



Catalogue of the papers and correspondence of

**Joseph Black CBE FEng
(1921-2000)**



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GENERAL INTRODUCTION

PROVENANCE

The papers were received in August 2001 from Mrs M. Black, the widow of Professor Black.

OUTLINE OF THE CAREER OF JOSEPH BLACK

Joseph Black was born in Belfast on 25 January 1921. He was educated at the Royal Belfast Academical Institution, where he showed great promise in mathematics and physics, and at Queen's University, graduating in 1941 with first class honours in mechanical engineering. After three years as a scientific officer with the Royal Aircraft Establishment at Farnborough, Hampshire, Black returned to Queen's in 1944 as a research fellow. He was awarded an MSc in 1945. Later in the same year Black joined de Havilland Aircraft as an aerodynamicist and worked with the team designing the revolutionary Comet jet aeroplane.

In 1946 Black left de Havilland to begin an academic career. His first appointment was as a lecturer in mechanical engineering at the University of Bristol where his colleagues included Sir Alfred Pugsley, Lord Chilver and Sir Bernard Crossland. Shortly after his appointment Black helped to establish the department of aeronautical engineering under the leadership of A. R. Collar. His gifts as a teacher and researcher were quickly recognised and led to his early promotion to senior lecturer.

Black left the University of Bristol to become Head of the Department of Engineering at the newly created Bristol College of Science and Technology (subsequently Bristol College of Advanced Technology) in January 1960. He decided that from the outset his new department should embrace both aeronautical and mechanical engineering. In 1966 the transformation of the College into Bath University of Technology (later the University of Bath) presented Black with new challenges as he helped to guide and foster the institution's development. Between 1960 and 1966 he was involved in the intensive academic planning which immediately preceded the university's creation and was a member of the committee that chose its Claverton Down site. From 1964 to 1974 Black served as a member of the University Grants Committee (UGC). Throughout the period of major construction at the University of Bath, Black was required to act impartially in the allocation of limited UGC resources to all universities. He performed his duties with skill and integrity and his original appointment was extended for a further five years.

Between 1970 and 1973, as one of the University of Bath's first pro-vice-chancellors, Black was instrumental in devising and implementing a number of innovative administrative and academic structures, including the establishment of a unified School of Engineering encompassing mechanical, aeronautical and manufacturing engineering. Black laid the foundation of the school's outstanding reputation in engineering design. He was a keen advocate of design as an integral part of engineering. Particularly enthusiastic about new techniques in computer-aided design, he ensured that appropriate emphasis was placed on design in the University of Bath undergraduate engineering curriculum. Recognising the need in engineering education for closer links between universities and industry Black played an important part in the introduction of the 'thin sandwich' course whereby students alternated academic terms with periods spent on industrial placements. He was also largely responsible for instigating degree courses in engineering with French and German. On his retirement from the University of Bath in 1985 Black was awarded a Leverhulme Trust Fellowship to research and write on engineering in art.

Black was a Fellow of the Institution of Mechanical Engineers, of the Royal Aeronautical Society and of the Royal Academy of Engineering. He was awarded honorary doctorates by the University of Loughborough and by the City University. He was a member of the Design Council between 1977 and 1982 and acted as chairman of the Engineering Components Awards, 1976 and the Engineering Products Awards, 1977. He served as Science and Engineering Research Council (SERC)/Design Council Engineering Design Co-ordinator from 1985 to 1989. Black received the Silver Jubilee Medal in 1977 and was appointed CBE in 1979 for his work in the field of university education.

Black was also passionately interested in art. He was chairman of Bath's Holburne of Menstrie Museum, a committee member of the Victoria Art Gallery, Bath and a trustee of Bath Industrial Heritage Museum. He was a devoted theatre-goer, a keen photographer and a talented silversmith.

Black married Margaret Hewitt in 1946. They had a daughter and three sons.

DESCRIPTION OF THE COLLECTION

The material is presented in the order given in the contents list. It covers the period from 1938 to 2000.

