/4 in. Runs 151-160'. Contents of folder so inscribed divided into three for ease of reference: test data sheets. 1960-1961.
- B.579-B.581 '2 3/4 in Runs 161-175'. Contents of folder so inscribed divided into three for ease of reference: test data sheets, graphs. January 1961.
- B.582 Contents of untitled folder: test data sheets, graphs. January 1961.
- B.583 '2 3/4 in. Performance.' Contents of folder so inscribed.
- B.584 Contents of untitled folder. 1958, 1960.
- B.585 'Hydrogen Blower Test Data'. Contents of folder so inscribed. 1959.
- B.586 'Reliability data'. Contents of folder so inscribed. 1959.

**Research and development**

- B.587 'Cracked Base Plates'. Contents of binder so inscribed. 1959, 1960.
- B.588, B.589 'Electrodes - Leeson'. Contents of binder so inscribed divided into two for ease of reference. 1959-1960.
- B.590, B.591 'Autoclave Test'. Contents of folder so inscribed divided into two for ease of reference. 1960.
- B.592 'Metallography'. Contents of folder so inscribed. 1960.
- B.593-B.599 'Debris (PWJ)'. Contents of folder so inscribed divided into seven for ease of reference. 1958-1961.
- 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.600 'Cast End Plates'. Contents of folder so inscribed. 1957, 1958.
- B.601, B.602 'Cell Heating'. Contents of folder so inscribed divided into two for ease of reference. 1958, 1959.
- B.603, B.604 'Gaskets & Plastics'. Contents of folder so inscribed divided into two for ease of reference. 1958-1960.
- B.605-B.608 'Hydrogen Blower    Howard and Higgs'. Contents of folder so inscribed divided into four for ease of reference. 1958.

### Research and development

- B.609 'Hydrogen Blower. Miscellaneous'. Contents of folder so inscribed. 1957.
- 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.612, B.613 'Northern Transport Agency (London) Ltd'. Contents of folder so inscribed divided into two for ease of reference. 1959-1960.
- B.613A 'Perforated Plate'. Contents of folder so inscribed. 1959.
- B.614-B.617 'U.S. (Leesona) Cell Packs'. Contents of folder so inscribed divided into four for ease of reference. 1959-1960.
- B.618 'Miscellaneous'. Contents of folder so inscribed. 1958-1960.
- 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.

**Research and development**

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-B.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.635 1957-1958.

B.636 1959 January - June.

**Research and development**

- B.637                    1959 July - December.
- B.638                    1960.
- B.639                    1961-1965
- B.640-B.642            'Visitors (Discussions)'. Contents of binder so inscribed divided into three for ease of reference: Bacon's manuscript notes of discussions with visitors 1959-1962, 1964, 1967, 1969.
- B.640                    1959.
- B.641                    1960.
- B.642                    1961, 1962, 1964, 1967, 1969.
- B.643                    Visitors Book. In use 1958-1963.

### Research and development

**B.644-B.854**

**ENERGY CONVERSION LIMITED**

**1961-1974**

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**

Contents of Bacon's ECL correspondence files 1962-1964, 1968-1974.

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.

**Research and development**

- B.647                    1963 January - February.  
  
Includes 'Note on discussion regarding methanol reforming catalysts', 2pp typescript and 'Proposal for New Patent Application for "Selective Hydrogen Electrode"', 3pp typescript.
- 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.658                    1969 January - March.

**Research and development**

- B.659 1969 April - June.
- B.660 1969 July - August.
- B.661 1969 October - December.
- B.662 1970 January - June.
- B.663 1970 July -September.
- B.664 1970 October - December.  
Includes 'Note on Regenerative Hydrogen-Oxygen Fuel Cell Systems',  
manuscript and typescript drafts.
- B.665 1971.
- B.666 1972-1974.
- B.667-B.671 Programmes of work and forward planning documents 1963-1969**
- B.667 'Fuel Cell Programme for January to September 1st, 1963'.
- 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.

**Research and development**

B.670 'Policy Plans for Fuel Cell Development' by J.C.H. Hart, 11 September 1969.

In original binder.

B.671 'Policy and Plans for Metal/Air Battery Development' by J.C.H. Hart, 11 September 1969.

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.

B.672 'Report on Visit to U.S.A., from July 14th-31st, 1961, to see the Present State of Development of Fuel Cells' by Bacon.

'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.

**Research and development**

- 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.
- B.679 'Note on Possible use of Mixed Gases in Medium Temperature, Medium Pressure, Hydrogen/Oxygen Fuel Cell'. N.d.
- 'Safety Precautions Advisable when using Methanol/Air Battery' by Bacon. N.d.
- B.680-B.698 ECL Fuel Cell Research Reports. 1963-1966.
- 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.

**Research and development**

- 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.

**Research and development**

- B.698 No.4 1966 1 September - 31 December.
- B.699-B.714 ECL Fuel Cell Development Reports. 1963-1966.  
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.

**Research and development**

- 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.723            Fuel Cell Engineering Reports. 1965-1966.
- 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.721                    No.2 1965 16 June - 1966 15 February.

### Research and development

- 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.724-B.736 Fuel Cell Research Programme Special Reports. 1961, 1964-1967.
- B.724 'Special Report No. 8. A Review with Reference to Future Research' by A.D.S. Tantram, 20 November 1961.
- B.725 'Preliminary report on Regenerative fuel cell systems Special Report no.4' by T.M. Fry, 17 April 1964.  
In original binder.
- B.726 'A General Review of Fuel Cell Research and Development Special Report No.5' by T.M. Fry, 21 May 1964.  
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.  
In original binder.
- B.728 'The Preparation of Ultrafine Novel Catalysts' by A.C.C. Tseung and S.M. Pearson Special Report 1965 - No.1'.  
In original binder.
- B.729 'Special Report No.10 Fuel Review Part 1. The economics of dissociated ammonia as a fuel for fuel cells' by T.M. Fry, 25 January 1965.  
In original binder.

**Research and development**

- B.730 'Special Report No.10 Fuel Review Part 2. Hydrocarbons' by T.M. Fry, 22 February 1965.  
In original binder.
- B.731 'Special Report No.13 Proposals for a Regenerative Hydrogen/Oxygen Fuel Cell Suitable for Transport and Other Applications' by S.B. Bailey, 23 March 1965.  
In original binder.
- B.732 Figures for preceding.  
In original binder.
- B.733 'Special Report No.14 The use of fuel cells for the propulsion of heavy road vehicles' by T.M. Fry, 22 July 1965.  
In original binder.
- B.734 'Special Report No.15 Studies of systems incorporating the silver-palladium anode Part 1. A comparison of methanol fuelled systems with external and internal reforming' by T.M. Fry, G.J.W. Pettinger and D.K. Ross, 6 August 1965.  
In original binder.
- B.735, B.736 'Special Report MCR 50 Fuel Cell Power Plant for Vehicle Propulsion 1967-1982' by H.R. Espig, 1 August 1967.  
2 folders.
- B.737-B.745 ECL Topic Reports. 1967-1968.
- B.737 No.20 'The Cracking of Methane' by R.H. Dahm, 3 February 1967.
- B.738 No.27 'Alternative Methods of Hydrogen Purification' by J.L. Jones, July 1967.

**Research and development**

- B.739 No.39 'Alkaline Fuel Cell Tolerance to Carbon Monoxide & Dioxide' by J.L. Stones, 20 May 1968.
- B.740 No.40 'The Electrochemical Reduction of Oxygen on Nickel Oxide and its Solid Solutions with Lithium and Chromium Oxides' by A.C.C. Tseung, A.D.S. Tantram and B.S. Hobbs, 16 October 1968.
- B.741 No.46 'The Catalytic Decomposition of Methane' by R.H. Dahm, 15 November 1968.
- B.742 No.47 'Half-Cell Testing of High Temperature Cell Testing' by T.F. Marsh. N.d.
- B.743 No. 57 'Secondary Batteries' by D.G. Conning, 13 June 1969.
- B.744 No.58 'Hydriding Titanium by Electrolysis' by P.C. Jones, 7 August 1968 [sic].  
In original binder.
- B.745 No.59 'Evaluation of Constructional Materials for Low Temperature Alkaline Fuel Cells Corrosion of Plastics in 5N KOH at 80<sup>0</sup>c' by H.M. Smith, 3 November 1969.  
No.60 'Evaluation of Constructional Materials for Low Temperature Alkaline Fuel Cells Corrosion of Metals in 5N KOH at 80<sup>0</sup>c' by H.M. Smith, 3 November 1969.
- B.746-B.773 ECL Visit Reports. 1964-1970.
- B.746 'Visit to Leeson-Moos and Pratt & Whitney March 16th - 20th 1964' by A.D.S. Tantram.  
In original binder.
- B.747 'Visit Report VR 66 Notes on a Symposium on Direct Conversion at Woolwich Polytechnic' by T.M. Fry, 31 March 1965.

**Research and development**

- B.748 'Visit Report VR 68 Symposium on hydrogen in industry' by T.M. Fry, 9 April 1965.  
  
In original binder.
- B.749 'Visit Report V.R. No.71 Paris Fuel Cell Conference and visit to Electricite de France. 23-26th February, 1965. A.C.C. Tseung'.
- B.750 'Visit Report VR 81 Visit to Fuel Cell Conference Brussels 21st -24th June, 1965' by C.G. Clow, 6 July 1965.  
  
'Visit Report VR 91 Visit to International Nickel Development & Research Dept. ... 12th November, 1965' by R.E. Bates, 18 November 1965.
- 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'.
- B.752 'Visit Report VR 99 by Dr D.P. Gregory, 3rd May, 1966. Visit of Dr McKay and Dr Jenkins of U.K.A.E.A., Harwell, on 28th April, 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 106 by H.R. Espig, 17th August, 1966. Visit to East Midlands Gas Board ... Leicester, on 17th August, 1966'.
- B.753 'Visit Report VR 110 by T.M. Fry, 21st September, 1966. Visit to SERAI, Brussels, on 16th September 1966'.  
  
'Visit Report VR 111 by T.M. Fry, 21st September, 1966. Visit to ACEC Charleroi, on 19th September, 1966'.
- B.754 'Visit Report VR 114 by A.C.C. Tseung and J.G. Bannochie, 26th September, 1966. Visit to Institute of Metals, Autumn Meeting, Chester, 19-23rd September, 1966'.  
  
'Visit Report VR 116 by D.P. Gregory, 4 October, 1966. Visit to Energy Conversion Limited, by N. Breele and M. Degobert, of Institute Francais Du Petrole, 23rd September, 1966'.

### Research and development

- B.755 'Visit Report VR 119 by T.M. Fry, 24th November, 1966. Visit to the National Institute of Oceanography, Wormley, Surrey, on 21st November, 1966'.
- 'Visit Report VR 120 by H.R. Espig and T.M. Fry 22nd December, 1966. Visit to the Admiralty Materials Laboratory, Holton Heath, on 19th December, 1966'.
- B.756 'Visit Report VR 121 by T.M. Fry 12 January 1967 Report of a meeting at the Institution of Electrical Engineers to discuss recent developments in fuel cells ... London, 9th January 1967'.
- 'Visit Report VR 122 by Dr H.R. Espig and E.G. Orpet 16th January 1967. Visit to Signals Research and Development Establishment, Christchurch, Dorset, on 6th January 1967'.
- 'Visit Report 123 VR 123 by Dr H.R. Espig and E.G. Orpet 16th January 1967. Visit to Lancashire Dynamo Electronic Products Ltd. on 2nd January 1967'.
- 'Visit Report VR 130 by D.P. Gregory and A.C.C. Tseung, 30th March, 1967. Visit to the Acheson Industries Ltd., Plymouth on 28th March, 1967'.
- B.757 'Visit Report VR 131 Visit to Pratt and Whitney Aircraft, East Hartford, Conn. February 27th, 1967 by Dr. D.P. Gregory and Mr J.G. Bannochie. 20th April, 1967'.
- B.758 'Visit Report VR 132 by H.R. Espig and T.M. Fry, 18th April, 1967. Report of a conference on the technology of the sea and sea-bed, held at A.E.R.E. Harwell, 5th - 7th April, 1967'.
- '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'.
- B.759 'Visit Report VR 135 Visit to I.G.T. Chicago April 25th - 27th 1967 by Mr A.D.S. Tantram and Mr T.F. Marsh'.

### Research and development

- B.760 Visit Report VR 136 Visit to America by F.T. Bacon March 13th - 24th 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 'Visit Report VR 137 Visit to the Propulsion and Energetics Panel Meeting of A.G.A.R.D. - N.A.T.O. Liege, June 1967 by D.P. Gregory and F.T. Bacon'.  
  
'Visit Report VR 138 Visit from Mr K.R. Thorne, Laporte Industries Limited. Subject - Sodium Borohydride 21st September, 1967'.  
  
'Visit Report VR 145 Visit to IGT and P & WA to discuss High Temperature Fuel Cell Work. Dr D.P. Gregory November 1967'.
- B.762 'Visit to Batelle Institute London office 8th February 1968 by Dr D.P. Gregory'.  
  
'Visit Report 149 Pratt & Whitney: 25-28th March 1968 (Molten Carbonate cell discussions) Sylvania: 29th March 1968 (Iron Electrodes) by Mr A.D.S. Tantram'.
- B.763 'Pratt and Whitney Visit Report May 14, 15 and 16th 1968 by C.G. Clow'.
- B.764 'Visit Report No.158 Notes on a Paper by W. Juda of Prototech Company on a Hydrocarbon Fuel Cell With Molten Alkali Hydroxide Electrolyte presented at Electrochemical Society Montreal October 4th 1968'.  
  
'Visit Report 160 Notes on the Fuel Cell Symposium at the Electrochemical Society Meeting Montreal October 1968 by D.P. Gregory'.

### Research and development

- B.765 'Visit Report No.163 to Admiralty Materials Laboratory Holton Heath 11th November 1968 by Mr C.G. Clow'.  
  
'Visit Report No.165 Pratt & Whitney Aircraft, Hartford, Connecticut, October 1968 by D.P. Gregory and D.G. Conning'.  
  
'Visit Report 169 Symposium on Electrocatalysis 21st 22nd November 1968 Eindhoven, The Netherlands by R.E. Bates'.
- B.766 'Visit Report 170 British Rail Research Centre, Derby by H.R. Espig on 3rd February 1969'.  
  
'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'.  
  
'Visit Report 180 Electricity Council Research Centre, Capenhurst to discuss Secondary Battery Systems by: D.G. Conning and P.C. Jones 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 'Visit Report No. 183 U.S.A. 14 - 22nd May 1969 Part I. A Brief Status Report by C.G. Clow'.  
  
'Visit Report No. 184 A.S.E.A Vaesteras, Sweden June 13th By: A.D.S. Tantram'.
- B.769 'Visit Report 186 Rocket Propulsion Establishment Westcott, Aylesbury, Bucks July 21st, 1969 F.T. Bacon & T. Doran'.
- B.770 'Visit Report 195 Pratt & Whitney Aircraft ... U.S.A. September 29th to October 2nd 1969. By: J.G. Bannochie'.
- B.771 'Visit Report No.199 British Oxygen Company F.T. Bacon and T.M. Fry. 25th June and 13th August 1969'.  
  
'Visit Report No.203 Normalair-Garrett F.T. Bacon and T.M. Fry 19th November 1969'.

**Research and development**

- B.772 'Visit Report No.205 The Gas Council London Research Station 2nd January 1970 T.M. Fry & A.D.S. Tantram'.  
  
'Visit Report No.214 Rolls Royce Limited, Rocket Department ... by F.T. Bacon and T.M. Fry 3rd March, 1970'.
- B.773 'Visit Report 216 3rd Conference on Industrial Carbons and Graphite 14th - 17th April, 1970, Imperial College ... London R.E. Bates - 23rd April 1970'.  
  
'Visit Report 226 Visit to E.C.L. of Dr A.B. Hart on 30th June 1970'.
- B.774-B.779 Miscellaneous ECL reports. 1962-1971.
- B.774 'Report of the Technical Working Party January, 1962'.
- B.775 'Preliminary Report on the feasibility of a novel electric motor and its application to Fuel Cell traction' by J.M. Jenkins, 1 April 1963.  
  
'Report on Supply of Porous Nickel for Fuel Cells July 1963' by J.M. Jenkins.  
  
'Preliminary Consideration of Fuel Cell Powered Rail Cars for German Railways', by J.M. Jenkins. N.d.
- B.776 'Water Removal from the Hydrogen Diffusion Membrane Type of Fuel Cell' by A.D.S. Tantram, 30 August 1963.  
  
'Physical and Chemical Properties of Refractory Materials A Compilation of Published Data' by A.C.C. Tseung, 25 February 1964.
- 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.
- B.778 'Electrochemical Generation and Storage near the Load Centres' by A.B. Hart. N.d. (latest bibliographical reference 1969).  
  
In original binder.

**Research and development**

B.779	'Submarine Power Sources' by C.G. Clow, April 1971.	
<b>B.780-B.837</b>	<b>Notes</b>	<b>1965-1970</b>
B.780-B.801	Duplicated ECL 'Research Notes'. 1965-1967.	
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.	
B.788, B.789	1966 March-April. 2 folders.	
B.790	1966 May.	
B.791	1966 June.	
B.792	1966 July.	

**Research and development**

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-B.808	Duplicated ECL 'Engineering Activity Notes'. 1967.
B.806	1967 January.
B.807	1967 February.

