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Catalogue of the papers and correspondence of

Francis John Worsley Roughton FRS

(1899 - 1972)

by Peter Harper and Timothy E. Powell

NCUACS catalogue no. 88/1/00

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GENERAL INTRODUCTION

PROVENANCE

The papers were received in April 1999 from Dr Rosemary Summers, daughter.

OUTLINE OF THE CAREER OF F.J.W. ROUGHTON

Francis John Worsley Roughton was born on 6 January 1899 at Kettering where his father was the fifth successive Roughton to practice medicine. He was educated at Winchester College (Scholar) and Trinity College Cambridge (Scholar). As a young man he suffered from attacks of paroxysmal tachycardia. In consequence he was unable to serve in the First World War coming up to Trinity in 1917 on leaving Winchester. He was also advised that his cardiac condition precluded his planned career in medicine. His academic distinction was such (1st Class Natural Sciences Tripos Part I) that although he was unable to take his Part II examinations because of repeated cardiac attacks he was treated as if he had done so, and became a graduate student. On completion of his thesis he was elected to a Fellowship at Trinity (1923). He was successively Lecturer in Biochemistry, 1923-1927 and Lecturer in Physiology, 1927-1947, at Cambridge. In 1925 he married Alice Hopkinson whose father had been Professor of Engineering at Cambridge. They had two children Geoffrey and Rosemary.

The foundations of Roughton's research career were laid working with H. Hartridge to make the first rapid kinetic measurement on a solution by the mixing method. His interest in these early years was mainly physiology and Roughton, with three other young Cambridge scientists M. Dixon, J. Needham and H. Tunnicliffe, belonged to an informal association called the Canula Club which met to discuss topics in physiology. In 1929 he was Rockefeller travelling fellow in the USA and was back again in America in 1940 at the Harvard Fatigue Laboratory, conducting war-related research, chiefly on the effects of carbon monoxide on respiration.

Roughton returned to Cambridge at the end of the Second World War and in 1947 accepted an invitation to become the second John Humphrey Plummer Professor of Colloid Science (in succession to E.K. Rideal) and Head of the Department of Colloid Science. He presided over a rather disparate group in the Department whose interests ranged from physical chemistry of proteins to ore flotation. During the latter part of his tenure he attempted to re-direct the work of the Department towards the study of membranes and biological surface effects. However, such were the doubts about the existence of a definable subject called Colloid Science that on his retirement in 1966 the title of the department was extinguished in favour of Biophysics. During the last 15 years of his

life he spent an increasing amount of time in California and Milan working on the basic problems of respiratory physiology and of the carbon dioxide - haemoglobin interaction.

Roughton was elected Fellow of the Royal Society in 1936. He died at Cambridge on 29 April 1972.

For a fuller account of the life and career of Roughton see Q.H. Gibson's memoir for the Royal Society on which this outline has freely drawn (*Biographical Memoirs of Fellows of the Royal Society*, vol 19 (1973), 563-582).

DESCRIPTION OF THE COLLECTION

The material is presented in the order given in the List of Contents. It covers the period 1905-1973.

Section A, Biographical, is the largest in the collection. There is some documentation of school, undergraduate and early scientific career but the principal component is a sequence of letters and postcards from Roughton to his mother, 1905-1929. There are also small groups of letters from 'friends' including scientific and Trinity College Cambridge colleagues from the period ca 1920-1925.

Section B, Department of Colloid Science, principally relates to the future of colloid science and the department on Roughton's retirement. The material includes Roughton's correspondence with the university authorities and scientific colleagues and papers by him and others on future of colloid science at Cambridge.

Section C, Publications, consists of a list of publications and a set of off-prints 1921-1973, the last item in the set being an off-print of Q.H. Gibson's memoir for the Royal Society.

Section D, Scientific correspondence, is not extensive but of some importance as relating to Roughton's Second World War research at Harvard. His correspondents are E.D. Adrian, W.L. Bragg, R.H. Fowler and A.V. Hill.

There is also an index of correspondents.

LOCATION OF OTHER MATERIAL

The principal deposit of Roughton papers is housed at the American Philosophical Society Library, Philadelphia, Pennsylvania, USA.