Section A, Biographical, contains a small amount of material relating to various aspects of Black's career. It includes letters of reference dating from before Black's graduation from Queen's University,

Belfast, a report on his visit to educational establishments in the USA and papers relating to the conferment of his honorary degrees. It also contains a small number of photographs documenting various aspects of his career between 1976 and 1989.

Section B, Research, comprises material relating to several aspects of Black's research work. It includes documentation of Black's involvement in the development of a specially designed 'floating stretcher' for use in ambulances and his interest in Gustave Eiffel's early contribution to experimental aerodynamics. The section also contains Black's Queen's University, Belfast MSc thesis and some blue print drawings he executed in 1938 for Robert Craig and Sons Ltd, Belfast.

Section C, Publications, contains a small amount of material relating to some of the papers and other publications written by Black between 1947 and 2000. It includes correspondence and drafts of papers on a wide range of subjects, from supersonics to Renaissance art, published in various journals.

Section D, Lectures and speeches, presents an incomplete record of lectures, speeches and talks given by Black throughout his career. The sequence includes material relating to seminars and talks given by Black to students and members of staff both at the University of Bath and at other schools, colleges and universities. It also contains documentation of lectures he gave to a variety of professional audiences. A large proportion of the material appears to relate to the illustrated lectures on engineering and art which Black delivered after his retirement in 1985.

There is also an index of correspondents.

ACKNOWLEDGEMENTS

We are very grateful to Mrs M. Black for her assistance in making this material available.

SECTION A	BIOGRAPHICAL	A.1-A.36	A.6-A.29	CAREER, HONOURS AND AWARDS	1938-1993
	A.1-A.5	OBITUARIES			The presentation is chronological.
	A.6-A.29	CAREER, HONOURS AND AWARDS			
	A.30-A.36	PHOTOGRAPHS			
A.1-A.5	OBITUARIES	2000			
A.1	<i>The Bath Chronicle</i> , 7 October 2000.		A.6	Letters of reference from Robert Craig and Sons (Engineers) Ltd, Belfast, 1 July 1938.	
A.2	<i>The Guardian</i> , 23 October 2000.			See also B.43.	
A.3	<i>The Independent</i> , 23 October 2000.		A.7	Letters of reference from Davidson and Co Ltd, Engineers and Ironfounders, Belfast, 30 August 1940.	
A.4	<i>The Times</i> , 7 November 2000.		A.8	Letters of reference from Professor F. V. W. Arnock, College of Technology, Belfast, 19 May 1941.	
A.5	<i>Bristol Evening Post</i> , 11 November 2000.		A.9	Letter <i>re</i> Black's appointment to the position of lecturer, Faculty of Engineering, University of Bristol, 7 August 1946.	
A.5a	Brochure entitled 'The Farnborough F1 Air Taxi: A Revolution in Air Travel, Joseph Black Lecture Given on the Occasion of the Opening of the Design and Project Exhibition, Department of Mechanical Engineering, University of Bath, June 2001. Includes a copy of A.3 and two colour photographs taken at the event.		A.10	Copy of application for the post of head of the department of aeronautical engineering, College of Technology, Bristol, 26 June 1959.	
			A.11	Letter from Sir Philip Morris, Vice-Chancellor, University of Bristol <i>re</i> Black's departure from the university, 23 December 1959.	
			A.12	6pp typescript entitled 'Report on Visit to USA on English-Speaking Union Technical Teachers Exchange Scheme', September-December 1962. Black was awarded an English-Speaking Union (ESU) Fellowship and designated a Gillette Fellow in December 1961. The award enabled him to spend three months in the USA studying various aspects of North American technical education with particular reference to undergraduate curricula, the architecture of teaching buildings, libraries and student accommodation, co-operative courses and programmes of postgraduate study.	
			A.13	<i>Colleges of Advanced Technology</i> , printed prospectus, January 1963.	