**Research and development**

- B.808 1967 March.
- B.809-B.813 Duplicated ECL 'Development Activity Notes'. 1967.
- B.809 1967 January.
- B.810 1967 February.
- B.811 1967 March.
- B.812 1967 April.
- B.813 1967 May.
- B.814-B.837 Duplicated ECL Technical Notes. 1966-1970.
- B.814 No.4. 'Power losses in Current Collectors' by C.G. Clow. 4 February 1966.  
No.5 'Notes on CO<sub>2</sub> and Alkaline Cells' by C.G. Clow, 4 May 1966.
- B.815 No.7. 'A comparison of the Efficiency of Different Fuel Cell Systems' by J.G. Bannochie, 16 May 1966.  
No.8. 'The Application of Potential - pH Diagrams to Fuel Cell Electrodes' by J.G. Bannochie, 12 July 1966.
- B.816 No.14. 'Reagents used in the General Electric self-contained fuel cell power source' by T.M. Fry, 28 November 1966.  
No.15. 'Economics of the Brown, Boverie Cell' by T.M. Fry, 10 January 1967.
- B.817 No.18. 'Materials for High-Temperature Molten Carbonate Fuel Cells' by B.S. Harris. N.d.

**Research and development**

- B.818 No.19. 'Voltage Drop and Current Distribution on Porous Nickel Electrodes Having Current Collection on the Edges' by M. Grenness, 12 June 1967.
- B.819 No.20. 'Loss of water from zinc-air cells by evaporation' by T.M. Fry and A.D.S. Tantram, 22nd June 1967.
- B.820 No.25. 'Titanium hydride - air battery' by F.T. Bacon, October 1967.
- B.821 No.34. 'Water Removal from Air Cathodes' by J.G. Bannochie.  
Corrections only to technical note no.34, 20 September 1968.
- B.822 No.42. 'Electrolyte concentration polarisation at fuel cell electrodes in different electrolytes at low temperatures' by J.G. Bannochie, 31 May 1968.
- B.823 No.43 'Corrosion Tests on O-Ring Materials' by R.E. Bates and H.M. Smith, 19 June 1968.
- B.824 No.45. 'Hydrogen-generating reactions for small scale applications' by T.M. Fry, 17 July 1968.  
In original binder.
- B.825 No.47. 'Fuel for Unattended Generators' by C.G. Clow, 11 September 1968.  
In original binder.
- B.826 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.

### Research and development

- 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.
- B.830                    No. 57. 'Comments on Topic Report No.42, a method for the calculation of particle size distribution from sedimentation data' by T.M. Fry, 5 December 1968.  
  
In original binder.
- B.831                    No.74. 'A Brief Technological Appraisal of Fuel Cell Research in Germany' by P.D. Power, 22 May 1969.
- B.832                    No.78. 'Deactivation of the Hydrogen Electrode by Mercuric Acid' by J.S. Clarke, 12 June 1969.
- B.833                    No. 91. 'The Position of the Gas/Liquid Interface in a "Hydrophobic" Electrode' by T.M. Fry, 3 December 1969.
- B.834                    No.102. 'Some Physical Properties of Molten Potassium and Sodium Hydroxides' by B.S. Harris. N.d.
- B.835                    No.105. 'U.K. Electricity Tariffs' by T.M. Fry, 22nd April 1970.
- B.836                    No.110. 'Nickel-Zinc Batteries and the Urban Electric Car' by B.S. Harris, 28 May 1970.
- B.837                    No. 122. 'The Weight, Range, Speed and Energy Requirements of an Electric Vehicle' by B.S. Harris, 27 September 1970.

**Research and development**

<b>B.838-B.854</b>	<b>Miscellaneous</b>	<b>1965-1969</b>
B.838	Application for the MacRobert award on behalf of Bacon and his collaborators R.G. Watson, J.C. Frost and T.M. Fry. Submitted by ECL 14 April 1969.  See also E.6.	
B.839-B.850	Lectures on fuel cells by ECL staff.	
B.839	Lecture to Association of Supervising Electrical Engineers on 'Aspects of Development and Application of Fuel Cells' by C.G. Clow, 16 February 1965.	
B.840-B.848	Lectures given as part of a course on fuel cells, Leicester, September 1965.	
B.840	'Introductory lecture on fuel cells' by T.M. Fry.	
B.841	'Lecture No.2' 'Fuel Cell Reactions' by J.M. Parry.	
B.842	'Lecture 3' 'Rate-controlling factors' by J.M. Parry.	
B.843	'Lecture 4' 'Fuel Cell Systems' by T.M. Fry.	
B.844	'Lecture 7' 'High Temperature Fuel Cells' by A.C.C. Tseung.	
B.845	'Lecture 8' 'Medium Temperature fuel cells' by T.M. Fry.	
B.846	'Lecture 9' 'Fuels for Fuel Cells' by G.R. Lomax.	
B.847	'Lecture 10' 'Materials for Fuel Cells' by A.C.C. Tseung.	

### Research and development

- B.848 'Lecture 12' 'Review of applications and prospects for fuel cells' by J.W. Pearson.
- B.849 '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.  
  
'How does a fuel cell work' by T.M. Fry, 17 February 1966.
- B.850 'The Use of Fuel Cells on and under the Sea' by H.R. Espig and T.M. Fry.  
Paper delivered at Ministry of Technology British National Conference on the Technology of the Sea and Sea-Bed, A.E.R.E., Harwell, 5-7 April 1967.
- B.851-B.854 Other papers by ECL staff 1966-1969 and n.d.  
4 folders.
- B.855-B.1077 RESEARCH AND DEVELOPMENT TOPICS ca 1935-1991**
- 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.
- B.855-B.865 'Electrodes, activation etc. Porous Nickel Diaphragm Materials Electrode Processes Faraday Society Meeting'. Contents of binder so inscribed divided into eleven for ease of reference: manuscript notes, correspondence, printed material. ca 1935-1948.
- B.866-B.877 'Electrolysers'. Contents of binder so inscribed divided into twelve for ease of reference: manuscript notes, correspondence, printed material. ca 1939-1987.
- B.878-B.888 'Electrodes and Materials'. Contents of binder so inscribed divided into eleven for ease of reference: manuscript notes etc. ca 1944-1953.

### Research and development

- B.889-B.896 '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 H<sub>2</sub>'. 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.912, B.913 'Carbon Fibres, etc and Graphite'. Contents of binder so inscribed divided into two for ease of reference: printed material, sample of carbon fibre. 1950, 1964-1971.
- 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.928-B.935 'Automatic Control'. Contents of binder so inscribed divided into eight for ease of reference: correspondence, manuscript notes, technical drawings. 1952-1960.

### Research and development

- 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.942 'Corrosion'. Contents of binder so inscribed: correspondence, manuscript notes. 1952-1966.
- B.943, B.944 'Miscellaneous papers on oxidation and corrosion'. Contents of binder so inscribed divided into two for ease of reference: manuscript notes, duplicated paper by U.R. Evans on 'Corrosion research in Cambridge', printed material. 1952-1971.
- B.945, B.946 'Porous Materials'. Contents of binder so inscribed divided into two for ease of reference: correspondence, manuscript notes etc. 1952-1970.
- 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.
- B.958-B.960 'Hydrogen Production III. Cracked Ammonia'. Contents of folder so inscribed divided into three for ease of reference: mostly printed material. 1951-1983.
- 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.969-B.978 'Development'. Contents of binder so inscribed divided into ten for ease of reference: 1952-1957.

### Research and development

- 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.981-B.994 'Battery Traction I'. Contents of binder so inscribed divided into fourteen for ease of reference: correspondence, manuscript notes, duplicated and typescript papers, printed material. 1953-1990.
- B.995 'Battery Traction II'. Contents of binder so inscribed: correspondence, manuscript notes etc. 1977-1987.
- B.995A 'Nickel Powders'. Contents of binder so inscribed: manuscript notes, reports, patent specification etc. 1954-1984.
- 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.1000 'Short currents'. Contents of binder so inscribed: manuscript and typescript notes and drafts. 1955-1961.
- B.1001 Untitled binder: manuscript notes and drafts, technical drawings *re* nickel oxide, nickel corrosion. 1955-1967.
- B.1002, B.1003 'Activation'. Contents of binder so inscribed divided into two for ease of reference: correspondence, manuscript and typescript notes and drafts, printed material. 1958-1974.
- B.1004, B.1005 'Air Compression and CO<sub>2</sub> Removal'. Contents of binder so inscribed divided into two for ease of reference: manuscript notes, correspondence, printed material. 1958-1972.

### Research and development

- B.1006-B.1014 'Hydrogen (liquid)'. Contents of binder so inscribed divided into nine for ease of reference: correspondence, manuscript notes, typescript and duplicated papers including ECL 'Visit Report No.214 Rolls Royce Limited, Rocket Department, Anstey ... 30 March 1970' by Bacon and T.M. Fry, printed material. ca 1958-1970.
- B.1015-B.1017 'H<sub>2</sub>-O<sub>2</sub> 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.1018-B.1024 'Hydrogen Diffusion'. Contents of binder so inscribed divided into seven for ease of reference: correspondence, manuscript notes, duplicated papers, printed material, patent specifications. ca 1960-1970.
- B.1025 'H<sub>2</sub> + O<sub>2</sub> Mixtures'. Contents of binder so inscribed: manuscript notes. 1960-1966.
- B.1026, B.1027 C<sub>6</sub>H<sub>6</sub> → C<sub>6</sub>H<sub>12</sub> Cell'. Contents of binder so inscribed divided into two for ease of reference: manuscript and typescript notes and drafts, printed material etc. 1961-1964.
- B.1028 'Hydrogen Production, Cracked Ammonia'. Contents of binder so inscribed: correspondence, manuscript notes, printed and duplicated material. 1962-1974.  
  
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.1034 'Energy storage'. Contents of binder so inscribed: correspondence, manuscript notes, printed material. 1963-1988.
- B.1035-B.1040 'Hydrogen storage'. Contents of binder so inscribed divided into six for ease of reference: correspondence, manuscript notes, printed material. ca 1964-1986.

### Research and development

- B.1041-B.1044 'Fuel Cells Regenerative Cells'. Contents of binder so inscribed divided into four for ease of reference: correspondence, manuscript notes, patent specifications etc. 1966-1970.
- B.1045-B.1048 'Electrodes, Titanium hydride'. Contents of binder so inscribed divided into four for ease of reference: correspondence, manuscript notes, printed material. 1966-1977.
- 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.
- B.1051 'Metal-air battery'. Contents of binder so inscribed: manuscript notes, duplicated papers. 1968-1970.
- B.1052 'Oxygen Electrode'. Contents of binder so inscribed: correspondence, manuscript notes, duplicated papers. 1970-1979.  
Includes earlier printed material.
- B.1053-B.1061 'Hydrogen as fuel'. Contents of binder so inscribed divided into nine for ease of reference: correspondence, manuscript notes, printed material. 1971-1980.
- B.1062 'Fuel Cells (Regenerative H<sub>2</sub>-O<sub>2</sub>)'. Contents of binder so inscribed: correspondence. 1973-1974.
- B.1063, B.1064 'Hydrogen Energy'. Contents of binder so inscribed divided into two for ease of reference: correspondence. 1975-1991.
- B.1065-B.1076 'Undersea use of F.C.'. Contents of binder so inscribed divided into twelve for ease of reference: correspondence, manuscript notes, typescript and duplicated papers, printed material. 1979-1991.
- B.1077 'Solar energy'. Contents of binder so inscribed: correspondence. 1986-1987.

## Research and development

### **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.

B.1078-B.1089

'Admiralty and C.J. B.'. Contents of binder so inscribed divided into twelve for ease of reference: correspondence, manuscript notes, typescript and duplicated papers, printed material etc. 1954-1974.

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.

Apart from Watson Bacon's principal correspondents are E.C. Wadlow of the Royal Navy Scientific Service Department of Materials Research at the Admiralty in London and C.H. Secord and A.B. Tavendale of CJB Constructors John Brown Limited.

B.1090, B.1090A

'H-O Cell Reports (Admiralty). Contents of binder so inscribed divided into two for ease of reference: Watson's progress reports to the Admiralty. 1954-1956.

B.1091-B.1093

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

In April 1963 Bacon visited American Cyanamid Central Research Center, Stamford, Connecticut with H.G. Oswin of Leesona Moos Laboratories to discuss fuel cell activities. American Cyanamid personnel visited ECL in April 1964.

B.1094

'Batelle'. Contents of folder so inscribed: correspondence. 1977.

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

### Research and development

- B.1095 'Brookhaven National Laboratory'. Contents of binder so inscribed: correspondence. 1979-1980.
- Bacon's principal correspondent is F.J. Salzano, Head, Energy Storage and Conversion Division.
- B.1096-B.1100 'C.E.G. B. and Electricity Council'. Contents of binder so inscribed divided into five for ease of reference: correspondence, manuscript notes, typescript and duplicated papers. 1959-1982.
- 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.
- B.1101-B.1104 'E.E.C. Hydrogen Programme City University'. Contents of binder so inscribed divided into four for ease of reference: correspondence etc. 1978-1986.
- 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.
- B.1105-B.1108 'E.E.C. (Hydrogen) + Dept of Energy'. Contents of binder so inscribed divided into four for ease of reference: correspondence, manuscript notes, duplicated papers, printed material. 1979-1987.
- 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.
- B.1109 'Hawker-Siddeley'. Contents of folder so inscribed: correspondence 1960-1961.
- Bacon's correspondents are E.P. Hawthorne and J. Lamborn of the Hawker Siddeley Nuclear Power Company Ltd.

### Research and development

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.

B.1117-B.1131 'Johnson Matthey'. Contents of binder so inscribed divided into fifteen for ease of reference: correspondence, manuscript notes, Bacon's 'Thanks' for the presentation of the Grove Memorial Medal etc. 1982-1992.

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.

B.1132-B.1147 'Leesona-Moos and P. & W.'. Contents of binder so inscribed divided into sixteen for ease of reference: correspondence, manuscript notes, printed material. 1957-1968.

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. Bacon's principal correspondents are at 'Leesona-Moos', A.M. Moos, H.G. Oswin and K.L. Rapp and at Pratt & Whitney, J.W. Connors, A.E. Edwards, J.R. Foley, H.M. Hershenson, W.H. Podolny and J.G. Tschinkel.

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'.

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### Research and development

- /... See also B.1148, B.1149, B.1150-B.1152, B.1301-B.1323.
- B.1148, B.1149 'Leesona-Moos & P&W II'. Contents of binder so inscribed divided into two for ease of reference: correspondence. 1969-1984.
- B.1150-B.1152 'Patterson Moos Pratt & Whitney'. Contents of binder so inscribed divided into three for ease of reference: purchase orders, correspondence. 1959-1960.
- 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 'M.E.X.E. [Ministry of Supply Military Engineering Experimental Establishment]'. Contents of binder so inscribed divided into three for ease of reference: correspondence, manuscript notes, duplicated and printed material. 1958-1963.
- 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'.

### Research and development

- B.1166-B.1170 'M. of T. and D. of E.' Contents of binder so inscribed divided into five for ease of reference: correspondence, manuscript notes, duplicated papers, printed material. 1966-1978.
- 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.1171 'M.P.D. Technology Ltd'. Contents of folder so inscribed: correspondence. 1979-1991.
- Bacon's correspondent is H.C. Angus. He approached Angus after hearing a paper by him on 'Energy storage using metallic hydrides' at an International Conference on Future Energy Concepts at the IEE in London in 1979.
- 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 (Sondes Place Research Laboratories Limited), Dorking, Surrey.
- See also B.1324-B.1333.
- B.1176-B.1181 'U.K.A.E.A (London) A.E.R.E. (Harwell)'. Contents of binder so inscribed divided into six for ease of reference: correspondence, manuscript notes etc. 1965-1990.
- Bacon was a consultant to Fuel Cells Ltd and visited Harwell regularly 1971-1973 while fuel cell work was being carried out there.
- B.1182-B.1184 'Fuel Cells Union Carbide'. Contents of binder so inscribed divided into three for ease of reference: correspondence, manuscript notes, duplicated and printed material, photograph. 1957-1975.
- The National Carbon Company Division of the Union Carbide Corporation announced 'a practical hydrogen-oxygen fuel cell' in 1958.

### Research and development

- B.1185 'Warren Spring'. Contents of binder so inscribed: correspondence, manuscript notes. 1959.
- 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 'Weir Group'. Contents of binder so inscribed: correspondence. 1979.
- 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 'Drawings 5" '. Contents of envelope so inscribed divided into eleven for ease of reference: Marshalls of Cambridge drawings re 'Oxygen Electrode 5 inch', 'Hydrogen Electrode 5 inch', 'Bipolar Electrode 5 inch' etc., some with manuscript annotation and amendment. 1957-1959.
- B.1209-B.1231 'Drawings 10" '. Contents of envelope so inscribed divided into twenty three for ease of reference: Marshalls of Cambridge drawings re 'Oxygen Electrode 10 inch', 'Hydrogen Electrode 10 inch', 'Bipolar Electrode 10 inch' etc., some with manuscript annotation and amendment. 1957-1960.

**Research and development**

- B.1232-B.1236 '10" Cell drawings'. Contents of folder so inscribed divided into five for ease of reference: Marshalls of Cambridge drawings *re* layout of 'H.O.C. Section - No. 6 Hangar', '10" Cell pipe layout', 'Internally ported 10" bipolar electrode' etc., some with manuscript annotation and amendment. 1958-1961.
- 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.1269 Associated Electrical Industries (Manchester) Limited. 1960.
- B.1270, B.1271 British Petroleum Research Centre. 1962.
- 2 folders.