ACKNOWLEDGEMENTS

We are grateful to Dr Summers for making the papers available for cataloguing.

Peter Harper
Timothy E. Powell
Bath 2000

SECTION A	BIOGRAPHICAL	A.1-A.184
A.1	<p>'Design of the catalogue and description of the contents of the papers and documents left by Professor F.J.W. Roughton, F.R.S. (1899-1972)'.</p> <p>This document relates to the principal deposit of Roughton papers housed by the Library of the American Philosophical Society, Philadelphia, Pennsylvania, USA.</p>	
A.2-A.12	School Education	
A.2-A.4	Holmwood School, Freshfield.	
A.2	School reports, 1909-1912.	
A.3	Miscellaneous papers from Holmwood School, 1910.	
A.4	Essay on Julius Caesar, possibly from Roughton's time at Holmwood School, n.d.	
A.5-A.12	Winchester College	
A.5	Scholarship 1912.	
	Letters and telegrams addressed to Roughton's parents. Unindexed.	
A.6-A.8	School reports.	
A.6	1912.	
A.7	1913.	
A.8	1915-1917.	
A.9	Timetables, n.d.	

Biographical

- A.10 Draft letter from Roughton's father to the headmaster, M.J. Rendall, *re* his son's decision that he would like to be a medical man and the consequences of this decision for his education, 1 February 1914.
- Letter from L.L. Garbutt at Winchester College to Roughton's father *re* his wishes 'in the matter of practical chemistry', 3 April 1916.
- A.11 Miscellaneous papers from Winchester College including printed letter from headmaster, M.J. Rendall *re* harvest plans proposed by the National Service Department (Agricultural Section), 29 May 1917.
- A.12 Exercise book used for extensive notes on Greek grammar. N.d.
- A.13-A.28 Notes, principally on mathematics and physics. Probably relate to Roughton's undergraduate studies at Trinity College, Cambridge.
- Contents of envelope divided into sixteen for ease of reference.
- 1 sheet only dated '6/5/18' (A.16).
- A.29, A.30 'A Sherlock Holmes Examination'.
- A.29 Copy of *The Trinity Magazine*, February 1921.
- 'A Sherlock Holmes Examination' appears on pp 53-55 of the magazine.
- A.30 Letter and manuscript notes and drafts relating to the Sherlock Holmes examination paper found loose at the front of the magazine.
- A.31 Michael Foster Research Studentship, 1921.
- Draft application, notice of election from *Cambridge University Reporter*, letter of congratulations from M.J. Rendall, headmaster of Winchester College.

Biographical

- A.32 George Henry Lewes Studentship, n.d.
- In consequence of his appointment to the George Henry Lewes studentship Roughton resigned from the Michael Foster studentship.
- Press announcement with manuscript draft of the same; copy of trust deed of the studentship.
- A.33-A.36 Fellowship, Trinity College, 1923.
- Letters and telegrams of congratulation; press-cutting.
- 4 folders.
- A.33 includes letter from University Registry to the effect that Roughton had been posted as passed in Physics and Chemistry, 21 March 1918. Found with Fellowship letters.
- A.37 University Lectureship in Biochemistry, 1924.
- Notices of vacancy and appointment, letters of congratulation.
- A.38 Rolleston Prize, 1924.
- Letters and telegram of congratulation; press-cutting.
- A.39-A.183 Family and personal correspondence, 1905-1929, n.d.
- A.39-A.164 Roughton's letters and postcards to his mother 1905-1929, n.d.
- The sequence includes letters and postcards from Holmwood School, Freshfield, Winchester College and Trinity College Cambridge and from a scientific visit to the USA in 1928-1929. Almost all Roughton's letters are undated and have been ordered from the postmarks on envelopes which have therefore been retained. Some of the ordering by year and month is tentative from the difficulty in deciphering postmarks.
- This sequence includes a small number of letters from Roughton to his father.
- A.39 1905, n.d.
- 1905 letter is addressed to 'My dear daddy'.

Biographical

- | | |
|------|--|
| A.40 | 1911 June, July.