- A.14 Letter *re* Black's Bristol College of Science and Technology salary, 10 July 1963.
- A.15 3pp typescript cv with 1p typescript entitled 'Personal and Extra-Mural Activities', nd *ca* 1964.
- A.16 Letter indicating receipt of Black's cv as application for a post at the University of Sussex, Brighton, 29 April 1968.
- A.17 Correspondence and cv *re* Black's application for the post of Vice-Chancellor, University of Aston, Birmingham, UK, 30 April 1968.
- A.18 Correspondence and papers *re* an invitation to apply for the position of Vice-Chancellor, Brunel University, Middlesex, UK, November-December 1969.
- A.19 Copy of letter *re* the end of Black's term of service with the University Grants Committee, 4 February 1974.
- A.20 3pp typescript cv and career summary, nd *ca* 1974.
- A.21 Correspondence *re* an invitation to apply for the post of Vice-Chancellor, La Trobe University, Bundoora, Australia, 2 February 1976.
- A.22 Correspondence *re* an invitation to apply for the position of Vice-Chancellor, University of Adelaide, Australia, 6 February 1976.
- A.23 Copy of letter inviting Black to become a member of the Design Council, 8 December 1976.
- A.24 Copy of certificate of Black's receipt of a Royal Medal to commemorate the Silver Jubilee of Queen Elizabeth II, 7 June 1977
- A.25 Copy of letter *re* the submission of Black's name for appointment to Commander of the Order of the British Empire, 14 November 1979.

- A.25a 1p typescript entitled 'The Joe Black Society' setting out the purpose and membership of a newly established association of graduates and staff of the University of Bath School of Engineering, nd *ca* 1985.
- A.26 3pp typescript introductory address delivered on the conferment of the degree of Doctor of Technology, *Honoris Causa*, [University of Loughborough, 1990].

See also F.20.
- A.27, A.28 Doctor of Science, *Honoris Causa*, City University, London, 2 December 1991.
- A.27 Certificate and congregation programme.
- A.28 2pp typescript introductory address delivered by A. Jebb.
- A.29 Certificate to commemorate fifty years of membership of the Royal Aeronautical Society, 1 July 1993.
- A.30-A.36 PHOTOGRAPHS 1976-1989, nd**
- See also F.11-F.20.
- A.30 Colour photograph of the staff and students of the School of Engineering, University of Bath, June 1976.

See also F.15.
- A.31, A.32 Design Council Award presentation ceremony, 1978.
- A.31 Four black and white photographs.
- A.32 Two colour photographs

- A.33 Colour photograph of the staff and students of the School of Mechanical Engineering, University of Bath, (?)June 1980.
- A.34 Black and white photograph endorsed 'Kenneth Grange, Jane Priestman, Chris Laughton, Wally Olins, Alan Livingstone: Chartered Society of Designers Seminar, Truro, April 21 1989'.
- A.35 Untitled black and white photograph showing Black receiving a (?)Design Council award, nd.
- A.36 Three black and white portrait photographs of Black, nd.

SECTION B RESEARCH B.1-B.47

This section contains material relating to several aspects of Black's research work. It includes his MSc thesis, submitted in November 1944, some early engineering drawings completed by Black while he was employed by Robert Craig and Sons (Engineers) Ltd of Belfast in 1938 and papers relating to Black's research on Gustave Eiffel's early work on aerodynamics. Papers, reports and notes relating to Black's supervision of University of Bath research into the design of stretchers used in ambulances and the production a 'floating stretcher' to reduce the detrimental effects of road vibration on patients in transit is also presented in this section.

B.1	THESIS
B.2-B.30	'FLOATING STRETCHER'
B.31-B.42	GUSTAVE EIFFEL
B.43-B.47	MISCELLANEOUS

B.1 THESIS 1944

MSc thesis (bound) entitled 'The Flow of Compressible Fluids at High Speeds with Particular Reference to Aeronautics', J. Black, Queen's University, Belfast, November 1944.

See also C.1, C.2.

B.2-B.30 **'FLOATING STRETCHER'** **1981-1987**

During the 1981-1982 University of Bath academic year the problem of vibration in commercial vehicle-based ambulances used in the UK was the subject of a final year undergraduate project supervised by Black. In late 1982 University of Bath postgraduates undertook a project to devise a way to reduce the discomfort and medical deterioration caused by stretcher vibration in ambulances. The 'floating stretcher', designed to alleviate problems of road vibration by means of a specially sprung suspension system which isolated the patient during transit, was the result of collaborative work between the University of Bath and Bath Institute of Medical Engineering (BIME).