### Research and development

- 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.1299 Electrical Research Association. 1945-1958.
- B.1274-B.1276 Published reports by A.P. Paton 1952 and Bacon 1953 and 1958. 3 folders.
- B.1277-B.1283 'Fuel Cell Reports'. Contents of binder so inscribed divided into seven for ease of reference: duplicated ERA fuel cell reports (not by Bacon). 1945-1958.  
These reports are papers for Sub-Committee Z/F: Storage of Electrical Energy. See also B.78-B.126.
- B.1284-B.1290 'Battery Storage Reports'. Contents of binder so inscribed divided into seven for ease of reference: duplicated ERA reports. 1947-1957  
These reports are papers for Sub-Committee Z/F: Storage of Electrical Energy. See also B.78-B.126.
- B.1291-B.1299 'Russian Fuel Cell Booklet'. Contents of binder so inscribed divided into nine for ease of reference: duplicated and typescript papers. 1947-1954.  
These papers are translations of *Direct conversion of chemical energy of fuel into electrical energy* by O.K. Davtyan, Moscow, 1947.
- B.1300 General Electric Company (UK) Research Laboratories. 1955.

**Research and development**

- B.1301-B.1323 'Leesona-Moos and P & W'. Contents of box so inscribed divided into twenty-three for ease of reference: printed, duplicated and typescript papers. 1958-1967.
- 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.1335 Warren Spring Laboratory, Stevenage, Hertfordshire. 1960.
- B.1336-B.1360                      Miscellaneous                      1933-1980**
- B.1336-B.1338 'Miscellaneous papers and photocopies'. Contents of folder so inscribed divided into three for ease of reference. 1938-1954.
- 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.

**SECTION C**

**LECTURES AND PUBLICATIONS**

**C.1-C.169**

C.1-C.127

DRAFTS

C.128-C.163

CORRESPONDENCE

C.164-C.168

OFF-PRINTS

C.169

BACKGROUND MATERIAL

For further material relating to Bacon's lectures and publications see Section E Societies and organisations and Section F Visits and conferences.

**Lectures and publications**

<b>C.1-C.127</b>	<b>DRAFTS</b>	<b>1953-1984</b>
	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	'Hydrogen-oxygen energy storage cells', <i>World Science Review</i> , 1959. Manuscripts and typescript drafts etc. 2 folders.	
C.5-C.8	'The High Pressure Hydrogen/Oxygen Fuel', paper at meeting of American Chemical Society, Atlantic City, New Jersey, September 1959. In <i>Fuel cells</i> (ed. G.J. Young). Reinhold 1960. See also C.143.	
C.5	Correspondence <i>re</i> 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	'Fuel Cells: Will they soon become major sources of electrical energy?', Evening Discourse, Royal Institution, London, 12 February 1960. <i>Proc.R. Instn Gt Br.</i> <b>68</b> , 171 (1960).  The substance of the discourse was also published in <i>Nature, Lond.</i> <b>186</b> (1960).  See also C.145.	

### Lectures and publications

- 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.21 'Energy storage based on electrolysers and hydrogen-oxygen fuel cells', paper at United Nations Conference on New Sources of Energy, Rome, 21-31 August 1961.
- 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.
- C.22, C.23 'Fuel Cells', paper at London branch of Institution of Plant Engineers, 5 December 1961. *J. Inst. Plant Eng.* **8** (1963).  
  
See also C.150.  
  
Typescript and manuscript drafts. 2 folders.
- C.24-C.29 'Fuel Cells', paper at United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas, Geneva, 4-20 February 1963.
- C.24-C.26 Correspondence and papers *re* arrangements. 3 folders.
- C.27-C.29 Manuscript and typescript drafts of paper. 3 folders.

**Lectures and publications**

- C.30-C.33 'The Medium Temperature Hydrogen/Oxygen (Air) Cell', paper at American Institute of Chemical Engineers meeting, New Orleans, 13 March 1963. Published in *Chemical Engineering Progress* technical manual.
- 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.
- C.34-C.44 'The High Pressure Hydrogen Oxygen Cell' (with A.M. Adams & R.G.H. Watson). In *Fuel Cells* (ed. W. Mitchell, Jr). Academic Press, New York. 1963.
- '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, C.46 Lecture on the engineering aspects of fuel cells, Royal Military College of Science, Shrivenham, 11 March 1964.
- C.45 31pp duplicated typescript + list of slides.
- C.46 23pp manuscript draft + list of slides.
- C.47 Paper on energy storage prepared for Institution of Electrical Engineers, London, 2 March 1965.
- 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.

### Lectures and publications

- C.48, C.49 'Progress review no. 57: fuel cells'. *J. Inst. Fuel*, September 1965.
- C.48 Correspondence 1964-1965.
- C.49 30pp typescript + references.
- C.50, C.51 'Some engineering aspects of the hydrogen oxygen fuel cell', paper at an American Chemical Society symposium on Fuel Cells, Atlantic City, New Jersey, September 1965. In *Hydrocarbon fuel cell technology* (ed. B.S. Baker). Academic Press, New York. 1965.
- See also F.18-F.22.
- C.50 Correspondence *re* arrangements.
- C.51 Manuscript drafts.
- C.52, C.53 'Some engineering aspects of fuel cells', article for Department of Education and Science periodical for fifth and sixth form science students. 1966.
- 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.
- Correspondence *re* arrangements only.
- C.55-C.59 'Lecture for Sheffield & Coventry and G.E.C.'. Contents of Bacon's folder so inscribed divided into five for ease of reference: correspondence, notes and drafts. 1965-1967.
- 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.

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### Lectures and publications

- /...
- 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.
- Bacon suggested J.C.H. Hart of Energy Conversion Ltd for Coventry and T.M. Fry of Energy Conversion Ltd for G.E.C.
- 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.
- C.60-C.62      'Energy storage using fuel cells', paper at Institution of Electrical Engineers colloquium on A New Look at Energy Storage, London, 23 May 1966.
- 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.
- C.63            Joint Professional Group meeting on Novel Processes for Energy Conversion and Storage, Institution of Electrical Engineers, London, 9 January 1967.
- Bacon was invited to attend and contribute to the discussion.
- Invitation, abstract of introductory remarks by D.P. Gregory, Bacon's notes of meeting.

### Lectures and publications

- C.64-C.67 'Fuel Cells, Past, Present and Future', the Edgar Fahs Smith Memorial Lecture, University of Pennsylvania, 16 March 1967. In *Electrochimica Acta* **14** (1969).
- 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.
- C.68 Institution of Electrical Engineers Colloquium on Electric Cars, London, 21 April 1967.
- 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-C.73 'Fuel Cells: past, present and future', paper at Materials Science Club informal meeting on materials for fuel cells and high energy density rechargeable batteries, The City University, London, 19-21 February 1968.
- 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.

**Lectures and publications**

- C.72                      Manuscript draft and notes *re* lecture.
- C.73                      Bacon's manuscript notes on meeting.
- C.74                      'Power for Apollo', transcription of a recording for BBC Radio, 7 July 1969.  
See also C.154.  
13pp duplicated typescript.
- C.75, C.76                'Fuel Cells', lecture at Department of Education and Science Engineering Summer School, Huddersfield College of Education (Technical), 16 July 1969.
- C.75                      Correspondence *re* arrangements, programme.
- C.76                      44pp typescript of lecture.
- C.77-C.80                'A historical and general survey of the problems associated with fuel cell design and construction', lecture at two-day course on Fuel Cells (Theory and Applications), Woolwich Polytechnic, London, 9 December 1969.
- 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.

### Lectures and publications

- 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-C.89            'Fuel Cells', public lecture at meeting of British Association, Swansea, 7 September 1971.
- 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-C.93            'High Temperature Aqueous Fuel Cells', lecture at International Conference on High Temperature High Pressure Electrochemistry in Aqueous Solutions, University of Surrey, Guildford, 8 January 1973.
- 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.

### Lectures and publications

- C.94-C.97 'Fuel cells and the growing energy problem, Melchett Lecture, Institute of Fuel, 8 November 1973. In *J. Inst. Fuel* (1974).
- 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.
- C.98-C.100 'Production of hydrogen by hydrolysis', paper at Symposium on Prospects for the Hydrogen Economy, Queen Mary College, University of London, 6 June 1974.
- 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.
- C.101 'Energy Storage based on Fuel Cell Principle', lecture at Architectural Association School of Architecture, London, 12 June 1974.
- Manuscript draft of lecture; brief correspondence 1975.

**Lectures and publications**

- C.102-C.105 'The production and use of synthetic fuels in military applications', *J. R. Utd Services Inst. Defence Stud.* (1974).
- 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-C.109 'Fuel cells' lecture in a series on research problems related to energy, Engineering Laboratory, Cambridge, 21 November 1974.
- 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.

### Lectures and publications

- C.111-C.117 'The development and practical application of fuel cells', Bruno Breyer Memorial Lecture at the Fourth Australian Electrochemistry Conference, Flinders University of Southern Australia, Adelaide, February 1976. (Published in the proceedings of the conference: *Trends in electrochemistry*. Plenum Press 1977).
- Bacon also gave a lecture at Perth during his Australian visit.
- For photographs taken at the conference see H.4.
- C.111, C.112 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.

### Lectures and publications

- 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.
- C.124 'The Development and Practical Application of Fuel Cells', talk at Department of Physical Chemistry Colloquium, University of Cambridge, 17 February 1981.  
  
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.128-C.144 'Publications I'. Contents of Bacon's binder so inscribed divided into seventeen for ease of reference. 1952-1960.
- C.128 1952-1953.
- C.129 1954 January - March.

**Lectures and publications**

- 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.133                    1955 January - June. Includes advance copy of article for McGraw Hill *World News* entitled 'Bigger and Better Fuel Cells on the Way'.
- 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*.

### Lectures and publications

- 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).
- C.145-C.156            'Publications II'. Contents of Bacon's binder so inscribed divided into twelve for ease of reference. 1960-1969.
- C.145                    1960 January - June. Includes typescript drafts of article for *Nature* based on Bacon's Royal Institution evening discourse (see C.9-C.14).
- C.146                    1960 July - December. Includes typescript copy of article by B.C. Lindley on 'Direct electricity generation by fuel cells' and duplicated typescript of lecture by P.W. Jones to the Birmingham Electric Club on 'The fuel cell - A logical development in the conservation of natural resources'.
- C.147                    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.
- C.148                    1961 July - December. Includes 'brief summary' of lecture for National Physical Laboratory and 'summary of lecture' for Associated Electrical Industries (Rugby) Limited.
- C.149                    1962 January - March.
- C.150                    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.
- C.151                    1962 May - September. Includes drafts for Bacon's article in *World Energy, a Financial Times Survey*.

### Lectures and publications

- C.152 1963-1965. Includes drafts of 'Three minute statement on fuel cells for a weekly programme in the USA' recorded by Central Office of Information, September 1964.
- C.153 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.
- C.154 1969 February - June. Includes transcription from a recording for BBC Radio entitled 'To the moon and back' (see C.74).
- C.155 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-C.163 'Publications III'. Contents of Bacon's binder so inscribed divided into seven for ease of reference. 1970-1991.
- 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.158 1971-1973.
- C.159 1974-1976.
- C.160 1979. Includes letter from Bacon to the *Financial Times*, published under the title 'Development of the hydrogen fuel cell', 12 April.
- C.161 1980.

**Lectures and publications**

C.162 1981.

C.163 1982-1983, 1987, 1991.

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

C.164-C.168 Off-prints etc of Bacon's publications 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 PATENTS**

**D.1-D.109**

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.

- D.1 '1. Patent 667,298 Twin-Pore Electrodes'. Contents of binder so inscribed.
- The British patent specification is entitled 'Improvements relating to galvanic cells and batteries'. The application date is given as 8 June 1949.
- D.2-D.5 '2. Patent B.P. 725,661 USP 2,716,670 Inhibiting Corrosion'. Contents of binder so inscribed, divided into four for ease of reference.
- The British patent specification is entitled 'Improvements relating to electric batteries'. The application date is given as 16 January 1953.
- D.6-D.13 '3. Patent 25802/56 Inhibiting Corrosion in Electrolysers'. Contents of binder so inscribed, divided into eight for ease of reference.
- 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.
- D.14-D.20 '4. Patent 25801/56 "Dished Plate Electrode"'. Contents of binder so inscribed, divided into seven for ease of reference.
- 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.
- D.21 '5. Patent 14221/57 Electrode Sintering Conditions'. Contents of binder so inscribed.
- The provisional specification is entitled 'Improvements relating to electric cells. The application dates from 1957.

### Patents

- D.22-D.27 '6. Patent Fuel Cell Details B.P. 822,086 U.S. 731,263'. Contents of binder so inscribed, divided into six for ease of reference.
- The British patent specification is entitled 'Improvements relating to electrical batteries'. The application date is given as 3 May 1957.
- D.28-D.32 '7. Patent 19691/58 Electrode Porting Arrangement'. Contents of binder so inscribed, divided into five for ease of reference.
- 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.
- D.33-D.37 '8. Patent 34127/58 Electrode with Feathered Edges'. Contents of binder so inscribed, divided into five for ease of reference.
- 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.
- D.38-D.43 '9. Patent 22436/59 Oxygenation & Activation of Oxygen Electrodes'. Contents of binder so inscribed, divided into six for ease of reference.
- 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.
- D.44, D.45 '10. Patent 29073/59 Concentration Cell Effect'. Contents of binder so inscribed, divided into two for ease of reference.
- 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.
- D.46-D.48 '11. Patent 30806/59 Very strong electrolyte'. Contents of binder so inscribed, divided into three for ease of reference.
- 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.

### Patents

- D.49-D.58 '12. Patent 31099/59 Trapped Electrolyte'. Contents of binder so inscribed, divided into ten for ease of reference.
- The British patent specification is entitled 'Improvements relating to fuel cells'. The application date is given as 11 September 1959.
- D.59-D.68 '13. Patent 34692/59 Fuel Cell Desiccants'. Contents of binder so inscribed, divided into ten for ease of reference.
- 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.
- D.69, D.70 '14. Patent "Water Injector Hydrogen Circulation" 2644/60'. Contents of binder so inscribed, divided into two for ease of reference.
- 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.
- D.71-D.75 '15. Patent "Temperature Control"'. Contents of binder so inscribed, divided into five for ease of reference.
- 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.
- D.76-D.78 '16. Patent Electrodes made from pre-sintered sheet'. Contents of binder so inscribed, divided into three for ease of reference.
- The British patent specification is entitled 'Improvements relating to hydrogen/oxygen cells'. The application date is given as 24 July 1961.
- D.79-D.86 '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.

### Patents

- D.87-D.90            '“18. Patent Egg box electrode” 1960-1963 5581/62'. Contents of binder so inscribed, divided into four for ease of reference.
- 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            '19. Patent Three Layer Electrode'. Contents of binder so inscribed, divided into four for ease of reference.
- 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           '20. Patent “PD activated Electrode”'. Contents of binder so inscribed, divided into six for ease of reference.
- The British patent specification is entitled 'Improvements relating to fuel cells'. The application date is given as 29 December 1961.
- D.101                '21. Patent Cyclohexane cell'. Contents of binder so inscribed.
- The provisional specification is entitled 'Improvements in and relating to electricity supply systems'. The application dates from 1963.
- D.102                '22. Patent Carbon fibre electrode'. Contents of binder so inscribed.
- 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           'Patent (Misc) & proposed new applications'. Contents of binder so inscribed, divided into four for ease of reference. 1960-1967.
- Includes papers, 1964-1967, relating to the opposition by the Leeson Corporation of a British patent application by the Societe des Accumulateurs Fixes et de Traction. Bacon advised the Leeson Corporation on technical aspects of the opposition.
- D.107                'Patent Specs:'. Contents of binder so inscribed.

**Patents**

D.108, D.109

'Fuel cell patents'. Contents of binder so inscribed, divided into two for ease of reference.

**SECTION E**

**SOCIETIES AND ORGANISATIONS**

**E.1-E.33**

E.1-E.5	AERONAUTICAL RESEARCH COUNCIL
E.6, E.7	COUNCIL OF ENGINEERING INSTITUTIONS
E.8-E.16	ELECTROCHEMICAL SOCIETY, INC.
E.17	INSTITUTE OF FUEL
E.18-E.20	INSTITUTION OF MECHANICAL ENGINEERS
E.21	ROYAL INSTITUTION
E.22-E.32	ROYAL SOCIETY
E.33	ROYAL SOCIETY OF ARTS

### Societies and organisations

- 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**
- E.6                              McRobert Award application 1969-1971.
- See also B.838.
- E.7                              Establishment of a Fellowship of Engineering 1976.
- 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.



**Societies and organisations**

- 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.32**                      **ROYAL SOCIETY**                      **1972-1991**
- Bacon gave a Review Lecture at the Royal Society on the Development and Practical Application of Fuel Cells, 1 February 1973. *Proc. Roy. Soc. Lond. A* **334**, 427-452. See also G.33, G.34.
- Bacon was elected to the Fellowship of the Royal Society in 1973. See A.28-A.31.
- 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.29-E.32                      General correspondence and papers, 1973-1991.
- E.29                      1973-1976.
- E.30                      1977-1979.
- E.31                      1980-1984.
- E.32                      1985, 1987-1989, 1991.

**Societies and organisations**

**E.33                      ROYAL SOCIETY OF ARTS                      1970-1984**

Bacon was elected a Fellow of the Society in 1970.