Includes 1 letter to Roughton's father. |
| A.41 | 1912 January, February.

Includes 1 letter to Roughton's father. |
| A.42 | 1913 April - June. |
| A.43 | 1913 July. |
| A.44 | 1913 October, November.

Includes 1 letter from Roughton's father. |
| A.45 | 1913 December. |
| A.46 | 1914 January, February. |
| A.47 | 1914 March. |
| A.48 | 1914 May. |
| A.49 | 1914 June. |
| A.50 | 1914 July. |
| A.51 | 1914 September. |
| A.52 | 1914 October. |

Biographical

A.53	1914 November.
A.54	1914 December.
A.55	1915 February. Includes 1 letter to Roughton's father.
A.56	1915 March.
A.57	1915 April.
A.58	1915 May.
A.59	1915 June.
A.60	1915 July.
A.61	1915 September.
A.62	1915 October.
A.63	1915 November.
A.64	1915 December.
A.65	1916 January.

Biographical

- | | |
|------|--|
| A.66 | 1916 February. |
| | Includes 1 letter to Roughton's father. |
| A.67 | 1916 March, April. |
| A.68 | 1916 May. |
| A.69 | 1916 June. |
| A.70 | 1916 July. |
| A.71 | 1916 September. |
| A.72 | 1916 October. |
| | Includes 1 letter to Roughton's father. |
| A.73 | 1916 November. |
| A.74 | 1916 December. |
| A.75 | 1916 (month unidentified). |
| A.76 | 1917 January. |
| A.77 | 1917 February. |
| | Includes printed letters from the headmaster of Winchester College, M.J. Rendall <i>re</i> the food situation and an epidemic form of pneumonia at the school. |

Biographical

- | | |
|------------|---|
| A.78 | 1917 March. |
| A.79 | 1917 April.

Includes medical opinions <i>re</i> Roughton's heart condition, paroxysmal tachycardia, and his exemption from military service. |
| A.80 | 1917 May. |
| A.81 | 1917 June. |
| A.82 | 1917 July. |
| A.83 | 1917 September. |
| A.84, A.85 | 1917 October.

2 folders. |
| A.86 | 1917 November. |
| A.87 | 1917 December.

Includes 1 letter to Roughton's father from the headmaster of Winchester College, M.J. Rendall. |
| A.88 | 1917 (month unidentified). |
| A.89 | 1918 January. |
| A.90 | 1918 February. |

Biographical

A.91	1918 March.
A.92	1918 April - June.
A.93	1918 July. Includes 1 letter to Roughton's father.
A.94	1918 August.
A.95	1918 October.
A.96	1918 November.
A.97	1918 December.
A.98	1919 January.
A.99	1919 February.
A.100	1919 March, April.
A.101	1919 May.
A.102	1919 June.
A.103	1919 July. Includes 1 letter to Roughton's father.

Biographical

A.104	1919 August.
A.105	1919 October. Includes 2 letters to Roughton's father.
A.106	1919 November. Includes 1 letter to Roughton's father.
A.107	1919 December.
A.108	1920 January.
A.109	1920 February.
A.110	1920 March. Includes 'Provisional Time Table for Easter Term 1920'.
A.111	1920 May.
A.112	1920 June - August.
A.113	1920 October, November.
A.114	1920 December.
A.115	1921 January.
A.116	1921 February.

Biographical

A.117	1921 March.
A.118	1921 April.
A.119	1921 May, June.
A.120	1921 July.
A.121	1921 August-October.
A.122	1921 December.
A.123	1921 (month unidentified).
A.124	1922 January.
A.125	1922 February.
A.126	1922 March - May.
A.127	1922 June.
A.128	1922 July, August.
A.129	1922 October.
A.130	1922 November, December.

Biographical

A.131	1923-1924.
A.132	1925-1926.
A.133	1927 January.
A.134	1927 March.
A.135	1927 April.
A.136	1927 May.
A.137	1927 June.
A.138	1927 July, August.
A.139	1927 September, October.
A.140	1927 November, December.
A.141	1928 January, February.
A.142	1928 March, April.
A.143	1928 May, June.
A.144	1928 July.