The material in this sub-section relates to Black's involvement in the design and development of the stretcher and his unsuccessful attempts to secure its widespread adoption by UK health services.

The presentation is chronological.

See also Appendix II.

- B.1 7pp typescript entitled 'Medical Evidence which Indicates the Need to Improve the Comfort and Reduce the Levels of Vibration During the Ambulance Journey', M. A. Foster and N. G. Luard, 14 December 1981.

- B.3 4pp typescript entitled 'A Literature Search to Determine Undesirable Frequencies of Vibration', M. A. Foster and N. G. Luard, 15 December 1981.

- B.4 European Patent Specification Application No. 83305088.3 entitled 'Vibration Damping Supports', University of Bath, 2 September 1983.

- B.5 *Interim Report: Stretcher Suspension System for Vibration Isolation in Ambulances* (Report No. 658) D. Leyshon, School of Engineering, University of Bath, September 1983.

- B.6 Copy of engineers' drawing entitled 'Camp Plate', 5 December 1983.

- B.7 Engineers' drawing entitled 'Isolator Assembly', 4 January 1984.

- B.8 2pp typescript notes with 2pp graphs entitled 'Tests on Hydragas Stretcher Suspension System', D. Leyshon, 13 March 1984.

- B.9 Graph entitled 'Graph 1 - Hydragas Suspension System: Transmissibility with Load Mass of 60kg', 14 March 1984.

- B.10 2pp typescript notes with 1p graph entitled 'Tests on Hydragas Suspension System', D. Leyshon, 4 April 1984.

- B.11 2pp typescript entitled 'Comments on British Patent Office Search Re: British Patent Application No. 8323591', 31 July 1984.

- B.12 2pp typescript entitled 'Suspension Systems for Stretchers in Ambulances', J. Black, July 1984.

- B.13 Hardback notebook containing notes and a diary of developments *re* work on the design and promotion of the 'floating stretcher', July 1984-July 1985.

- B.14 1p typescript notes with 1p graph entitled 'Tests on Hydragas Suspension System', D. Leyshon, 20 September 1984.

- B.15 3pp typescript entitled 'Comments on US Patent Search Report Re: US Application No. 525816', 21 January 1985.

- B.16 University of Bath internal memo from D. Leyshon to J. Black with 1p graph *re* vertical mode transmissibility, 1 February 1985.

- B.17 University of Bath internal memo from D. Leyshon to J. Black with 1p graph *re* vertical mode transmissibility, 4 February 1985.

- B.18 Engineers' drawing entitled 'Standard Displacer 700 Series \pm 40mm Stroke', 14 February 1985.

- B.19 2pp typescript notes entitled 'Hydrogas Suspension System: Vertical Transmissibility' with 2pp graphs and covering letter, 13 February 1986.
- B.20 Copy of Certificate of Grant of United Kingdom Patent entitled 'Vibration Damping Supports', 25 June 1986.
- B.21 *The BIME Floating Stretcher*, with covering correspondence, 1987.
- B.22 14pp manuscript notes and graphs entitled 'Friction Damping' recording the results of mathematical modelling of a vibration isolation system with friction damping as the medium, nd.
- B.23 2pp untitled manuscript notes re experimental and design work on the 'floating stretcher', nd.
- B.24 8pp manuscript notes and graphs entitled 'Hydragas Spring Modelling', nd.
- B.25 22pp typescript with illustrative figures entitled 'Vibration Damping Supports', nd.
- B.26 Background material re US patent applications, 1973, 1974, 1978, 1981.
- B.27 Background material re European patent applications, 1981, 1984.
- B.28 Background material re stretcher design and vibration, 1973-1986.
- B.29 Eight black and white and one colour photographs of the 'floating stretcher' prototype and its components, nd.
- B.30 Balsa wood model of the 'floating stretcher' suspension mechanism, nd.