**E.33                      Correspondence and papers, 1970-1971, 1976, 1979, 1984.**

Includes papers *re* Symposium on Renewable Sources of Energy in 1976.

SECTION F	VISITS AND CONFERENCES	F.1-F.38
F.1-F.8	5th World Power Conference, Vienna, 17-23 June 1956.  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 <i>re</i> 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.8	Correspondence arising, July 1956 - August 1957, 1958, 1960.	
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 <i>re</i> fuel cell interests of the Universal Winding Company, Cranston, Rhode Island.	

### Visits and conferences

- 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, F.13 'Report on Visit to U.S.A., from July 14th-31st. 1961; to see the Present State of Development of Fuel Cells'.
- 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.

### Visits and conferences

- F.17                      Invitation declined:
- Sixth AGARD [Advisory Group for Aeronautical Research and Development] Combustion and Propulsion Colloquium on 'Energy Sources and Energy Conversion', Cannes, France, 16-20 March 1964.
- F.18-F.22                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 Leeson-Moos and Pratt & Whitney.
- F.18                      Correspondence *re* arrangements.
- F.19                      Letters of thanks.
- F.20                      Manuscript notes *re* arrangements, American Chemical Society meeting, etc; business cards received by Bacon during visit.
- F.21                      Small format notebook used for 'Sep. 1965 Miscellaneous Notes'.
- F.22                      Small format notebook used for 'Notes for Speech'.
- F.23, F.24                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 Leeson-Moos, Pratt & Whitney and the General Electric Company.
- F.23                      Correspondence *re* arrangements, correspondence arising.
- F.24                      Small format notebook used for 'Miscellaneous Notes Visit to U.S.A. March 1967'.

### Visits and conferences

- F.25                    29th AGARD [Advisory Group for Aeronautical Research and Development] Propulsion and Energetics Panel meeting on 'Performance Forecast of Selected Static Energy Conversion Devices', Liège, Belgium, 12-16 June 1967.
- Correspondence *re* arrangements, programme, attendance list etc.
- Folder also includes manuscript notes *re* AGARD meeting to be held in Brussels, October 1967
- F.26-F.28            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.
- F.28                    'Visit to Pratt and Whitney, Hartford, Connecticut, Institute of Gas Technology, Chicago and the Argonne National Laboratory', limited distribution report (Energy Conversion Ltd and United Kingdom Atomic Energy Authority) by G.T. Rogers, July 1971.
- F.29                    Fourth International Symposium on Fuel Cells, Antwerp, Belgium, 2-3 October 1972.
- Bacon's manuscript notes on conference papers or abstracts of papers, dated 24 October 1972.
- F.30                    Symposium on Prospects for the Hydrogen Economy, Queen Mary College, University of London, 6 June 1974.
- Bacon gave a paper of the production of hydrogen by hydrolysis (see C.98-C.100).
- Bacon's manuscript notes on proceedings.
- F.31, F.32            Joint Chemical Society/Society of Chemical Industry Conference on the Electrolytic Production of Hydrogen, City University, London, 25 and 26 February 1975.

**Visits and conferences**

- 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].
- F.34 International Conference on Future Energy Concepts, Institution of Electrical Engineers, London, 30 January - 1 February 1979.  
Brief correspondence, list of participants, Bacon's manuscript notes on proceedings.
- F.35-F.38 5th World Hydrogen Energy Conference, Toronto, Canada, 15-20 July 1984.  
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.

**SECTION G**

**CORRESPONDENCE**

**G.1-G.259**

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	MISCELLANEOUS CORRESPONDENCE
G.252-G.259	REFERENCES AND RECOMMENDATIONS

**Correspondence**

- G.1-G.43A**                      **ALPHABETICAL BY CORRESPONDENT**                      **1952-1993**
- Contents of Bacon's files with named individuals.
- 
- G.1-G.25**                      **Evans, U.R.**                      **1965-1977, 1980**
- 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                      1966 January - February. Includes copy of report 'A Practical Fuel Cell. Tentative suggestions by U.R. Evans' sent to J.G. Waller of the National Research Development Corporation (NRDC), February 1966.
- 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                      1966 April - June. Includes Appendix to Evans's report 'An Economic Fuel Cell'.
- 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                      1967. Includes Bacon's notes of meetings with Evans, copies of Evans's letters to Tantram and J.C.H. Hart of ECL, synopsis of talk by Evans for fuel cell symposium held at ECL and draft paper for *Nature* based on talk 'The Cathodic Reduction of Oxygen in Fuel Cells and Corrosion Cells'.

### Correspondence

- 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.8 1968 March. Includes copies of Evans's reports 'The Fuel Cell in Power Generation' and 'A General-Purpose Fuel Cell'.
- 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.10 1968 July - September. Includes copies of Evans's report 'Proposed Iron-Bromine Cell' and copies of his letters to Tantram and A.B. Hart of the Central Electricity Research Laboratories.
- 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'.

### Correspondence

- 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.'
- G.17 1970 September - December. Includes copy of Evans's report 'A light lead accumulator for electric cars and copies of Evans's letters to J.G. Bannochie of ECL and M.A. Pound of Le Carbone (G.B.).
- G.18 1971 January - March.
- G.19 1971 April. Includes copy of Evans's report 'The Problem of the Light Accumulator for Vehicles'. See G.20 for later version of this report.
- G.20 1971 May. Includes further version of Evans's report 'The Problem of the Light Accumulator for Vehicles'. See also G.19.
- G.21 1971 June. Includes copy of Evans's report 'Possible improvements of the Bacon Cell' and copy of Evans's letter to G.T. Rogers of the Atomic Energy Research Establishment, Harwell.
- G.22 1971 July - November. Includes copy of Evans's letter to Rogers *re* the end of his Consultancy in September and letter to Tantram sending copy of report on the problem of the light accumulator for vehicles. See G.20.
- G.23 1972-1974. Includes copies of Evans's letters to B.B. Hundy of the Cranfield Institute of Technology and J.R. Maddox, Maddox Editorial Ltd.
- G.24 1975. Includes copies of Evans's letters to A.H. Cottrell, Master, Jesus College, Cambridge and R. Eden, Cavendish Laboratory, Cambridge.
- G.25 1976-1977, 1980. Includes copy of Evans's letter to Sir Christopher Cockerell *re* Cockerell's letter to *The Times*, 21 December 1976, *re* solar, wind and wave sources of power.
- 1980 item is obituary of Evans from *The Times*.

### Correspondence

- | <b>G.26-G.38A</b> | <b>Fry, T. M.</b>   | <b>1952-1988</b> |
|-------------------|---|------------------|
|                   | <p>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.</p> <p>See also B.215-B.228.</p> |                  |
| G.26              | 1952-1959.  |                  |
| G.27              | 1961, 1963-1966. Includes text by Fry of proposed lecture on 'Fuel Cells' at a Symposium on Direct Conversion, Woolwich Polytechnic, London, 29-30 March 1965.  |                  |
| G.28              | 1967-1968. Includes 'Fuel Cell Long Range Policy and Planning. Detailed breakdown of Phase 1' signed by Fry and dated 31 December 1968.   |                  |
| G.29              | 1969-1971.  |                  |
| G.30              | 1972 February - April. Includes correspondence and Bacon's manuscript notes <i>re</i> article for <i>New Scientist</i> on non-fossil chemical fuels.  |                  |
| G.31              | 1972 May. Includes correspondence <i>re</i> <i>New Scientist</i> article and 'Draft of 14th May 1972' and 'Draft of 22nd May 1972' of the article entitled 'Hydrogen from Nuclear Energy - The Next Major Fuel?'.<br><br>   |                  |
| G.32              | 1972 June. Includes 'Draft of 1st June 1972' and 'Draft of 10 June 1972' of <i>New Scientist</i> article.   |                  |
| G.33              | 1972 July - December. Includes list of names and addresses of those to be sent <i>New Scientist</i> reprints and correspondence <i>re</i> preparation of Bacon's 1973 Review Lecture on Fuel Cells for the Royal Society (see E.22-E.28, G.34).   |                  |

### Correspondence

- 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
- G.38 1977-1982, 1985-1988.
- G.38A 'Fuel Cell Power Sources their development-status and prospects' review paper prepared by Fry for the Senior Energy Adviser, United Nations Energy Programme, 12 October 1974.
- G.39 Marshall, A.G.G. 1988, 1991, 1993**
- 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.



**Correspondence**

- |            |   |
|------------|---|
| G.44, G.45 | Lists of expenses, receipts, 1933-1942.<br>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.                                   |

**Correspondence**

- G.58                    1940 September - December.
  
- G.59                    1941 January - March.
  
- G.60                    1941 April - July.
  
- G.61                    1941 August - December.
  
- G.62                    1942 January - February.
  
- 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.

### Correspondence

- G.71                    1945 April - June.  
  
Includes 'Technical Statement Concerning Proposal to develop the Hydrogen - Oxygen Cell', 3pp manuscript dated 23 April 1945.
- G.72                    1945 July, August.  
  
Includes 'The Hydrogen - Oxygen Cell', 6pp manuscript dated 20 August 1945 and 4pp typescript version.
- G.73                    1945 September - December.
- G.74                    1946 January.  
  
Includes 'Technical Statement Concerning Proposal to develop the Hydrogen - Oxygen Cell', 6pp manuscript draft dated 30 January 1946 and 5pp typescript version.
- 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.
- G.79                    1947 January - March.  
  
Includes list of 'sundry expenses' incurred by Bacon November 1946 - March 1947.
- G.80                    1947 April - June.

### Correspondence

- 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.  
Includes lists of expenses, December 1947 - June 1948 and June 1948 - August 1948.
- 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.

### Correspondence

- 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 H<sub>2</sub>-O<sub>2</sub> Cell', 3pp typescript and 'Comments by Mr Bacon on Draft of the Proposed Patent Concerning H<sub>2</sub>-O<sub>2</sub> 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.  
  
Includes list of expenses, July - October 1949, '4. Summary of Performance Achieved', 1p manuscript and 'Lost Current in the H<sub>2</sub>-O<sub>2</sub> Cell. Note by Mr Daniel', 1p typescript.
- G.97                    1949 November.
- G.98                    1949 December.  
  
Includes list of expenses, October - December 1949.
- G.99                    1950 January.

**Correspondence**

- 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.

**Correspondence**

- 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.

### Correspondence

- 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.
- G.127                    1962 January - June.  
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.

**Correspondence**

- 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.136                    1966.
- G.137                    1967.  
  
Includes notes on the literature.
- G.138                    1968.
- G.139                    1969.
- G.140                    1970 January - June.
- G.141                    1970 July - December.
- G.142                    1971 January, May - October.
- 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.

**Correspondence**

- 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.
- G.147                    1973 January - June.
- G.148                    1973 July - December.
- G.149                    1974 January - June.
- G.150                    1974 July - December.
- G.151                    1975 January - June.
- G.152                    1975 July - October.
- G.153                    1975 November - December.
- G.154                    1976 January - June.
- G.155                    1976 July - December.
- G.156                    1977 January - June.
- G.157                    1977 July - December.

### Correspondence

- G.158 1978.
- G.159 1979.
- G.160 1980 April - September.
- G.161 1980 October - December.  
Includes Bacon's manuscript notes of Royal Society meeting on 'Prospects for Industrial Electrochemistry', 10 and 11 December 1980.
- G.162 1981 January - March.
- G.163 1981 April - June.
- G.164 1981 July - September.  
Includes Bacon's manuscript notes *re* 'Electric Vehicle Development Group Fourth International Conference & Demonstration entitled Hybrid, Dual Mode & Tracked Systems. (15th - 16th Sept. 1981)'.
- G.165 1981 October - December.
- G.166 1982 January.
- G.167 1982 February - April.  
Includes Bacon's manuscript notes *re* meeting on fuel cells at the Royal Society, 8 February 1982.
- G.168 1982 May - June.  
Includes 5pp typescript draft (not by Bacon) 'Hydrogen as an automotive fuel', 8 May 1982.

**Correspondence**

G.169	1982 July - December.
G.170	1983 January - April.
G.171	1983 May - June.
G.172	1983 July - December.
G.173	1984.
G.174	1985 January - June.
G.175	1985 July - December.
G.176	1986 January - June.
G.177	1987 January - April.
G.178	1987 May - August.
G.179	1987 September - December.
G.180	1988 January - June.
G.181	1988 July - December.
G.182	1989.

**Correspondence**

G.183 1990 January - June.

G.184 1990 September - December.

G.185 1991

**G.186-G.221 PERSONAL CORRESPONDENCE 1952-1991**

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.186 1952-1953.

G.187 1954.

G.188 1955 January - August.

G.189 1955 September - December.

G.190 1956-1957.

G.191 1958-1959.

G.192 1960.

G.193 1961.

### Correspondence

- G.194                    1962.  
  
Includes correspondence *re* Bacon's 'Service Agreement' with Energy Conversion Limited.
- G.195                    1963-1964.
- 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.
- G.200                    1967 January - February.  
  
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.203                    1969 January - June.
- G.204                    1969 July - October.  
  
Includes correspondence *re* visit of Apollo 11 astronauts to the UK.

### Correspondence

- 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.
- G.210                    1973 January - February.  
  
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.214                    1976.

**Correspondence**

G.215 1977.

G.216 1978.

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

G.217 1979.

G.218 1980-1983.

G.219 1984-1986.

G.220 1987-1988.

G.221 1989-1991.

**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.

G.222 1953-1954.

G.223 1955.

G.224 1956-1957.

G.225 1958.

**Correspondence**

- G.226 1959 January - March.
- G.227 1959 April - June.
- G.228 1959 July - October.
- G.229 1959 November - December.
- G.230 1960 January - March.
- G.231 1960 April - June.
- G.232 1960 July - September.
- G.233 1960 October - December.
- G.234 1961 January - March.
- G.235 1961 April - May.
- G.236 1961 June.  
Principally correspondence and papers *re* British Hydromechanics Research Association Open Days.
- G.237 1961 July - September.
- G.238 1961 October - December.

**Correspondence**

G.239	1962 January - April.
G.240	1962 May - December.
G.241	1963 January - May.
G.242	1963 July - December.
G.243	1964 January - June.
G.244	1964 July - December.
G.245	1965.
G.246	1966.
G.247	1967-1968.
G.248	1969 January - June.
G.249	1969 July - December.
G.250	1970.
G.251	1971-1973.

**Correspondence**

<b>G.252-G.259</b>	<b>REFERENCES AND RECOMMENDATIONS</b>	<b>1954-1990</b>
G.252-G.258	Contents of Bacon's 'Personnel' files: correspondence and papers <i>re</i> appointment of research workers to the fuel cell project and references and recommendations for researchers in the fuel cell field. 1954-1988.	
G.252	1954.	
G.253	1956 -1960.	
G.254	1961 - 1962.	
G.255	1963 - 1969.	
G.256	1971 - 1972.	
G.257	1973 - 1975.	
G.258	1977 - 1979, 1982, 1985, 1988.	
G.259	Recommendations etc for Japan Prize, 1984-1990.	



**Non-print material**

**H.1-H.23**

**PHOTOGRAPHS**

H.1-H.7	People
H.8-H.14	Equipment
H.15-H.19	Lectures and publications
H.20-H.23	Publicity material

**H.1-H.7**

**People**

**ca 1950s-ca 1991, n.d.**

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.6	ca 1991.

**Non-print material**

H.7	Undated photographs, including photographs from 1950s.	
<b>H.8-H.14</b>	<b>Equipment</b>	<b>1957-1959, n.d.</b>
H.8-H.11	Photographs and drawings of equipment, identified by annotations on envelopes, labels etc.	
H.8	1958-1959.	
H.9-H.11	N.d. 3 folders.	
H.12-H.14	Unidentified photographs.	
H.12	May 1957.	
H.13, H.14	N.d. 2 folders.	
<b>H.15-H.19</b>	<b>Lectures and publications</b>	<b>1956-1978</b>
	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 <i>The Times Science Review</i> , 1956.	
H.16	Small proofs for American Chemical Society lecture, June 1959.	



**Non-print material**

**H.24-H.26                      MISCELLANEOUS                      1955-1956, 1959, n.d.**

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', 1959.

H.26                      Box of slides, n.d.