Biographical

- A.145 1928 October.

Includes 1 letter from Roughton's wife Alice.
- A.146 1928 November.

Includes 2 letters from Roughton's wife Alice and 1 letter from Roughton to his father.
- A.147, A.148 1928 December.

2 folders.

A.148 includes 1 letter from Roughton's wife Alice and a Christmas greetings cable.
- A.149 1929 January.
- A.150 1929 February.
- A.151 1929 March.
- A.152-A.161 N.d. Letters written from Winchester College.

10 folders.

A.154 includes 2 letters to Roughton's father and A.155 and A.158 include 1 letter each to Roughton's father.
- A.162, A. 163 N.d. Letters and postcards mostly written from Trinity College Cambridge and Union Society Cambridge.

2 folders.

A.162 includes a letter which may have been written on a return visit to Winchester.
- A.164 N.d. Letter written from 27 Millington Road, Cambridge.

Biographical

A.165-A.172	'Friends Letters'. Contents of folder so inscribed divided into nine for ease of reference: 1919, 1922-1924, n.d.
A.165	1919.
A.166	1922.
A.167-A.168A	1923. 3 folders.
A.169, A.170	1924. 2 folders.
A.171, A.172	N.d. 2 folders.
A.173-A.179	'Friends'. Contents of folder so inscribed divided into seven for ease of reference: 1923-1925, n.d.
A.173	1923.
A.174-A.177	1924. 4 folders.
A.178	1925.
A.179	N.d.
A.180-A.184	Contents of folder divided into five for ease of reference: miscellaneous correspondence 1917-1925, n.d.

Biographical

- | | | |
|-------|------------|--|
| A.180 | 1917-1918. | Letter of 13 December 1917 informed Roughton that he had been elected to a Scholarship of £80 a year at Trinity. |
| A.181 | 1919. | |
| A.182 | 1920-1922. | Includes notification of Roughton's election as a member of the Physiological Society. |
| A.183 | 1924-1925. | |
| A.184 | N.d. | |

SECTION B

DEPARTMENT OF COLLOID SCIENCE

B.1-B.55

In 1947 Roughton succeeded E.K. Rideal as the second John Humphrey Plummer Professor of Colloid Science and Head of the Department of Colloid Science, University of Cambridge. On his retirement in 1966 'the doubts about the existence of a definable subject called Colloid Science were so strongly and widely shared that the title of the department was extinguished in favour of Biophysics' (Q.H. Gibson, 'Francis John Worsley Roughton', *Biographical Memoirs of Fellows of the Royal Society*, vol 19 (1973), p 566).

The papers principally relate to the future of colloid science and the department on Roughton's retirement.

An historical account of the development of the department is given in its first Annual Report 1955-1956. See B.1.

B.1-B.3 Annual Reports 1955-1961.

B.1 1955-1956. With manuscript annotation.

This was the first Annual Report from the Department of Colloid Science.

1956-1957.

B.2 1957-1958.

1958-1959.

B.3 1959-1960.

1960-1961.

B.4-B.46 General correspondence and papers, 1951-1968.

B.4 Establishment at 1 January 1951.

Department of Colloid Science

- B.5 'Preliminary statement of needs of the Department of Colloid Science for the Quinquennium 1957-1962', April 1955.
- 'Needs of Department of Colloid Science as from October 1955'.
- Papers *re* Rockefeller Foundation grant, October 1955.
- B.6 Faculty of Physics and Chemistry 'Needs of the Departments, 1956-57'.
- Page 2 only of minutes of meeting, dated at the top of the page in manuscript '27 Jan 1956'.
- Page 3 only of statement of needs, dated at the top of the page in manuscript '1956/57'.
- 4pp typescript statement by Roughton on the formation of an Advisory Committee for Colloid Science, dated at the top of the first page in manuscript '1956'.
- B.7, B.8 Correspondence between Roughton and H.M. Taylor, Secretary General of the Faculties, arising from resignation of J.H. Shulman from his position as Reader in Surface Chemistry in the Department of Colloid Science, June-August 1957.
- 2 folders.
- B.9 Report on meeting of the Committee of the General Board on the Department of Metallurgy, 24 June 1957, to consider the future of J.H. Shulman's group working on surface chemistry, dated 1 July 1957, with 2pp typescript 'additions ... accepted by General Board Committee'.
- B.10 Correspondence between Roughton and H.M. Taylor, Secretary General of the Faculties, *re* future arrangements for Colloid Science, September - November 1957.
- Includes ground floor plan of the Department of Physical Chemistry.
- B.11 Papers *re* 'Needs' of the Department of Colloid Science, 1957-1958.
- B.12 'Current changes in the Department of Colloid Science'. Paper summarising the changes, 31 May 1957 - 23 January 1958.