- B.31-B.42 GUSTAVE EIFFEL 1984-1990**
- This sub-section contains material relating to research carried out by Black on Gustave Eiffel and his contribution to the development of experimental aerodynamics. Black's work resulted in a paper that was published in *The Aeronautical Journal* in 1990.
- See also C.12.
- B.31 Correspondence and two colour photographs re Black's research on Eiffel, September 1984-July 1985.
- B.32 Correspondence re the possibility of Black giving a talk on Eiffel to the Historical Group of the Royal Aeronautical Society, March 1990.
- B.33 2pp typescript notes (annotated) entitled 'Comments on Prof. Black's paper on Eiffel', J. A. Bagley, June 1990.
- B.34 3pp typescript list of references with copies of illustrative figures, nd.
- B.35 2pp manuscript notes re reference works on Eiffel and his work, nd.
- B.36-B.42 Background material, 1964-1990, nd.
- Copies of papers, newspaper cuttings, post cards, photographs and publication extracts re Gustave Eiffel and his work used by Black as a research resource.
- Seven folders.

B.43-B.47	MISCELLANEOUS	1938-1980
B.43	Blue print drawings entitled '3" Centrifugal Pump Enclosed Impeller', J. Black, Robert Craig and Sons (Engineers) Ltd, Belfast, 4 May 1938. See also A.6.	
B.44	Softback notebook containing general notes on research, committee meetings, teaching and conferences, 1968-1973.	
B.45	Thirty-eight black and white untitled photographs <i>re</i> research into aerodynamics and aeroplane wing design, nd.	
B.46, B.47	Background material, 1956-1980. Publications, offprints and extracts <i>re</i> engineering design, the history of flight and aerodynamics. Two folders.	

SECTION C	PUBLICATIONS	C.1-C.18
	This section contains material relating to papers and other publications written by Black between 1947 and 2000. It includes a copy of his early ground-breaking book, <i>An Introduction to Aerodynamic Compressibility</i> (1947) and correspondence and drafts relating to some of his papers, on subjects ranging from supersonics to Renaissance art, published in various journals. A report compiled by the Science and Engineering Research Council (SERC) Engineering Design Working Party of which Black was a member is also included in this section. The presentation is chronological, 1947-2000.	
C.1, C.2	<i>An Introduction to Aerodynamic Compressibility</i> , J. Black, London, 1947.	
C.1	Published volume.	
C.2	Typescript proof review.	
C.3, C.4	'Ernst Mach - Pioneer of Supersonics', <i>Journal of the Royal Aeronautical Society</i> 54 pp371-377, 1950.	
C.3	Photocopied extract.	
C.4	Correspondence, October-December 1957.	
C.5	1p typescript list of Black's publications, 1946-1956.	
C.6	'A Systems Approach to Training Instruction', <i>British Association for Commercial and Industrial Education</i> 27(2) pp35-39, June 1973.	
C.7	Newspaper cuttings of correspondence <i>re</i> the teaching of engineering design at British universities, October 1977.	

- C.8 *Report of the Engineering Design Working Party*, Science and Engineering Research Council (SERC), 1983.
Black was a member of the working party.
- C.9 Copy of Black's review of *Industrial Design in Engineering: a Marriage of Techniques*, ed C. H. Flurscheim, *Times Higher Education Supplement*, 25 May 1984.
- C.10 *Designing Our Technological Future: A paper Based on a Summary of Lectures Given by Professor Joseph Black, CBE, FEng, Mr Geoffrey Shillito and Mr Merrick W Taylor, FBIM, FRSA to the Foundation for Science and Technology*, British Gas, November 1985.
- C.11 *Engineering Design Education on Undergraduate Degree Courses in UK Universities and Polytechnics*, J. Black, Fellowship of Engineering, December 1986.
- C.12 'Gustave Eiffel - Pioneer of Experimental Aerodynamics', *The Aeronautical Journal* **94(937)** pp231-244, August/September 1990.
Correspondence and papers re the publication and distribution of copies of Black's paper, June 1990-February 1991.
See also B.31-B.42.
- C.13 'Saving the Lagoon', *History Today* **48(4)** pp10-16, April 1998.
See also F.9.
- C.14 13pp typescript draft entitled 'A Renaissance Artist and the New Inventions: The Nova Reperta (1553) of Johannes Stradanus (1523-1605)' with 5pp illustrative figures, February 1999.
- C.15 Correspondence and newspaper cuttings re a letter written by Black published in *The Times* concerning government agreements with foreign car manufacturers, 2 August 2000.