## INDEX OF CORRESPONDENTS

ABE, Satsuki	G.173
ACADEMIC PRESS, INC	C.34
ACCUMALATOREN-FABRIK AKTIENGESELLSCHAFT	B.938, B.939, B.976, B.982
ADAM, Neil Kensington	B.638
ADAMS, A.M.	B.973, B.1163-B.1165, C.34, C.36, C.40, C.44, C.134, F.1, F.4, G.107, G.108, G.116
ADRIAN, Edgar Douglas, 1st Baron	A.29
AERONAUTICAL RESEARCH COUNCIL	B.340, B.342, E.1-E.5
AGAR, John Newton	B.142, B.143, B.333, B.957, B.961, C.132, D.47, D.48, G.75, G.147, G.183, G.186, G.197, G.224, G.244 See also B.113, B.145, C.83, G.127, G.134, G.161, G.230
AGNEW, Hugh Ladas	G.202
AGRELL, S.O.	G.208
AIR RESEARCH AND DEVELOPMENT COMMAND (EUROPEAN OFFICE)	B.978
ALDOUS, Alan	See G.183
ALEXANDER, Paul J.	G.148, G.150
ALKALINE BATTERIES LTD	B.937, B.939, B.941, B.973, G.103-G.108
ALLIBONE, Thomas Edward	See B.144
ALLIS-CHALMERS MANUFACTURING CO.	B.875, C.34, G.135 See also G.230
ALLMAND, Arthur John	G.47, G.61, G.67, G.68, G.71, G.72, G.75, G.77 See also B.55, B.127, G.57
ALLMAND, Christopher	A.36, C.113
ALLMAND, Dorothy	C.155
AMERICAN CHEMICAL SOCIETY	C.5
AMERICAN CYANAMID CO.	B.1091-B.1093, C.31

**Index of correspondents**

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS	C.30, C.31
ANDERSON, John, 1st Viscount Waverley	G.187
ANDERSON, John T.	B.875-B.877, F31
ANDERSON, John Stuart	B.942
ANDREW, Maurice R.	G.147, G.148
ANGLIA TELEVISION LTD	C.142
ANGUS, H.C.	B.1171
APPLEBY, A. John	B.995, C.113, E.9, E.10, E.14, G.147, G.156-G.158, G.160-G.162, G.164, G.170-G.173, G.182 See also G.176
APPLETON, Sir Edward Victor	G.62, G.64
A.P.V. CO. LTD	G.103, G.104, G.109
ARCHER, Mary Doreen (Lady Archer)	G.158, G.159, G.164, G.177, G.183, G.220 See also E.21, G.162
ARMOUR RESEARCH FOUNDATION	B.636, B.637, B.894
ARNOLD, H.R.	B.636
ARTHUR D. LITTLE INC.	B.973, B.974
ASEA ALLMANNA SVENSKA ELEKTRISKA AKTIEBOLAGET	B.638, G.136
ASSOCIATED ELECTRICAL INDUSTRIES (MANCHESTER) LTD	B.638, G.232-G.234
ASSOCIATED ELECTRICAL INDUSTRIES (RUGBY) LTD	C.148
ATOMIC ENERGY OF CANADA LTD	B.978
ATOMIC ENERGY RESEARCH ESTABLISHMENT	B.637, B.942, B.1054- B.1056, B.1145, B.1176- B.1181, E.9, E.10
AUSTIN CROMPTON PARKINSON ELECTRIC VEHICLES LTD	B.982, B.983
AUSTIN MOTOR CO. LTD	B.972, B.978
BACKHOUSE, J.	B.969

**Index of correspondents**

BACON, Anthony W.	G.49 See also G.192
BACON, Barbara	A.32, A.33, C.112, G.209, G.210 See also B.1109, B.1181, G.146, G.192, G.197, G.204
BACON, Charles	G.213
BACON, Sir Edmund Castell, 13th and 14th Baronet	G.186-G.193, G.195-G.197, G.199, G.206, G.216, G.218, G.219
BAGLEY, Donald	B.948
BAJ VICKERS LTD	B.1039 See also BRISTOL AEROJETS LTD
BAKER, Bernard S.	C.50
BAKER, Henry E.	B.1038, B.1039, B.1050, B.1153, G.56, G.61, G.63, G.64, G.71, G.73, G.77, G.78, G.80, G.82-G.84, G.88, G.91, G.95, G.99- G.102, G.109, G.173, G.177, G.179, G.186, G.206, G.208, G.210, G.212, G.216-G.221
BAKER, John Fleetwood, Baron	C.133, F.37, G.75, G.92, G.93, G.217
BANNOCHIE, J.G.	B.1056, B.1177, B.1178, G.147, G.155, G.156, G.213 See also G.17
BARAK, Monty	B.933, B.938-B.941, B.973, C.31, C.48, C.56, G.107, G.108, G.149, G.210 See also B.621, C.55, C.60, F.34, G.148
BARNARD, K.N.	G.224
BARNES, Robert S.	B.1056
BARNES, S.C.	G.129, G.130
BARRER, Richard Malling	G.252
BARTLEY, George A.S.	G.50
BATTELLE CENTRE DE RECHERCHE DE GENÈVE	B.986, B.1045, B.1094

**Index of correspondents**

BATTELLE INSTITUTE LTD	G.143, G.144
BATTELLE MEMORIAL INSTITUTE	B.620, G.235, G.236
BAUMGARDNER, Fanning M.	B.280, G.191, G.253 See also B.277
BAWN, C.E.H.	G.252
<i>BEAMA JOURNAL</i>	B.136, C.128-C.130, C.132, C.137, G.138, G.223, G.233
BEARD, James R.	G.65
BECCU, K.D.	B.1045, B.1048, B.1094
BEECH AIRCRAFT CORPORATION	B.1014
BEEN, Julian F.	A.35
BEÉR, J.M.	C.55, C.56
BELLS ASBESTOS AND ENGINEERING LTD	B.962, B.963, G.60, G.62, G.79, G.80
BENNION, Douglas N.	E.8, E.14
BERKOVITCH, I.	C.139
BERL, Walter G.	B.916
BIDWELL, R.G. Shelford	C.102
BIEGLER, T.	C.112
BILLERBECK, W.J.	See B.1062
BILSLAND, Sir Steven	G.68, G.69
BISCHOFF, Alexander G.	G.238, G.239
BLACK, William Rushton, Baron	B.299
BLAKE, Alan R.	B.1098
BLOMGREN, Erik A.	B.639, C.151

**Index of correspondents**

BOCKRIS, John O'M.	B.1008, B.1011, B.1012, B.1034, B.1038, B.1056, C.64, C.65, C.111-C.113, F.18, F.19, F.37, G.135, G.140, G.141, G.144, G.145, G.148-G.150, G.174-G.183, G.188, G.189 See also B.153
BODE, H.	B.637, B.938, B.939, B.976, B.978, G.225 See also B.285
BOEING AIRPLANE CO.	G.226
BOLDRINI, Marcello	C.148
BORMAN, Frank	G.206
BOSCAWEN, Evelyn Hugh, 8th Viscount Falmouth	G.64
BOSCAWEN, Robert	G.218
BOWEN, C.E.	G.71
BOWERS, J.E.	B.1078, G.190 See also B.94, B.96, B.100, B.101, B.106, B.109, B.110
BOWLBY, Sir Anthony Hugh Mostyn, 2nd Baronet	B.665
BOYD, Mark Lennox-	B.1067, B.1070
BP CHEMICAL CO.	G.128
BP VENTURES	B.1077
BRAGG, Stephen Lawrence	B.1012
BRAGG, Sir William Lawrence	C.9, C.129, G.71, G.72, G.75, G.206
BRAUNHOLTZ, W.T.K.	G.65
BREGMAN, J.I.	B.894, G.128, G.129
BRIGHT, James	G.248, G.249
BRISTOL AEROJET LTD	B.1016, B.1036, B.1038 See also BAJ VICKERS LTD
BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE	C.82, C.83

**Index of correspondents**

BRITISH BROADCASTING CORPORATION	C.140-C.144, C.153-C.158, See also B.149
<i>BRITISH CHEMICAL ENGINEERING</i>	C.139
BRITISH COAL UTILISATION RESEARCH ASSOCIATION	G.51, G.67, G.68
BRITISH COUNCIL	G.236
BRITISH ELECTRICAL AND ALLIED INDUSTRIES RESEARCH ASSOCIATION	See ELECTRICAL RESEARCH ASSOCIATION
BRITISH ELECTRICITY AUTHORITY	B.1162, B.1163, G.111, G.119
BRITISH ERMETO CORPORATION LTD	G.111
BRITISH HYDROMECHANICS RESEARCH ASSOCIATION	G.236
BRITISH INSULATED CALLENDER'S CABLES LTD	B.962, B.963
BRITISH OXYGEN CO. LTD	B.620, B.911, B.947-B.950, B.955, B.957, B.1008-B.1010, G.89-G.91, G.96, G.107-G.109, G.118
BRITISH PETROLEUM CO. LTD	B.644, B.645, B.647, B.648, B.650, B.952, B.1061, C.24, C.25, E.14, G.126, G.127
BRITISH RAILWAYS BOARD	B.985
BRITISH ROPES LTD	B.644-B.646, B.662 See also B.649, B.658
BRITISH RUBBER PRODUCERS' RESEARCH ASSOCIATION	B.966
BRITISH SCIENCE & TECHNOLOGY TRUST	B.1131
BRITISH SCIENTIFIC INSTRUMENT RESEARCH ASSOCIATION	G.51, G.54
BRITISH STEEL CORPORATION	B.1056
BRITISH TECHNOLOGY GROUP	B.304, B.306-B.308
BRITISH THOMSON-HOUSTON CO. LTD	B.972, B.975
BRITISH UNITED TRACTION LTD	B.983
BRITISH WELDING RESEARCH ASSOCIATION	B.620, B.945, G.99
BROECK, H. van den	G.162-G.165, G.167, G.170, G.173, G.176, G.184

**Index of correspondents**

BROERS, G.H.J	See G.123
BROOKHAVEN NATIONAL LABORATORY	B.1095, B.1101
BROWN, BOVERI & CO. LTD	B.639, G.126, G.128, G.129, G.136
BROWN, David E.	B.1061, E.14
BROWNE, Benjamin Chapman	G.75
BROWNELL, Lloyd E.	G.227, G.228
BRUNDRETT, Sir Frederick	See G.94
BRUNT, Sir David	B.1164
B.S.A. GROUP RESEARCH CENTRE	B.945, B.946, G.110, G.111, G.116-G.119
BUDDEN, Kenneth George	G.220
BUDENBERG GAUGE CO. LTD	G.49, G.76, G.78, G.84, G.85, G.90, G.91, G.100, G.104, G.111-G.113, G.118, G.119
BURROWS, R.	B.636
BUSSE, James G.	G.226
BXL BAKELITE XYLONITE LTD	B.1023, B.1024
CAIRNS, E.J.	G.135
CALDECOTE, Robert Andrew Inskip, 2nd Viscount	See INSKIP
CALDER, Nigel David Ritchie	C.141
<i>CAMBRIDGE EVENING NEWS</i>	C.158 See also C.163
CAMBRIDGE INSTRUMENT CO. LTD	B.162, G.88, G.112, G.113, G.116, G.119
<i>CAMBRIDGE NEWS</i>	C.152, C.153
CAMBRIDGE UNIVERSITY ENGINEERING SOCIETY	C.148, C.149
CAMERON, Donald S.	B.1117, B.1120, B.1126-B.1131
CAMERON, H. Keith	B.637, B.971, B.972, G.107, G.204, G.226

**Index of correspondents**

CAMPBELL, Wilson William	B.1157, B.1158
C.A. PARSONS & CO. LTD	B.971, C.142, C.143, C.145, C.146, G.47, G.50, G.55, G.56, G.73, G.74, G.101, G.191, G.230, G.231, G.233
CARBORUNDUM CO. LTD	G.115, G.116
CASAZZA, J.A.	B.1062
CENTRAL ELECTRICITY AUTHORITY	B.973, B.1164, B.1165, C.34, C.36, C.40, C.44, C.48, C.134, C.135
CENTRAL ELECTRICTY GENERATING BOARD	B.1096-B.1100
CHAMBERS, H.H.	B.1172-B.1174
CHANDLER, William A.	B.1014
CHAPLIN, Michael R.	G.247
<i>CHEMICAL AND PROCESS ENGINEERING</i>	C.129
<i>CHEMICAL ENGINEERING</i>	G.150
<i>CHEMICAL PROCESSING</i>	C.136
<i>CHEMISTRY IN BRITAIN</i>	C.153
CHESTERFIELD TUBE CO.	B.951
CHESTERS, John Hugh	B.898, C.94, C.95 See also E.17
CHICAGO BRIDGE AND IRON CO.	G.135
CHLORIDE BATTERIES LTD	G.107, G.108
CHLORIDE ELECTRICAL STORAGE CO. LTD	B.621, B.933, B.938-B.940, B.973, G.65, G.69
CHURCHILL, Clementine Ogilvy Spencer-, Baroness	G.209
CITY UNIVERSITY	B.1101-B.1104
CJB CONSTRUCTORS JOHN BROWN LTD	B.1083-B.1086
CJB DEVELOPMENTS LTD	B.876, B.877, B.1123, F.31
CJB (PROJECTS) LTD	B.875

**Index of correspondents**

CLEARE, Michael J.	B.1117
CLEAVER, A.V.	B.1012, B.1014, G.149
CLOVER, Charles	G.181
CLOW, Colin G.	B.1177, B.1178, C.90 See also C.82
COALES, John Flavell	B.1060, E.7, G.200, G.206, G.216
COATES, George L.A.	B.1159-B.1161
COCKERELL, Sir Christopher Sydney	A.30, A.36 See also G.25
COHN, Ernst M.	B.1008, G.138-G.141, G.145-G.157, G.159, G.170, G.174, G.201, G.202
COHN, G.	G.133
COMSAT COMMUNICATIONS SATELLITE CORPORATION	B.1016 See also B.1062
CONNORS, John W. ('Jack')	B.1141-B.1143
CONSIGLIO, Joe A.	G.132
CONSOLIDATED EDISON CO. OF NEW YORK, INC.	B.1120
CONWAY, C.G.	B.1162- B.1165, G.117-G.119
COOKE, Edmund A.	B.1110
COOKSON, Roland	G.69, G.70
COOPER, A.R.	B.1162
CORK, Dennis	G.170-G.172, G.211
CORLETT, Roy C.	B.1065-B.1076, G.180
CORRINGHAM, A.F.M.	B.663-B.665
COSTAIN-JOHN BROWN LTD	B.869, B.870
COTTON, Arthur F.R.	G.187, G.188
COTTON, J.B.	B.1114

**Index of correspondents**

COTTRELL, Sir Alan Howard	A.29 See also G.216
COUNCIL OF ENGINEERING INSTITUTIONS	E.6, E.7
COURTAULD, August	B.969
COX, Sir (Ernest) Gordon	G.251
CRAWLEY, H. John	A.22, B.274-B.287, B.288- B.292, B.295-B.304, B.305, B.309-B.312, B.313-B.319, B.320-B.323, B.339, B.630, C.140, G.238 See also B.1127, C.83
CRITCHLEY, Michael	C.101
CROFT, Anthony J.	B.1039, G.177, G.178
CROMPTON PARKINSON LTD	B.973, B.978
CUNLIFFE, Hon. Geoffrey	G.68
CUNNINGHAM, Max	G.228, G.229
CURTISS-WRIGHT CORPORATION	G.228
DAGLISH, A.G.	G.136
<i>DAILY TELEGRAPH</i>	G.181
DAINTON, Frederick Sydney, Baron	A.31, G.252
DALE, B.W.	G.178
DANCKWERTS, Peter Victor	G.159, G.227, G.236 See also G.197
DAVID BROWN INDUSTRIES LTD	B.635, B.637
DAVIDSON, H.W.	G.200
DAVIDSON, John Frank	G.202, G.212, G.218
DAVIES, C.W.	G.252
DAVIS, William J.	B.942, G.188, G.190 See also B.105, B.109
DAVIS, Sir William Wellclose	G.162, G.164, G.165
DAWSON, H.C.	B.1111, B.1151

**Index of correspondents**

DAWSON, J.K.	B.1180, B.1181
DAY, G.V.	B.1180
DEDRICK, J.H.	B.1034
DE HAVILLAND PROPELLERS LTD	B.972
DELL, R.M.	B.1180, B.1181, E.9, E.10
DENBIGH, Kenneth George	A.28, A.29, C.113
DEUTSCHE BUNDESBAHN	B.872, B.891, B.893
DEWAR, M.J.S.	G.187, G.252
DIXON, Bernard	C.158
DOLLIN, Frank	G.74, G.191
DORAN, Trevor	B.1010
DOUGLAS, David L.	B.639, G.124-G.126, G.130, G.131
DOWSON, Robert	G.66 See also B.44
DOWTY SEALS LTD	B.964
DUCKWORTH, John Clifford	B.289, B.290, B.294, B.298, B.299, B.317-B.319, B.1067
DUNLOP RUBBER CO. LTD	B.966
DUNWORTH, J.V.	C.134, C.136
EAGLE-PICHER INDUSTRIES, INC.	B.1099
EASTERN GAS BOARD	G.116
EDEN, Richard J	G.215
EDEN, Roger	G.168
EDISON SWAN ELECTRIC CO. LTD	B.962-B.964
EDWARDS, Alfred E.	B.342, B.1139, B.1150- B.1152
EDWARDS HIGH VACUUM LTD	B.1005
EGERTON, Sir Alfred Charles Glyn	B.142, G.72-G.76, G.96, G.190

**Index of correspondents**

E.I. DUPONT DE NEMOURS & CO.	B.1116
EISENBERG, Morris	G.225
ELDREDGE, K.R.	G.118, G.119
ELECTRIC BOAT DIVISION (GENERAL DYNAMICS CORPORATION)	B.977
ELECTRIC POWER STORAGE LTD.	G.141
ELECTRICAL RESEARCH ASSOCIATION	B.133-B.147, B.148-B.153, B.910, B.936, B.947, B.971, C.133, F.2, G.74-G.119, G.197
<i>ELECTRICAL REVIEW</i>	C.161-C.163
ELECTRICITY COMMISSION	G.72
ELECTRICITY COUNCIL	B.339, B.1098-B.1100
ELECTROCHEMICAL SOCIETY, INC.	C.146, C.147, D.1-D.6, E.8- E.16, G.224, G.225, G.239
ELENCO N.V.	G.162-G.165, G.167, G.170, G.173, G.176, G.184
ELEY, Daniel Douglas	G.151
ELLINGHAM, H.J.T.	B.43, B.136, B.183, G.54-G.56, G.96, G.97, G.98, G.187
ELLIOTT BROTHERS (LONDON) LTD	G.126, G.132, G.133
EMELÉUS, Harry Julius	G.225
EMMERSON, T.	See C.83
ENERGY CONVERSION LTD	B.644-B.666, B.956, B.1010, B.1011, B.1045, B.1058, C.25, C.82, C.157, E.6, F.18, G.243 See also G.194
ENERGY RESEARCH CORPORATION	B.1017
ENGELHARD INDUSTRIES, INC	B.956, G.133
ENGELHARD INDUSTRIES LTD	G.170
ENGELHARD SALES LTD	G.150, G.152-G.154
<i>THE ENGINEER</i>	C.163