Department of Colloid Science

- B.13 Correspondence between Roughton and H.M. Taylor, Secretary General of the Faculties, *re* future arrangements for Colloid Science, January - March 1958.
- B.14 Correspondence between Roughton and H.M. Taylor, Secretary General of the Faculties, *re* future arrangements for Colloid Science, April - June 1958.
- B.15-B.20 Correspondence and papers *re* Committee of the General Board on matters of concern to the Department of Colloid Science, 1958-1959.
- The Committee met on 14 and 31 July 1958 and 10 February 1959.
- 6 folders.
- B.21 1p typescript draft *re* the problem of smaller departments such as Colloid Science in the University, dated in manuscript at the top of the page '1958'.
- B.22 Correspondence *re* Plummer Chair of Colloid Science and the Oppenheimer benefaction, November 1959.
- B.23 Papers prepared by Roughton for the Committee on the John Humphrey Plummer Professorship of Colloid Science, June 1960.
- B.24 'Revised draft' of report of the Committee on the John Humphrey Plummer Professorship of Colloid Science, July 1960, with related correspondence, July - September 1960.
- B. 25 Papers *re* 'Needs for 1961/2', 'Quinquennial Estimates, 1962-67', 'Needs for the Redevelopment of the Museum Site' and 'The Bles Bequest'. 1960.
- B.26 Correspondence and papers *re* research in the department funded by Government Research Councils, departmental needs for 1962-1963 and accommodation. 1961.

Department of Colloid Science

- B.27 Correspondence and papers principally *re* committee appointed by the General Board to consider the future of work in the Department of Colloid Science, and matters arising. 1962.
- Includes off-print of article on the Department of Colloid Science from *Chemistry and Industry*, 1962.
- B.28 Paper by Roughton with covering letter about the idea of creating for him 'a personal professorship plus research unit ... together with other problems to do with the Department of Colloid Science'. December 1962.
- B.29 Correspondence principally *re* personnel questions arising from decisions to discontinue the Professorship of Colloid Science on Roughton's retirement and wind up the Department, 1963.
- B.30 Papers *re* Departmental 'Needs for 1965-66', the shortage of colloid chemists and the Bles Bequest, 1964 and n.d.
- B.31-B.40 Correspondence and papers *re* the future of the Department of Colloid Science, 1965.
- B.31 January 1965.
- Includes paper by Roughton on 'The History of Biophysics in Cambridge and Great Britain and its Relationships with Colloid Science (with some criticism of the proposal to attach the Professorship of Biophysics to the Plummer Foundation)', 19 January 1965.
- The paper is sub-titled 'Extract from the speech of Professor F.J.W. Roughton at the meeting of the Board of Biology A on 30 November 1964'.
- B.32 February 1965.
- Includes papers by Roughton and minutes of meetings of the Faculty Board of Biology 'A', 15 February and of the Faculty Board of Physics and Chemistry, 19 February.
- B.33 April, May 1965.
- Papers *re* Department of Physics and Department of Physical Chemistry Quinquennial Estimates, 1967-1972.