- C.16 5pp typescript notes with illustrative figures entitled 'The Historical Development of Flight - The Forerunners, BC to 1899', nd.
- C.17 4pp typescript entitled 'UGC Reserves: Educational Development and Implementation', J. Black, nd.
Black was a member of the University Grants Committee (UGC) from 1964 to 1974.
- C.18 7pp typescript (extract) entitled 'The Allocation and Assessment of Final Year Project Work in the Engineering Degree Course at the University of Bath', J. Black, nd.

SECTION D LECTURES AND SPEECHES

D.1-D.26

This section contains material relating to lectures and speeches delivered by Black at various events and venues between 1971 and 1995. The typescript lectures are often accompanied by lists of slides, illustrative figures and diagrams, and overhead projector transparencies.

Most of the notes and typescript drafts are not dated. It is not always possible therefore to identify the occasion for which the lectures were prepared. Following his retirement from the University of Bath in 1985 Black was awarded a Leverhulme Trust Emeritus Fellowship to undertake research on engineering in art. He subsequently gave many illustrated lectures on this subject to a wide range of audiences. Much of the undated material in this section appears to relate to this period of Black's work.

Dated lectures have been placed at the beginning of the sequence in chronological order while those without any discernible date have been placed in alphabetical order of title at the end of the sequence.

- D.1, D.2 'Two Thousand Years of Fluid Motion - From Aquae Sulis to Sonic Booms', Bath University of Technology Public Lecture, 9 February 1971.
- D.1 4pp typescript list of slides entitled 'University of Bath School of Engineering Lecture: Two Thousand Years of Fluid Motion'.
- D.2 Ticket.
- D.3 10pp typescript entitled 'Teachers, Libraries and the New Resources - A Plea for an Educational Partnership', address delivered to a Standing Conference of National and University Libraries (SCONUL) Meeting on Non-Print Material, University of Surrey, December 1971.
- D.4 2pp typescript notes entitled 'Lecture to Wandsworth School: How Man Harnessed the Power of Water and Wind' with 2pp typescript list of slides, 9 January 1973.

- D.5 2pp manuscript list of slides entitled 'Lecture to Imperial College', 19 March 1977.
- D.6 8pp typescript lecture cards entitled 'Engineering Employers Federation', nd latest bibliographical reference 1984.
- D.7 11pp typescript speech entitled '50th Anniversary of the Department of Aeronautical Engineering, University of Bristol' nd ca 1995.
- D.8 10pp typescript (annotated) lecture entitled 'The Conquest of Flight', nd.
- D.9-D.14 Various typescript lectures beginning 'Civilisation emerged as man learnt ...', nd.
- D.9 30pp untitled typescript labelled 'Cranfield Seminar, Feb. 8'.
- D.10 30pp untitled typescript with amendments.
- D.11 30pp untitled typescript draft (annotated).
- D.12 4pp untitled typescript draft.
- D.13 2pp manuscript list of slides.
- D.14 Various manuscript and typescript versions of an illustrative figure depicting the chronology of developments in man's utilisation of water and wind.
- D.15 'History of Fluid Mechanics - Man the Thinker'. Contents of folder so inscribed.
2pp manuscript list of slides with illustrative diagrams and 14 slides, nd.

D.16-D.21	'O/H Transparencies: Design Council'. Contents of folder so inscribed divide into five for ease of reference.
D.16	3pp manuscript notes entitled 'Design Teaching, I. C. July 15', nd.
D.17-D.21	40 transparencies entitled 'Systematic Engineering Design', nd. Five folders.
D.22	1p typescript entitled 'Seminar: Research in Engineering Design', nd.
D.23	3pp typescript lecture notes entitled 'What is Research in Engineering Design?', nd.
D.24	2pp untitled manuscript draft beginning 'In Part 1 of this chronicle of man's achievements ...', nd.
D.25	5pp typescript untitled lecture cards (annotated), nd.
D.26	6pp typescript and manuscript untitled lecture cards, nd.