**Index of correspondents**

<i>ENGINEERING MATERIALS AND DESIGN</i>	C.147
ENGLISH ELECTRIC CO. LTD	B.970-B.972, B.975, G.187, G.188, G.231
ERICKSON, Claud R.	G.226-G.228, G.231, G.232
ESPIG, Hans R.	B.665, B.666, B.1058
ESSO DEVELOPMENT CO. LTD	C.136
ESSO PETROLEUM CO. LTD	B.971
EULER, Karl-Joachim	G.137, G.142, G.150, G.159
EURATOM MATERIALS DIVISION	B.1054, B.1056
EVANS, A.G.	G.252
EVANS, G.A.	B.1012
EVANS, Ulick Richardson	A.29, B.942, B.977, C.128, G.1-G.25, G.105
EVANS, William Davis, Baron Energlyn	See G.11
<i>EVENING NEWS</i>	C.145
FAIRLEY, Peter	C.157
FARADAY SOCIETY	G.80, G.224
FELL, John R.	B.1070, G.126, G.132, G.133
FELLGETT, Peter Bemers	A.30
FELLOWS, T.G.	B.301, B.302
FELLS, Ian	A.37, G.159, G.161, G.165, G.166, G.168, G.175, G.176, G.178, G.179, G.184
FENTON, Wilfrid David Drysdale	B.1156
FERGUSON BATTERY CO. LTD	B.916
FESCOL LTD	G.100, G.118
FICKETT, Arnold P.	E.8, E.9, G.154 See also G.156
<i>FINANCIAL TIMES</i>	B.1031, C.151, C.160

**Index of correspondents**

FINNISTON, Sir (Harold) Montague	B.1054, C.82, C.83, G.233
FISHER, Keith R.	B.1077
FLECK, Alexander, 1st Baron	B.1110 See also E.19
FLEISCHACKER, Herman	B.636, B.637, F.9
FLEISCHER, Arthur	G.136, G.137, G.142, G.155
FLETCHER, James C.	A.31
FLUID CONTROL (GREAT BRITAIN) LTD	G.109, G.111
FOLEY, J.R. ('Dick')	B.1147, B.1148, B.1149, C.160, E.10, E.14 See also B.1146, B.1176
FORD, Sir Hugh	E.23
FORD MOTOR CO. LTD	B.991
FORREST, John Samuel	B.973, B.975, B.1162, B.1163, B.1165, C.135, F.1, F.2, F.4, F.6, G.119
FORRESTER, R.D.	G.211, G.212
FOX, Terence R.C.	G.188, G.190 See also B.144, B.145, C.134, C.138, G.112, G.113, G.240, G.241, G.252
FOXBORO-YOXALL LTD	B.929-B.932
FOYLE, Christina	G.210
FRISCH, Otto Robert	G.229
FROST, John Creigh	A.21, B.288, B.309-B.312, B.313-B.319, B.320-B.323, B.324, B.328-B.330, B.331- B.333, B.335-B.342, B.347, B.364, B.423-B.425, B.630- B.632, B.637, B.638, B.872, B.931, B.950, B.983, B.1039, B.1061, B.1111, B.1133, B.1134, B.1137, B.1150- B.1152, B.1181, C.141, D.38, D.59, G.166, G.167,

*l...*

**Index of correspondents**

FROST, John Creigh, cont'd	G.169, G.173, G.184, G.185, G.195, G.200, G.201, G.203, G.209, G.212, G.214-G.218, G.230, G.240, G.248
FRY, Tom M.	B.215-B.228, B.333, B.664, B.898, B.956, B.1009, C.136, C.157, G.26-G.38A, G.81-G.83, G.86, G.87, G.90, G.98, G.101, G.105- G.107, G.111-G.113, G.119, G.198 See also B.54, B.86, B.90, B.181, C.56, C.59, G.166
FUEL CELL CORPORATION	G.130, G.241
FUEL CELLS LTD	B.302, B.303
FURUYA, Nagakazu	G.178, G.179
F.W. BERK & CO. LTD	G.104, G.105, G111-G.113
GAIRDNER, J.O. Hugh	G.219, G.221
GALLAGHER-DAGGITT, G.	G.165-G.167
GARDNER, F.W.	G.73
GARNER, William Edward	G.252
GAS COUNCIL	B.1053, G.136, G.238, G.239
GAS RESEARCH BOARD	G.65
GATES, Sylvester G.	G.193
GEE, G.	G.252
GENERAL ELECTRIC CO. (US)	B.635, B.639, B.954-B.956, C.130, C.160, E.9, E.10, F.23, G.124-G.126, G.130- G.137, G.152, G.173, G.193, G.226, G.233, G.234, G.253 See also C.111, F.9, F.11, F.19
GENERAL ELECTRIC CO. LTD (UK)	B.265, B.637, B.971-B.974, B.981, G.107, G.226
GENERAL MOTORS CORPORATION	B.991
GETTY, J. Paul	G.145

### Index of correspondents

GIBB, Sir Claude Dixon	B.971, G.74, G.101
GIBSON, E.J.	B.1185
GIFFARD, John Anthony Hardinge, 3rd Earl Halsbury	A.29, B.273, B.274, B.1057, B.1058, C.113, G.101 See also B.141, B.145
GIFFEN, E.	G.228, G.229
GILBERT, N.J.	B.1081
GILLIBRAND, Maurice I	C.160, G.197
GKN ROLLED AND BRIGHT STEEL LTD	B.1054
GOSLAND, L.	B.146, B.147
GOSS, F.R.	G.252
GOTT, Howard	G.37, G.38
GRANT, Sir Anthony	G.176
GRAY, John	G.141
GRAY, Peter	G.162
GRAY, Thomas J.	B.638, G.128, G.202
GREAT BRITAIN AND NORTHERN IRELAND	
ADMIRALTY	B.133, B.323, B.1078- B1090A, G.62, G.64, G.65, G.67, G.73, G.74, G.94, G.119, G.186
AIR MINISTRY	G.64
BOARD OF TRADE	G.192
DEPARTMENT OF ENERGY	B.1061, B.1105-B.1107, B.1181, G.185
DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH	B.139, B.591, B.622, B.929, B.930, B.963, B.970, B.981, B.1185, G.47, G.57, G.62-G.64, G.67, G.69-G.71, G.73, G.222
DEPARTMENT OF THE ENVIRONMENT	B.995
DEPARTMENT OF TRADE AND INDUSTRY	B.1108

**Index of correspondents**

HOME OFFICE	G.94, G.95
MINISTRY OF AVIATION	E.1, E.2
MINISTRY OF DEFENCE	B.1071, G.94, G.118, G.176
MINISTRY OF ENERGY	B.1170
MINISTRY OF FUEL AND POWER	B.324, B.871, B.928, B.1162-B.1164, G.70, G.71, G.87, G.106, G.107, G117-G.119
MINISTRY OF LABOUR AND NATIONAL SERVICE	G.57
MINISTRY OF POWER	B.1165
MINISTRY OF SUPPLY	B.1159-B.1161, E.1, G.107, G.108, G.118
MINISTRY OF TECHNOLOGY	B.1009, B.1010, B.1166- B.1169
MINISTRY OF TRANSPORT	B.986
OFFICE OF THE MINISTER OF SCIENCE	G.192
WAR OFFICE	B.639, B.648
GREAVES, C.	C.59
GREEN, Bertie	B.876
GREEN, Robert D.	G.183
GREENWOOD, H.D.	B.957
GREGORY, Derek P.	B.1053, B.1057-B.1061, B.1063, B.1143, B.1144, C.160, E.10, E.14, F.36, G.145, G.157, G.161, G.164, G.165, G.173 See also C.63, C.82, F.19, G.172
GREGSON, John, Baron	B.995 See also B.1071
GRENNESS, M.	B.1003
GRIFFIN, G.J.L.	G.157
GRIMES, Patrick R.	G.135

**Index of correspondents**

GROSS, Nicol	G.99
GROSVENOR, Peter	C.158
<i>GUARDIAN</i>	B.1123, C.163
GUEST KEEN & NETTLEFORDS LTD	B.665
GUGGENHEIM, Ernest Armand	G.252
HAAG, Fred G.	G.228
HAKIM, Jack	G.130-G.133, G.135
HALDANE, Thomas Graeme Nelson	B.970, B.971, F.6, G.58- G.65, G.67, G.71, G.75, G.82, G.116, G.117, G.200-G.202, G.217
HALDEMAN, R.G.	F.23
HALE, HAMILTON & CO.	B.928-B.933, G.110- G.113, G.115, G.119
HALL, J.M.	B.613A
HALSBURY, John Anthony Hardinge Giffard, 3rd Earl	See GIFFARD
HAMMOND, P.	C.149
HAMPSON, P.J.	B.1100
HARDING, Graham	G.47
HARDMAN, John S.	C.121
HARESNAPE, J.N.	B.125, B.644, B.645, B.952, C.25, G.126, G.127
HARLECH TELEVISION LTD	C.156
HART, A.B. ('Tony')	B.1096-B.1100, C.15, C.48 See also C.70, C.83, G.10, G.11
HART, John C.H.	B.644-B.662, B.1045, E.6, F.18, G.6, G.201, G.210, G.211 See also B.125, B.1156, G.194, G.208
HARTLEY, Sir Harold Brewer	C.9, G.111 See also G.100

**Index of correspondents**

HATFIELD, W.H.	G.47
HATSOPOULOS, G.N.	B.978
HAWKER SIDDELEY NUCLEAR POWER CO. LTD	B. 637, B.1109
HAWLEY, Robert	C.145, C.146
HAWTHORNE, E.P.	B.1109
HAWTHORNE, Sir William Rede	A.29, C.129, G.152- G.154 See also B.331, B.1156
HAYES, John	G.215
HEAD WRIGHTSON & CO. LTD	B.871, B.872
HEATH, C.E.	G.146, G.153
HEATH, Sir Edward George Richard	G.183
HEMMING, H.H.	B.971
HENDRIE, H.A.	B.910, B.1143
HENNESSEY, Dennis	B.273-B.280, B.282, B.301, B.309-B.312, B.313, B.320, B.321, B.422, B.423 See also B.285, B.317, B.1133, B.1182
HENRY WIGGIN & CO. LTD	B.910, B.917-B.922, G.48, G.50, G.53, G.58-G.60, G.63, G.72, G.76-G.81, G.84, G.86, G.99, G.105, G.109
HERRMANN, W.	G.130, G.131
HERSHENSON, H.M. ('Herb')	B.1147, B.1148, B.1149
HEWITT, Margaret	F.35
HEYMAN, Horace W.	B.985-B.988, B.991, G.154
HEYWOOD, C. Phillip	B.1081, G.195-G.201, G.213, G.214
HINSHELWOOD, Sir Cyril Norman	G.252
HINTON OF BANKSIDE, Christopher, Baron	E.20
HIRSCHENHOFER, J.H.	G.184

**Index of correspondents**

HOAR, T.P.	B.945, B.973, B.974, C.65
HOARE, James P.	G.13
HODGE, Sir William Vallance Douglas	A.29, G.204
HODGKIN, Sir Alan Lloyd	See E.23
HORSLEY, W.D.	See B.44
HOUGHTBY, W.E.	B.1149 See also B.1148
HOUSTOUN, Robin H.	G.100
HOWARD, Donald Euan Palmer, 4th Baron Strathcona and Mount Royal	B.1068
HOWARD, Sir (Stephen) Gerald	G.192
HULBERT, H.M.	C.31
HUNDY, B.B.	See G.23
HUNTRIDGE, John H.	B.349, B.351, B.364, G.199, G.220, G.221 See also G.39
HURST, W., Martin-	E.15, G.173, G.175
HUTCHISON, Sir James Riley Holt, 1st Baronet	G.189
HUTCHISON, Sir Kenneth	See G.168
ICI IMPERIAL CHEMICAL INDUSTRIES LTD	B.626, B.942, B.947, B.962, B.964, B.970, B.1028, B.1110-B.1116, B.1151, C.147-C.149, G.56, G.68, G.105
IHRIG, Harry K.	C.34
ILFORD LTD	B.1134
IMI IMPERIAL METAL INDUSTRIES	B.1114
<i>INDUSTRIAL AND ENGINEERING CHEMISTRY</i>	C.129, C.131, C.132, C.138, C.143, C.145
INGOLD, Christopher Kelk	G.252
INSKIP, Robert Andrew, 2nd Viscount Caldecote	G.185

**Index of correspondents**

INSTITUT BATTELLE CENTRE DE RECHERCHE DE GENÈVE	See BATTELLE CENTRE DE RECHERCHE DE GENÈVE
INSTITUTE OF ENERGY	B.1119, C.121
INSTITUTE OF FUEL	B.954, B.1030, C.48, C.94, C.95, E.17, G.91, G.157, G.242-G.244, G.246, G.250
INSTITUTE OF PHYSICS	C.140, G.242, G.244
INSTITUTION OF CHEMICAL ENGINEERS	C.129, C.130, C.146
INSTITUTION OF ELECTRICAL ENGINEERS	B.995, B.1061, C.60, C.63, C.68, C.142, C.145, F.34
INSTITUTION OF GAS ENGINEERS	B.951, B.954
INSTITUTION OF MECHANICAL ENGINEERS	C.139, C.143, C.144, E.18- E.20, G.186
INSTITUTION OF PLANT ENGINEERS	C.146-C.151
<i>INTERDISCIPLINARY SCIENCE REVIEWS</i>	C.159-C.163
INTERNATIONAL ASSOCIATION FOR HYDROGEN ENERGY	B.1063, B.1064
INTERNATIONAL ELECTROLYTIC PLANT CO. LTD	B.869, B.874, G.71
INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS	B.1060
INTERNATIONAL NICKEL CO. (MOND) LTD/ INTERNATIONAL NICKEL LTD	B.925-B.927
IRVING, David Blair	B.1153, B.1156
JACOBI, J.W.	G.226, G.227
JACOBY, Robert H.	G.226
JEFFERSON, J.L.	G.57
JENKINS, Jonathan M.	B.649 See also B.1050
JENNY, Ernst	G.126, G.232, G.233

**Index of correspondents**

MILLS, Mark P.	See G.178
MILNE, A.G.	B.1156
MINKOFF, G.J.	G.128
MITCHELL, E.B.	G.233
MITCHELL, Will, Jr	C.34, C.36, C.40, C.44
MOND NICKEL CO. LTD	B.254, B.629, B.858, B.889, B.910, B.917-B.924, B.942, B.945, B.946, B.1002, B.1003, G.52, G.53, G.55, G.60, G.62, G.65, G.77- G.80, G.83, G.85-G.89, G.92, G.94, G.95, G.97, G.99-G.101, G.103-G.105, G.107-G.114, G.116-G.119, G.222, G.223, G.230 See also INTERNATIONAL NICKEL CO. (MOND) LTD
MONTGOMERY, C.W.	F.9
MOORE, John E.	B.1065-B.1067 See also B.1073
MOOS, Anthony M.	B.279, B.317, B.1132, B.1133, B.1135, B.1137- B.1140, B.1142, B.1145- B.1147, B.1148, B.1149, B.1152, B.1182, D.104, E.8, E.14, F.19 See also B.310, B.1144, C.40
MORGAN CRUCIBLE CO. LTD	G.98, G.99, G.120, G.121, G.137
MORRILL, Carle C.	B.1144
MOTOO, Satoshi	G.168, G.169
MOULE, Ian A.	G.182, G.221
MOULIN, E.B.	C.134
MPD TECHNOLOGY LTD	B.1171
M.W. KELLOGG CO.	B.949, B.951
MYERS, F.H.E.	G.127

**Index of correspondents**

NARDINI, G.V.	G.129
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	A.32-A.36, B.1014, B.1148, G.139, G.145, G.146, G.149-G.151, G.174, G.201, G.206, G.209 See also G.36
NATIONAL CARBON CO. (DIVISION OF UNION CARBIDE CORPORATION)	G.120 See also B.1182
NATIONAL COAL BOARD	B.957, B.975, B.976, G.233
NATIONAL PORTRAIT GALLERY	G.215
NATIONAL RESEARCH COUNCIL OF CANADA	B.978
NATIONAL RESEARCH DEVELOPMENT CORPORATION	A.22, A.29, A.30, B.142, B.143, B.273-B.287, B.288- B.304, B.305, B.309-B.312, B.313-B.319, B.320-B.323, B.630, C.24, C.47, C.60, C.140, D.5, D.7, D.8, D.10- D.13, D.15-D.21, D.23-D.28, D.31-D.34, D.37-D.50, D.52- D.67, D.69-D.77, D.79- D.101, D.103-D.106, F.11, G.5-G.7, G.101, G.238 See also A.21, B.1133
<i>NATURE</i>	C.145, G.233
<i>NATURWISSENSCHAFTLICHE RUNDSCHAU</i>	G.229, G.230
NEI PARSONS LTD	A.37, G.162, G.163
NEUMAYR, Franz M.	B.638
NEWELL, John	F.19
NEWITT, Dudley Maurice	C.113, D.110
<i>NEW SCIENTIST</i>	B.1060, C.141, C.158, G.30-G.33
NICHOLSON, R.L.R.	B.1179, B.1180
NORA, Vittorio de	E.14
NORMALAIR LTD	B.931, B.932
NORMALAIR-GARRETT LTD	B.1010, B.1011