Department of Colloid Science

- B.34 May 1965.
- Papers *re* the Professorship of Colloid Science, the Bles Bequest and links between the Universities and Government Research Establishments and Industry.
- B.35 June 1965.
- Correspondence *re* the future of Colloid Science.
- B.36 July-September 1965.
- Correspondence, principally *re* personnel questions, arising from the winding up of the Department of Colloid Science.
- B.37 October-December 1965.
- Correspondence and papers *re* Professorship of Colloid Science.
- B.38 November 1965.
- Department of Physics and Department of Physical Chemistry 'Needs for 1966-67'.
- B.39 List of 'Invitations, mostly accepted' on back of two Cambridge University Engineering Department invitation cards for the opening 'of the final stage of the building authorised by the University in 1948' on 3 December 1965.
- The invitations include conferences and consultancy work and continue for a period after Roughton's retirement in 1966.
- B.40 Faculty Board of Physics and Chemistry paper on the future of the Department of Colloid Science, n.d. [?1965].
- B.41-B.43 Correspondence and papers *re* the future of the Department of Colloid Science, 1966.

Department of Colloid Science

- B.41 January, February 1966.
- Includes '1st draft' of statement by J.W. Linnett of his own position and ideas on the future of the Department of Colloid Science, sent to Roughton, with covering letter, 7 January.
- B.42 April, May 1966.
- Includes agenda, memorandum on future accommodation for colloid science and minutes of meeting of the Council of the School of Physical Sciences, 17 May.
- B.43 September, October 1966.
- Includes paper *re* a General Discussion of the Faraday Society on Colloid Stability, Nottingham, September.
- B.44-B.46 January, February 1968.
- Includes correspondence and papers *re* Senate Discussion on Colloid Science, 20 February.
- 3 folders.
- B.47-B.54 Undated papers.
- B.47 Typescript copies of 2 letters from N.K. Adam, 1 of them dated in error in 1936; 'Summary of Professor N.K. Adam's views'.
- B.48 Carbon copy of letter to Vice-Chancellor from ? a senior member of the Department of Colloid Science.
- 'Memorandum to the General Board on the future of the Department of Colloid Science'. This memorandum was prepared by the senior staff of the Department other than Roughton.
- B.49 1p duplicated typescript by J.W. Linnett.

Department of Colloid Science

- B.50-B.54 Manuscript and typescript notes and drafts by Roughton.
5 folders.
- B.55 Miscellaneous printed material 1941-1961.

SECTION C	PUBLICATIONS	C.1-C.7
C.1	List of publications. This list was produced by Roughton's daughter, Dr Rosemary Summers and includes as its final item Q.H. Gibson's biographical memoir of Roughton for the Royal Society, <i>Biographical Memoirs of Fellows of the Royal Society</i> , vol. 19 (1973), 563-582. See C.7.	
C.2-C.7	Off-prints 1921-1973	
C.2	1921-1928. 1 bundle.	
C.3	1930-1938. 1 bundle.	
C.4	1941-1949. 1 bundle	
C.5	1951-1959. 1 bundle.	
C.6	1960-1968. 1 bundle.	
C.7	1970-1973. 1 bundle.	

SECTION D

SCIENTIFIC CORRESPONDENCE

D.1-D.6

The small amount of correspondence presented here dates from Roughton's time in the USA during the Second World War. In 1940 he went to the Harvard Fatigue Laboratory, Cambridge, Massachusetts where he conducted war-related research, chiefly on the effects of carbon dioxide on respiration.

The correspondence comprises both incoming correspondence and manuscript copies of Roughton's own letters.

D.1	Adrian, E.D.	1941-1942
	Includes a manuscript copy of a 1942 letter from Roughton to Sir Henry [?] <i>re</i> his research.	
D.2	Bragg, W.L.	1941
	Bragg's letters to Roughton were written from Canada. Roughton visited aviation medicine centres in Canada in the summer of 1941.	
	Includes Roughton's 'Notes on a Visit to Aviation Medicine Centres in Canada June 23 - July 2/41'.	
D.3	Fowler, R.H.	1941, n.d
	Fowler's 1941 letters are written from the British Technical Mission (from February 1941 Central Scientific Office), British Purchasing Office, Washington D.C. An undated letter is written from the University of Toronto.	
D.4-D.6	Hill, A.V.	1940-1945, n.d.
	Hill's letters are written as the Secretary of the Royal Society. His letters of July-August 1940 relate to the arrangements for Roughton to visit the USA.	
D.4	1940.	
D.5	1941-1943.	
D.6	1945, n.d.	

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