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SECTION E	APPENDIX I	E.1-E.30
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This section contains a small amount of material, relating mainly to publications and lectures and speeches, received in July 2002 after the main catalogue of the correspondence and papers of Joseph Black (no.107/6/02) was complete. The material covers the period 1947-1996 and supplements the material presented in Sections A, C and D of the original catalogue.

E.1	BIOGRAPHICAL
E.2-E.20	PUBLICATIONS
E.21-E.30	LECTURES AND SPEECHES

E.1	BIOGRAPHICAL	1974
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E.1 Newspaper cutting *re* Leverhulme Trust grant received by Black and T. J. Floyd for the development of engineering teaching materials, *Bath and Wilts Evening Chronicle*, 6 March 1974.

E.2-E.20	PUBLICATIONS	1947-1976
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This sub-section contains material relating to papers and other publications written by Black between 1947 and 1976. It includes copies of papers published in a number of journals and correspondence relating to newspaper articles in which Black was interested.

The presentation is chronological.

E.2 'Wind Tunnels', *Discovery VIII (5)* pp136-141, May 1947.

E.3 'Supersonic Flow Investigations with Hydraulic Analogy Water Channel' with O. P. Mediratta *The Aeronautical Quarterly 2*, February 1951.

- E.4 'A Note on the Vortex Patterns in the Boundary Layer Flow of a Swept-Back Wing', *Journal of the Royal Aeronautical Society*, April 1952.
- E.5 'Research Review', *Aeronautics* pp36-39, November 1952.
- E.6 'The Advance of Supersonic Flight', *Discovery* pp250-255, August 1953.
- E.7 'An Experimental Investigation of the Effects of Deformation on the Aerodynamic Characteristics of a Sweptback Wing', 26pp typescript with illustrative figures and photographic appendices, September 1953.
- E.8 'Some Measurements of Leading Edge Separation Bubbles on a 10 per cent Thick Symmetrical Aerofoil', *Journal of the Royal Aeronautical Society* **57** pp819-823, December 1953.
- E.9 'Pressure Distribution and Boundary Layer Investigations on 44 Degree Swept-back Tapered Wing', Ministry of Supply Aeronautical Research Council Technical Report, 1953.
- E.10 'Flow Studies of the Leading Edge Stall on a Swept-Back Wing at High Incidence', *Journal of the Royal Aeronautical Society* **60** pp51-60, January 1956.
- E.11 'An Experimental Investigation of the Effects of Deformation on the Aerodynamic Characteristics of a Swept-back Wing' Ministry of Supply Aeronautical Research Council Technical Report, 1956.
- E.12 Correspondence *re* a contribution on American higher technical education by Black to a publication of the Three Counties Industrial Education Association, April-September 1963.
- E.13 'The Colleges of Advanced Technology and Industry', 4pp typescript (annotated) with covering letter *re* possible publication, September 1964.

- E.14 'British Universities since the Brynmor Jones Report', *Journal of Education Technology*, nd latest bibliographic reference 1965.
- E.15 'Education and Training in the Second Century', *The Aeronautical Journal* **73(698)** pp91-100, February 1969.
- E.16 'Supersonic Flow in the Animal World', *The Aeronautical Journal* pp319, 320, May 1972.
- E.17 Correspondence, papers and cuttings *re* articles on teaching engineering published in *The Times Higher Education Supplement*, 1972-1974.
- E.18 'Much More than a Repository for Books', *The Times Higher Education Supplement*, 2 February 1973.
- E.19 'The Challenge of New Media: Systems Approach to Educational Technology' *Council of Europe Information Bulletin* **3**, 1974.
- E.20 'Allocation and Assessment of Project Work in the Final Year of the Engineering Degree Course at the University of Bath', *Assessment in Higher Education* **1(1)** pp35-54, September 1975.
- E.21-E.30 LECTURES AND SPEECHES 1966-1996**
- This sub-section contains copies of lectures and speeches on a range of topics relating to engineering teaching given by Black at various events between 1966 and 1996. It includes the script of a short television broadcast on education technology (E.24).
- The presentation is chronological.
- E.21 15pp typescript lecture (annotated) entitled 'Change in the British University Pattern', 2 April 1966.