**Index of correspondents**

NORTH EAST DEVELOPMENT COUNCIL	C.154, G.205
NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD	B.981
NORTHERN TRANSPORT AGENCY (LONDON) LTD	B.612, B.613, B.614
NUCLEAR DEVELOPMENTS LTD	B.895
NUTTALL, L.J.	E.9, E.10, G.152, G.173
O'BRIEN, Frank T.	C.160 See also E.9
OERLIKON ENGINEERING CO./OERLIKON LTD	B.870, G.95
OLIPHANT, Sir Mark (Marcus Laurence Elwin)	C.113 See also C.112
ONSLow, D.V.	G.74-G.79, G.81-G.83
OSTHOFF, R.C.	G.132, G.234
OSWIN, Harry G.	B.1140, B.1142-B.1147, B.1148, C.50, E.9, E.10, E.14, F.18, F.36, G.141, G.155, G.158, G.160, G.161, G.171, G.184, G.185, G.193, G.202
OVENSTON, T.C.J.	B.1078
OXFORD CRYOGENICS LTD	B.1008, B.1009
PAINE, T.O	B.1148, C.111, G.139
PALMER, Nigel I.	B.1012, B.1147, G.141
PANETH, Friedrich Adolf	G.51, G.53
PARKER, Alan B.	B.304, B.306-B.308
PARKINSON & COWAN LTD	G.96
PARRISH, Michael Anthony	G.158, G.161-G.163, G.165, G.167, G.169-G.173, G.175- G.181, G.184, G.185 See also G.159
PARRY, John M.	B.1016, G.243
PARSONS, Roger	G.154

**Index of correspondents**

PATERSON, James G.T.	G.72-G.80, G.82, G.96-G.98, G.191
PATON, A.P.	B.133-B.147, B.148-B.152, G.85-G.119 See also B.92, B.280
PATON, Sir (Thomas) Angus (Lyll)	B.1059
PATTERSON MOOS DIVISION (UNIVERSAL WINDING CO. INC.)	B.279, B.280, B.612, B.630, B.631, B.972- B.974, B.977 B.1132-B.1135, B.1137, B.1150, B.1182 See also B.1116
PATTERSON MOOS RESEARCH (DIVISION OF LEESONA CORPORATION)	B.1138, B.1139, B.1150-B.1152 See also LEESONA CORPORATION, LEESONA MOOS LABORATORIES
PEAKER, Gilbert	See G.25
PEART, Stanley	G.252
PENZIAS, Walter	B.995, G.159, G.166, G.167, G.172
PEPPER, D.C.	G.252
PERCY, Lord Eustace	G.51
PERGAMON PRESS LTD	C.144
PERRY, Henry James Harkness	B.316, B.324, B.325, B.327, B.331-B.339, B.341, D.43, D.65, G.125, G.193- G.197, G.200, G.203
PERUTZ, Max Ferdinand	E.31
PETERSEN, Peter	B.950, G.129
P.G. ENGINEERING LTD	B.950
PHILLIPS, W.A.	G.212, G.230-G.232
PHIPPS, Ivon M.	G.231
PITKETHLY, R.C.	C.24
PLESSEY CO. LTD	B.638

**Index of correspondents**

PLUST, Heinz-Günther	B.639, B.995, G.128, G.129, G.136 See also B.647, G.158, G.179
PODOLNY, William H.	B.1141, B.1142, B.1148, B.1149, E.8, E.9, E.14, F.19 See also B.1144-B.1146, B.1150, B.1176
POLLARD, D.	G.177
POOLEY, Derek	B.1181
PORTER, David F.	B.665, B.1099, C.82
PORTER, George, Baron	E.21, E.32
POSNER, A.M.	G.118
POST, J.L. van der	B.1053
POTTER, Edmund C.	C.111-C.113, G.162
POUND, M.A.	See G.17
POWDER METALLURGY LTD	B.919, B.920, B.946
POWELL, Blennie	C.67, G.202, G.204, G.212
POWER-GAS CORPORATION	B.949, B.951, G.96
POWER JETS (RESEARCH & DEVELOPMENT) LTD	G.100, G.101
PRATT & WHITNEY AIRCRAFT (DIVISION OF UNITED AIRCRAFT CORPORATION)	B.342, B.900, B.1138, B.1139, B.1141-B.1149, B.1150- B.1152, G.148
PRESTON, G.	B.1170
PUBLIC SERVICES ELECTRIC AND GAS CO.	B.1062
PURDY, John F.	B.636
PYE OF CAMBRIDGE LTD	G.213
PYM, Francis Leslie, Baron	A.36, B.1071, G.204, G.212, G.220, G.221
RAND, David A.J.	C.112, C.113, G.162
RAPP, Kenneth J.	B.280, B.630, B.972-B.974, B.977, B.1132-B.1134, B.1137, B.1150-B.1152

**Index of correspondents**

RAYMER, James A.	B.1014
REDMAYNE, R.A.S.	G.63
REID, William T.	C.31, G.130, G.235, G.236
<i>RESEARCH</i>	C.130, C.131
REYNOLDS METAL CO.	B.1034
RICARDO & CO. LTD	B.974, B.975
RICHARD KLINGER LTD	B.933, B.961, B.962, B.964-B.967, G.57, G.59, G.60, G.77-G.80, G.82- G.84, G.86-G.88, G.91, G.92, G.95, G.97-G.100, G.103, G.104, G.107, G.113, G.115
RICKERTON, Barrie W.	B.1012
RIDDELL COUSLAND & CO. LTD	G.50-G.53, G.59, G.60, G.76
RIDEAL, Sir Eric Keightley	A.30, G.93, G.100, G.110, G.187 See also G.75, G.76, G.188
RIDLEY, G.A.	G.230
RIDLEY, Matthew White, 3rd Viscount	B.971, G.65, G.71, G.192, G.230, G.231
RITCHIE, Ian M.	C.112, C.113, G.227
ROBENS, Alfred, Baron	B.1118, B.1119
ROBERTS, Lewis Edward John	B.1053-B.1055, B.1057
ROBERTS, Ralph	B.636, B.872, B.942, B.975, G.224, G.225, G.230
ROBERTSON, John Monteath	G.252
ROBINSON, F.D.	C.138
ROGERS, C.F.C.	See G.25
ROGERS, Geoffrey T.	B.637, B.1176-B.1178, B.1180, G.31, G.132, G.227 See also B.302, G.21, G.22, G.152
ROLLS-ROYCE LTD	B.1009, B.1012, B.1014

**Index of correspondents**

JOHNSON MATTHEY & CO. LTD	B.272, B.627, B.910, B.917-B.919, B.1018, B.1020, B.1021, B.1117, G.46, G.49-G.53, G.56, G.60, G.63, G.76-G.79, G.84, G.86, G.89, G.91, G.94, G.119, G.223 See also G.122, G.183
JOLLEY, L.J.	B.1165
JONES, Dudley de G.	C.90, C.91
JONES, Sir Henry Frank Harding	B.1031-B.1033 See G.151, G.152
JONES, Paul William	B.310, B.322, B.324-B.330, B.331-B.334, B.336-B.339, B.612, B.613, B.619-B.634, B.946, B.1084, B.1151, D.79, D.81, G.193-G.195, G.199, G.202, G.218 See also B.348, B.594
JUSTI, Eduard W.	B.1039, B.1162, B.1163, G.123, G.126-G.128, G.130-G.132, G.135, G.137, G.140, G.142- G.144, G.148, G.151-G.153, G.157, G.158, G.242 See also G.220
KASTNER, L.J.	C.138
KATZIN, Alfred G.	C.15
KEMMETT, FRANCIS W.	A.32-A.34 See also G.36
KENDALL, James P.	G.252
KENNEDY, Sir John Macfarlane	G.72
KENT, C.E.	G.133
KESTNER EVAPORATOR & ENGINEERING CO. LTD	G.63, G.84
KIDD, Franklin	A.29
KING, Frederick Ernest	B.644, B.647, B.648, C.82, G.252
KLEIN, Martin	B.1017

**Index of correspondents**

K.L.G. SPARKING PLUGS LTD	G.48-G.52
KORDESCH, Karl V.	B.1008, B.1009, B.1183, B.1184, E.10, G.120, G.156, G.177, G.178-G.180, G.182, G.183
KORNBERG, Sir Hans Leo	E.29
KREVELEN, D.W. van	G.188
KURTI, Nicholas	B.1007, B.1008
LACEY, Stephen	G.64
LAMBORN, J.	B.1109
LANGLEY, Kevin F.	B.1181
LAWRIE, James	C.34, C.138-C.140
LE CARBONE LTD	G.96-G.98, G.105, G.106, G.108
LEESONA CORPORATION	B.1145-B.1149, E.8
LEESONA MOOS LABORATORIES (DIVISION OF LEESONA CORPORATION)	B.1012, B.1140, B.1142, B.1143, B.1145-B.1147, C.50, F.18, F.19 See also B.954
LENY, W. d'	B.1110
LESLIE, D.C.	C.98
LEWIS, J.D.	B.1010
LEWIS, Wilfred Bennett	B.978
LEVINSON, T.G.D.	G.138
LIEBHAFSKY, Herman A.	B.1052, F.23, G.126, G.134, G.135, G.137, G.151, G.233 See also F.9, F.11, F.19, G.130
LINDLEY, Bryan C.	C.146, G.230, G.231 See also B.153
LINDSTROM, Olle	G.136
LIPSCHUTZ, Heinz	B.1075, B.1076

**Index of correspondents**

LLOYD, Geoffrey W.	G.70, G.71, G.196, G.203
LOCKE, H. Brian	B.299, B.300, B.302
LOCKHEED AIRCRAFT CORPORATION	G.225
LOFTHOUSE, E.	B.1113-B.1115
LOMBE, Sir Edward Malcolm Evans-	G.94, G.188, G.194
LONDON ELECTRICITY BOARD	B.1153, B.1156
LONDON TRANSPORT EXECUTIVE	B.637, B.971, B.972
LOW, Toby (Austin Richard William), 1st Baron Aldington	G.193
LURGI APPARATE-TECHIK GMBH	B.876
LURGI GESELLSCHAFT FUR WARMETECHNIK M.B.H.	B.871-B.873
LYDALL, Francis	G.56, G.57
McDANIEL, Randall	G.174
McDONALD, I.R.	C.124
McGREGOR, A.M.	G.147
McHUGH, G.	B.1180
McKAY, H.A.C.	B.1145, B.1176
MADDOCK, Sir Ieuan	B.1059
MADDOX, Sir John Royden	See G.23
MAIR, W. Austyn	B.1063, C.106, G.149, G.150, G.154, G.212
MANGOLD, Tom	C.143
MANSERGH, Nicholas	G.204
MARCHETTI, C.	B.1054, B.1056, B.1060 See also B.1058, B.1059
MARCONI SPACE AND DEFENCE SYSTEMS LTD	B.1070
MARGERISON, Thomas Alan	B.975, C.130, C.131, C.141, G.224
MARPLES, Alfred Ernest, Baron	B.1060

**Index of correspondents**

MARSHALL, Sir Arthur Gregory George	A.30, B.285, B.312, B.317, B.319, B.321, B.330, B.331, B.341, B.343, B.346, B.347, B.349-B.351, G.33, G.39, G.159, G.191, G.198, G.200, G.205, G.206, G.212, G.221 See also B.1134
MARSHALL CAVENDISH LTD	C.159, C.160, C.162
MARSHALL, Walter, Baron	A.29, B.1179 See also B.664, B.1180, B.1181
MARSHALLS OF CAMBRIDGE LTD	A.21, B.309-B.312, B.313- B.319, B.320-B.323, B.324- B.330, B.331-B.342, B.343, B.346, B.347, B.349-B.351, B.600-B.618, B.619-B.634, B.1127-B.1129, G.191, G.192, G.205, G.210
MASSEY, Sir Harrie Stewart Wilson	E.30
MATOO, Satoshi	G.179
MAY, John R.	B.639
MEGAW, Helen D.	B.910
MELVILLE, Sir Harry Work	G.252
MENTER, Sir James Woodham	G.76
MENZIES, R.C.	G.187
MERZ, Charles H.	G.56, G.57
MERZ AND MCLELLAN	B.970, B.971, B.1157, B.1158, F.6, G.56, G.57, G.60-G.65, G.67, G.75, G.82 See also A.20
METAL & PLASTIC COMPACTS LTD	G.116
METALLIC MANUFACTURING CO. LTD	G.48, G.49, G.58, G.59, G.65
METALLISATION LTD	B.945, B.946, G.117, G.118
MICHAELIS, Anthony R.	C.159-C.163
MILITARY ENGINEERING EXPERIMENTAL ESTABLISHMENT	B.1159-B.1161
MILLER, T.W.	G.242

**Index of correspondents**

MILLS, Mark P.	See G.178
MILNE, A.G.	B.1156
MINKOFF, G.J.	G.128
MITCHELL, E.B.	G.233
MITCHELL, Will, Jr	C.34, C.36, C.40, C.44
MOND NICKEL CO. LTD	B.254, B.629, B.858, B.889, B.910, B.917-B.924, B.942, B.945, B.946, B.1002, B.1003, G.52, G.53, G.55, G.60, G.62, G.65, G.77- G.80, G.83, G.85-G.89, G.92, G.94, G.95, G.97, G.99-G.101, G.103-G.105, G.107-G.114, G.116-G.119, G.222, G.223, G.230 See also INTERNATIONAL NICKEL CO. (MOND) LTD
MONTGOMERY, C.W.	F.9
MOORE, John E.	B.1065-B.1067 See also B.1073
MOOS, Anthony M.	B.279, B.317, B.1132, B.1133, B.1135, B.1137- B.1140, B.1142, B.1145- B.1147, B.1148, B.1149, B.1152, B.1182, D.104, E.8, E.14, F.19 See also B.310, B.1144, C.40
MORGAN CRUCIBLE CO. LTD	G.98, G.99, G.120, G.121, G.137
MORRILL, Carle C.	B.1144
MOTOO, Satoshi	G.168, G.169
MOULE, Ian A.	G.182, G.221
MOULIN, E.B.	C.134
MPD TECHNOLOGY LTD	B.1171
M.W. KELLOGG CO.	B.949, B.951
MYERS, F.H.E.	G.127

**Index of correspondents**

NARDINI, G.V.	G.129
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	A.32-A.36, B.1014, B.1148, G.139, G.145, G.146, G.149-G.151, G.174, G.201, G.206, G.209 See also G.36
NATIONAL CARBON CO. (DIVISION OF UNION CARBIDE CORPORATION)	G.120 See also B.1182
NATIONAL COAL BOARD	B.957, B.975, B.976, G.233
NATIONAL PORTRAIT GALLERY	G.215
NATIONAL RESEARCH COUNCIL OF CANADA	B.978
NATIONAL RESEARCH DEVELOPMENT CORPORATION	A.22, A.29, A.30, B.142, B.143, B.273-B.287, B.288- B.304, B.305, B.309-B.312, B.313-B.319, B.320-B.323, B.630, C.24, C.47, C.60, C.140, D.5, D.7, D.8, D.10- D.13, D.15-D.21, D.23-D.28, D.31-D.34, D.37-D.50, D.52- D.67, D.69-D.77, D.79- D.101, D.103-D.106, F.11, G.5-G.7, G.101, G.238 See also A.21, B.1133
<i>NATURE</i>	C.145, G.233
<i>NATURWISSENSCHAFTLICHE RUNDSCHAU</i>	G.229, G.230
NEI PARSONS LTD	A.37, G.162, G.163
NEUMAYR, Franz M.	B.638
NEWELL, John	F.19
NEWITT, Dudley Maurice	C.113, D.110
<i>NEW SCIENTIST</i>	B.1060, C.141, C.158, G.30-G.33
NICHOLSON, R.L.R.	B.1179, B.1180
NORA, Vittorio de	E.14
NORMALAIR LTD	B.931, B.932
NORMALAIR-GARRETT LTD	B.1010, B.1011

**Index of correspondents**

NORTH EAST DEVELOPMENT COUNCIL	C.154, G.205
NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD	B.981
NORTHERN TRANSPORT AGENCY (LONDON) LTD	B.612, B.613, B.614
NUCLEAR DEVELOPMENTS LTD	B.895
NUTTALL, L.J.	E.9, E.10, G.152, G.173
O'BRIEN, Frank T.	C.160 See also E.9
OERLIKON ENGINEERING CO./OERLIKON LTD	B.870, G.95
OLIPHANT, Sir Mark (Marcus Laurence Elwin)	C.113 See also C.112
ONSLOW, D.V.	G.74-G.79, G.81-G.83
OSTHOFF, R.C.	G.132, G.234
OSWIN, Harry G.	B.1140, B.1142-B.1147, B.1148, C.50, E.9, E.10, E.14, F.18, F.36, G.141, G.155, G.158, G.160, G.161, G.171, G.184, G.185, G.193, G.202
OVENSTON, T.C.J.	B.1078
OXFORD CRYOGENICS LTD	B.1008, B.1009
PAINE, T.O	B.1148, C.111, G.139
PALMER, Nigel I.	B.1012, B.1147, G.141
PANETH, Friedrich Adolf	G.51, G.53
PARKER, Alan B.	B.304, B.306-B.308
PARKINSON & COWAN LTD	G.96
PARRISH, Michael Anthony	G.158, G.161-G.163, G.165, G.167, G.169-G.173, G.175- G.181, G.184, G.185 See also G.159
PARRY, John M.	B.1016, G.243
PARSONS, Roger	G.154