- E.22 12pp typescript lecture (annotated) entitled 'How New Methods and Concepts Can Help Engineering Teachers – an Educational Technology Workshop' with P. McMahon, October 1974.
- E.23 10pp typescript lecture (annotated) with appendices entitled 'NECCTA Conference', 25 March 1975.
- E.24 6pp typescript television broadcast script (annotated) entitled 'A Challenge of the New Media to the Librarian', 6 November 1975.
- E.25 'Heat and Mass Transfer in Ink Drying and Infra-Red Dryness Measurement', Sixth Thermodynamics and Fluid Mechanics Convention, University of Durham, UK, 6-8 April 1976.
- E.26 'Keynote Address - Institute of Medical and Biological Illustration (IMBI) Annual Conference, University of Bath, September 1976', *Medical and Biological Illustration* 27 pp99-102, 1977.
- E.27 5pp typescript address (annotated) entitled 'The Impact of New Technology on Engineering Curricula', Goals of Engineering Education Conference, Leicester Polytechnic, UK, 15-16 April 1980.
- E.28 4pp typescript oration given on the occasion of the presentation of the degree of Doctor of Science, Honoris Causa to Sir Basil Blackwell, University of Bath, 4 July 1984.
- E.29 4pp typescript notes (annotated) entitled 'Design and Manufacture Seminar – University of Birmingham' with 2pp manuscript notes, 6 December 1984.
- E.30 10pp typescript address (annotated) entitled 'Department of Aerospace Engineering; 50th Anniversary', University of Bristol, nd ca 1995.
- See also D.7.

SECTION F APPENDIX II F.1-F.20

This section contains a small amount of supplemental material relating mainly to Joseph Black's involvement in work on the design and development of an ambulance stretcher suspension system. Received after the main collection catalogue had been completed and published, the material covers the period 1949-1990. It was donated by Professor Sir Nick Black, Professor Joseph Black's son, in January 2018 and February 2019.

See also B.2-B.30 and A.30-A.36.

- F.1-F.7 Correspondence, notes, papers, drawings and patent specifications *re* the 'floating stretcher', 1982-1989.
Seven folders.
- F.8 45pp typescript draft (annotated) entitled 'Turner and Victoria Engineering with appendix of copied images, nd latest bibliographical reference 1992.
- F.9 16pp typescript draft (annotated) entitled 'Saving the Lagoon: A 15th Century Venetian Environmental Engineering Achievement' with appendix of copied images, 6 September 1997.
See also C.13.
- F.10 13pp typescript draft entitled 'A Renaissance Artist and the New Inventions: The *Nova Reperta* (1553) of Johannes Stradanus (1523-1605)' with appendix of copied images, nd latest bibliographical reference 1998.
- F.11 Black and white photograph of the staff and students of the Faculty of Engineering, University of Bristol, Spring 1947.
- F.12 Black and white photograph of the staff and students of the Faculty of Engineering, University of Bristol, May 1949.

- F.13 Black and white photograph of Black on a visit to ?Sud-Aviation showing an aeroplane (?Concorde) under construction, 1969.
- F.14 Colour photograph showing with Black with HRH The Duke of Edinburgh inscribed on the back 'Presentation: Engineering Components, Inverness', June 1977.
- F.15 Colour photograph of the staff and students of the School of Engineering, University of Bath, June 1981.
See also A.30.
- F.16 Black and white photograph showing Black presenting an award inscribed on the back 'Sportsnight, School of Engineering', February 1983.
- F.17 Two colour photographs of Black at his desk in his office in the School of Engineering, 4 East, University of Bath, May 1985.
- F.18 Three colour photographs of Black's retirement presentation, July 1985.
- F.19 Colour photograph of showing Black presenting an award to two graduating students inscribed on the back 'Joseph Black Prize', 1987.
- F.20 Two colour photographs of showing Black at a ceremony for the conferment of the degree of Doctor of Technology, *Honoris Causa*, University of Loughborough, July 1990.
See also A.26.