**Index of correspondents**

PATERSON, James G.T.	G.72-G.80, G.82, G.96-G.98, G.191
PATON, A.P.	B.133-B.147, B.148-B.152, G.85-G.119 See also B.92, B.280
PATON, Sir (Thomas) Angus (Lyll)	B.1059
PATTERSON MOOS DIVISION (UNIVERSAL WINDING CO. INC.)	B.279, B.280, B.612, B.630, B.631, B.972- B.974, B.977 B.1132-B.1135, B.1137, B.1150, B.1182 See also B.1116
PATTERSON MOOS RESEARCH (DIVISION OF LEESONA CORPORATION)	B.1138, B.1139, B.1150-B.1152 See also LEESONA CORPORATION, LEESONA MOOS LABORATORIES
PEAKER, Gilbert	See G.25
PEART, Stanley	G.252
PENZIAS, Walter	B.995, G.159, G.166, G.167, G.172
PEPPER, D.C.	G.252
PERCY, Lord Eustace	G.51
PERGAMON PRESS LTD	C.144
PERRY, Henry James Harkness	B.316, B.324, B.325, B.327, B.331-B.339, B.341, D.43, D.65, G.125, G.193- G.197, G.200, G.203
PERUTZ, Max Ferdinand	E.31
PETERSEN, Peter	B.950, G.129
P.G. ENGINEERING LTD	B.950
PHILLIPS, W.A.	G.212, G.230-G.232
PHIPPS, Ivon M.	G.231
PITKETHLY, R.C.	C.24
PLESSEY CO. LTD	B.638

**Index of correspondents**

PLUST, Heinz-Günther	B.639, B.995, G.128, G.129, G.136 See also B.647, G.158, G.179
PODOLNY, William H.	B.1141, B.1142, B.1148, B.1149, E.8, E.9, E.14, F.19 See also B.1144-B.1146, B.1150, B.1176
POLLARD, D.	G.177
POOLEY, Derek	B.1181
PORTER, David F.	B.665, B.1099, C.82
PORTER, George, Baron	E.21, E.32
POSNER, A.M.	G.118
POST, J.L. van der	B.1053
POTTER, Edmund C.	C.111-C.113, G.162
POUND, M.A.	See G.17
POWDER METALLURGY LTD	B.919, B.920, B.946
POWELL, Blennie	C.67, G.202, G.204, G.212
POWER-GAS CORPORATION	B.949, B.951, G.96
POWER JETS (RESEARCH & DEVELOPMENT) LTD	G.100, G.101
PRATT & WHITNEY AIRCRAFT (DIVISION OF UNITED AIRCRAFT CORPORATION)	B.342, B.900, B.1138, B.1139, B.1141-B.1149, B.1150- B.1152, G.148
PRESTON, G.	B.1170
PUBLIC SERVICES ELECTRIC AND GAS CO.	B.1062
PURDY, John F.	B.636
PYE OF CAMBRIDGE LTD	G.213
PYM, Francis Leslie, Baron	A.36, B.1071, G.204, G.212, G.220, G.221
RAND, David A.J.	C.112, C.113, G.162
RAPP, Kenneth J.	B.280, B.630, B.972-B.974, B.977, B.1132-B.1134, B.1137, B.1150-B.1152

**Index of correspondents**

RAYMER, James A.	B.1014
REDMAYNE, R.A.S.	G.63
REID, William T.	C.31, G.130, G.235, G.236
<i>RESEARCH</i>	C.130, C.131
REYNOLDS METAL CO.	B.1034
RICARDO & CO. LTD	B.974, B.975
RICHARD KLINGER LTD	B.933, B.961, B.962, B.964-B.967, G.57, G.59, G.60, G.77-G.80, G.82- G.84, G.86-G.88, G.91, G.92, G.95, G.97-G.100, G.103, G.104, G.107, G.113, G.115
RICKERTON, Barrie W.	B.1012
RIDDELL COUSLAND & CO. LTD	G.50-G.53, G.59, G.60, G.76
RIDEAL, Sir Eric Keightley	A.30, G.93, G.100, G.110, G.187 See also G.75, G.76, G.188
RIDLEY, G.A.	G.230
RIDLEY, Matthew White, 3rd Viscount	B.971, G.65, G.71, G.192, G.230, G.231
RITCHIE, Ian M.	C.112, C.113, G.227
ROBENS, Alfred, Baron	B.1118, B.1119
ROBERTS, Lewis Edward John	B.1053-B.1055, B.1057
ROBERTS, Ralph	B.636, B.872, B.942, B.975, G.224, G.225, G.230
ROBERTSON, John Monteath	G.252
ROBINSON, F.D.	C.138
ROGERS, C.F.C.	See G.25
ROGERS, Geoffrey T.	B.637, B.1176-B.1178, B.1180, G.31, G.132, G.227 See also B.302, G.21, G.22, G.152
ROLLS-ROYCE LTD	B.1009, B.1012, B.1014

**Index of correspondents**

ROLLS-ROYCE (1971) LTD	G.149
ROSEN, Jessel	G.47
ROVER CO. LTD	B.635
ROYAL AERONAUTICAL SOCIETY	A.26
ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH	G.107, G.108
ROYAL COLLEGE OF ART	G.229, G.230
ROYAL INSTITUTION OF GREAT BRITAIN	E.21, G.251
ROYAL SOCIETY	A.28, E.22-E.32 See also G.127
ROYAL SOCIETY OF ARTS	E.33
RUDDOCK, F.A.	B.910
RUSTON & HORNBY LTD	B.637
RUTTLEY, E.	C.158, F.33
RYAN, Frank J.	B.1118-B.1126
RYLE, Sir Martin	B.1034
SALZANO, Frank J.	B.1038, B.1095, E.8, E.9, E.14, E.15, G.179, G.180
SARTORI, R.	G.238, G.239
SATHYANARAYANA, S.	G.162
SÄUFFERER, Helmut	G.159-G.161
SAUNDERS, Sir Owen Alfred	E.1, G.150 See also G.154
SAVAGE, J.C.	G.54
SCHARLAU, A.	B.872, B.873
SCHIFFRIN, D.J.	B.1039
SCHON, Sir Frank	A.29
SCHORI METALLISING PROCESS LTD	B.945, G.118, G.119
SCHULDINER, Sigmund	B.977, B.978

**Index of correspondents**

SCHWABE, K.	G.246
SCIENCE MUSEUM, LONDON	G.229, G.230
SCOTT, David S.	F.35, F.37
SCOTT POLAR RESEARCH INSTITUTE	B.652
SCURLOCK, R.G.	B.1012
SECORD, Campbell H.	B.1083, B.1085
SEKULES, Walter	C.131-C.134
SELLERS, E.S.	G.200, G.224
SERBY, John Edward	B.1166-B.1169
SHARMAN, G.L.	C.136
SHELL DEVELOPMENT CO.	G.225
"SHELL" RESEARCH LTD	B.635, G.124-G.126
SHEPPARD, Norman	A.30
SHOENBERG, David	G.214
SIEMENS CORPORATION	G.148
SIEMENS-SCHUCKERT (GREAT BRITAIN) LTD	G.114, G.115, G.117
SILLARS, R.W.	G.232-G.234
SIMON, Sir Francis Eugene	B.137, B.970, G.99-G.101
SIMPLIFIX COUPLINGS LTD	G.63, G.73, G.76-G.79, G.84-G.86, G.88, G.90, G.91
SINGER, Felix	G.115
SINTERED PRODUCTS LTD	G.111-G.114
SISSON, H.A.	G.66
SLATER, Sir William Kerlake	C.24-C.26
SLAUGHTER, Fred.	G.169
SMITH, Anthony E.	B.647, B.648
SMITH, Sir Frank Edward	G.47
SMITH, Gerald Clive	B.430, B.632, G.197

**Index of correspondents**

SMITH, Harry	B.644-B.646, B.662 See also B.649, B.658
SMITH, S.S.	B.895, B.1110-B.1112
SMITH'S DELIVERY VEHICLES LTD	B.982-B.985
SOCIETY FOR VISITING SCIENTISTS	G.230, G.231
SOCIETY OF ENGINEERS	G.208, G.209
SOLOMON, P.J.B.	See C.110
SONDES PLACE RESEARCH INSTITUTE	B.328, B.333, B.632, B.969, B.978, B.1172-B.1175
SOUTH AFRICAN SCIENTIFIC LIAISON OFFICE	B.978
SOUTH EASTERN ELECTRICITY BOARD	B.1156
SOUTHERN TELEVISION LTD	C.156
SPENGLER, H.	G.123
SPOTNITZ, R.M.	B.896
SPRING, Frank Stuart	G.252
SPRING, Kenneth H.	B.1096
SPRINGALL, H.D.	G.252
SRINIVASAN, S.	B.1038, F.23, G.133 See also B.1095
STAEHLE, Roger W.	C.90, C.91
STANDARD OIL CO.	B.638
STANLEY, Charles W. Wentworth-	B.970-B.972, B.975, G.205
STANLEY, D.T.J.	B.1072
STANLEY MARINE CONSULTANTS	B.1072
STEINBERG, Meyer	B.873
STERN, F.	G.127
STERN, Kurt G.	C.129, C.130
STEWART, Robert A.	B.1142, B.1143
STONEHEART, Paul	B.1149

**Index of correspondents**

STROM, Clifton O.	B.970, B.971, G.197, G.228-G.230
<i>SUNDAY EXPRESS</i>	C.153
<i>SUNDAY PICTORIAL</i>	C.143
SUNDSTRAND AVIATION	B.639
SUNVIC CONTROLS LTD	B.932, B.933
SUTTON, Sir Oliver Graham	C.83
SWAN, Sir Kenneth R.	G.191
SZEGO, George C.	C.30, C.31, E.2
TAM, W.A.	G.135
TAMURA, Hideo	G.237
TANLAW, Simon Brooke Mackay, Baron	B.1058
TANTRAM, A.D.S. ('Tony')	B.328, B.632, B.646, B.647, B.650, B.1172, B.1173, C.25, G.147 See also G.5-G.7, G.9-G.13, G.22, G.146, G.152, G.153
TATCHELL, A.R.	C.77
TAVENDALE, Alexander Blease	B.1084-B.1086
TAYLOR, Sir Geoffrey Ingram	A.31, G.211
TAYLOR, H.D.	G.187
TAYLOR, J. Bryan	F.35-F.37
TAYLOR, S.R.G.	G.226, G.227
TECHNICAL RESEARCH WORKS LTD	G.53, G.54
TEED, Philip L.	B.921, G.198, G.199, G.201, G.207
THERMAL SYNDICATE LTD	G.52, G.53, G.101-G.103
<i>THE TIMES</i>	B.1059, C.69, C.134-C.136, C.139, C.158
THIRSK, H.E.	B.937

**Index of correspondents**

THOMAS, Alan	G.158
THOMAS, Sir John Meurig	E.21, G.230
THOR, Janusz	G.237
THORNTON, W.M.	G.47
THRELFALL, P.M.	G.213
THRING, James B.	G.146-G.148
THRING, Meredith Wooldridge	C.118
THURNHAM, Peter G.	C.148, C.149
TORELL, Bruce N.	See B.1138, B.1151
TRACKED HOVERCRAFT LTD	B.301, B.302
TRANSPORT AND ROAD RESEARCH LABORATORY	B.995
TREFGARNE, David Garro, 2nd Baron	G.176
TSCHINKEL, J.G. ('Hans')	B.1139, B.1144, B.1145 See also B.1152
TSEUNG, Alfred Chan Chung	B.1048, B.1101-B.1104, C.70, C.112, E.10, G.146, G.148, G.149, G.153, G.157 See also B.1052, G.152
TUCKER, Anthony	B.1123, C.163
TURNER BROTHERS ASBESTOS CO. LTD	B.936, B.962-B.964, B.967, G.63, G.65, G.79, G.81- G.83, G.86, G.93, G.98
TYCHO CORPORATE TECHNOLOGY CENTER	B.1016
UBBELOHDE, Alfred René John Paul	A.30, C.130, G.147, G.252 See also G.187
UNESCO	C.134
UNION CARBIDE CORPORATION	B.1012, B.1182-B.1184 See also NATIONAL CARBON CO.
UNION CARBIDE U.K. LTD	B.1008
UNITED AIRCRAFT CORPORATION	See PRATT & WHITNEY AIRCRAFT

**Index of correspondents**

UNITED GAS CORPORATION	B.977, B.978
UNITED KINGDOM ATOMIC ENERGY AUTHORITY	B.1179-B.1181
UNITED STATES OF AMERICA	
U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES	B.952
U.S. ENVIRONMENTAL PROTECTION AGENCY	G.184
U.S. NAVAL RESEARCH LABORATORY	B.977, B.978
UNITED TECHNOLOGIES	B.1149, E.10, E.14
UNIVERSAL WINDING CO. INC.	See PATTERSON MOOS DIVISION (UNIVERSAL WINDING CO.)
UNIVERSITY OF NEWCASTLE UPON TYNE	A.37
UTSI, P.A. Vincent	G.212
VALENTA, Pavel	G.235, G.236
VARLEY, C.H.	See G.97
VARTA AKTIENGESELLSCHAFT	G.137, G.145
VEZIROGLU, T. Nejat	B.1060, B.1063, B.1064, F.37
VIELSTICH, W.	G.122, G.134, G.135, G.137, G.139
VINEYARD, G.H.	B.1038
VOCCA, Ottavio	B.635, B.636, B.639
VOYSEY, R.G.	B.1163, B.1165, G.106, G.107, G.119, G.224
WADLOW, E.C.	B.133, B.323, B.324, B.1078-B.1086, B.1088, G.119
WALKER, R.A.E	B.142, B.143
WALKLEY, Allan	G.228, G.229, G.234
WALLACE, N.G.	G.157 See also G.159

**Index of correspondents**

WALLER, J.G.	See G.1, G.2
WALTON, G.N.	C.110
WANSBROUGH, George	G.47, G.201
WARD, A.M.	G.252
WARDLOW, William	G.252
WARNER, Philip C.	G.162, G.163
WARREN SPRING LABORATORY	B.591, B.622, B.1185
WATSON, Rex Gordon Harry	B.143, B.144, B.333, B.594, B.634, B.981, B.1080, B.1087, B.1089, D.45, G.40- G.43A, G.174, G.182, G.202, G.210, G.221, G.222 See also B.93, B.98, B.103, B.108, B.110
WATT, William J.	G.226, G.227
WECK, Richard	G.12
WEIL, Kurt H.	F.36
WEIR, Charles D.	G.97, G.107, G.108, G.112, G.186
WEIR GROUP	B.1186
WEIR, W.H.	B.1009
WELBOURN, Donald B.	B.349
WESTINGHOUSE ELECTRIC INTERNATIONAL CO.	B.637
WEST MIDLANDS GAS BOARD	G.94
WHARTON, W.	B.869, B.871, B.977, B.978
WHITEHEAD, S.	B.133, B.134, B.136, B.137, B.139, B.140, B.142-B.145, B.971, G.72, G.93, G.94, G.101, G.107, G.108, G.110, G.112, G.113, G.119
WILCOCK, Donald F.	B.635

**Index of correspondents**

WILKE, Gerhard	B.285, B.316, B.872, B.981-B.983, B.988, C.137 See also B.144, G.207, G.208
WILKIE, Douglas Robert	B.898, G.150
WILKINSON, John A.E.	G.176
WILLIAMS, C.G.	C.124, C.126
WILLIAMS, Keith Rolls	B.340, B.341, B.635, B.1057, C.48, C.56, G.39, G.122, G.124-G.126, G.140, G.142, G.144, G.145, G.147, G.150, G.152, G.157, G.158, G.160, G.163, G.167, G.183-G.185, G.197
WILLIAMS, Richard	E.14
WILLIAMSON, F.S.	G.224
WILLIS, Hector Ford	B.1083
WILLIS, Kenneth Edmund Victor	B.289-B.295, B.297, B.321- B.323, B.645, C.47, C.60, F.11 See also B.1152
WILLS, L. Goodwyn	B.1033, B.1061
WILSON, Harold	See G.204
WINSEL, August	G.144, G.145
W.M. CHRISTY & SONS LTD	G.49
WOLLASTON, Nicholas	G.216
WORLD ENERGY CONFERENCE	C.158, F.33
<i>WORLD SCIENCE REVIEW</i>	B.965, C.138-C.140
W.R. GRACE & CO.	B.896, G.141
WRIGHT, Philip	B.319
WYNNE-JONES, W.J.K	B.937, G.101
YEAGER, Ernest	B.637, C.30, C.31, G.125, G.228
YIM, G.K.	B.896

**Index of correspondents**

<i>YORKSHIRE POST</i>	C.142
YOSHIZAWA, Shiro	B.639
YOUNG, George J.	C.5, C.146
YOUNG, Henry John	B.313, B.321, B.322, B.324- B.328, B.331, B.333-B.340, B.601-B.603, B.610, B.611, B.614, B.1151, D.70, D.103, G.193, G.194
YOUNG, Leslie E.	B.929, B.930
YOUNG, P.A.	B.871, B.872, G.191
ZVEGINTZOV, M.	B.321, C.24