

Catalogue of papers and correspondence of

DOROTHY MARY MOYLE NEEDHAM FRS

(1896 - 1987)

Compiled by Timothy E. Powell and Peter Harper

Deposited in the Library, Girton College, Cambridge

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LIST OF CONTENTS

Items

Page

GENERAL INTRODUCTION

4

SECTION A

BIOGRAPHICAL AND PERSONAL

A.1 - A.120

9

SECTION B

CAMBRIDGE UNIVERSITY

B.1 - B. 33

23

SECTION C

NOTEBOOKS

C.1 - C.78A

27

SECTION D

PUBLICATIONS AND LECTURES

D.1 - D. 74

31

SECTION E

VISITS AND CONFERENCES

E.1 - E. 11

40

SECTION F

CORRESPONDENCE

F.1 - F. 38

42

SECTION G

NON-PRINT MATERIAL

G.1 - G. 10

47

INDEX OF CORRESPONDENTS

48

GENERAL INTRODUCTION

PROVENANCE

The papers were received in March and August 1990 from Dr Joseph Needham FRS via Girton College Cambridge.

OUTLINE OF THE CAREER OF D M M NEEDHAM

Dorothy Mary Moyle was born in London on 22 September 1896. She was educated at Claremont College, Stockport, and St Hilary's School, Alderley Edge, before passing the entrance examination to Girton College Cambridge in 1915 to study for the Natural Science Tripos. She passed Part I in 1918 and Part II, specialising in Chemistry, in 1919.

There followed research on aerobic synthesis of the muscle fuel glycogen for the Food Investigation Board of the Department of Scientific and Industrial Research, working under F G Hopkins at the Sir William Dunn Institute of Biochemistry, Cambridge. Dorothy Moyle received the 'title' of BA and MA in 1923 and of PhD in 1926, as women were not at the time able to receive degrees in the Senate House.

In 1924 Dorothy Moyle married Joseph Needham, a fellow worker in Hopkins's laboratory. She was awarded a Beit Memorial Fellowship for 1925-28 and during this period she did much collaborative work with her husband as well as pursuing her

own lines of research. Dorothy Needham's most important work was on carbohydrate metabolism in muscle. From 1930 to 1940 she was involved in pioneering work on the part played by ATP (adenosinetriphosphate) in the contraction of muscle. For this and other research she was awarded the Cambridge University Sc.D. (1945) and elected to the Fellowship of the Royal Society (1948).

In 1940 she joined Dr Malcolm Dixon's chemical defence research group to work on the effects of chemical weapons (mustard gas in particular) on the metabolism of skin and bone-marrow. This was followed by a period in China 1944-45 where Joseph Needham was Scientific Counsellor at the British Embassy in Chungking (Chongqing). Dorothy Needham was appointed Associate Director of the Sino-British Cooperation Office.

After the war Dorothy Needham returned to the Sir William Dunn Institute in Cambridge to take up work on enzyme biochemistry. Despite her great distinction she had never held an established post at the University and was now supported by a short-term Medical Research Council grant, twice renewed. In 1952, however, the MRC declined to extend her grant further on the grounds that to do so would run counter to the Council's policy of not providing long-term funding for personal stipends. The Broodbank Fund of the University awarded Dorothy Needham a grant to run 1952-55 but there were difficulties in securing further funding. An approach to the Royal Society in 1955 was unsuccessful, the President, Lord Adrian, apparently believing that it was unnecessary for married women, FRSS or not, to have salaries (see A.13). However, support was forthcoming from the Agricultural Research Council and thereafter she was funded principally by the ARC for research on the proteins of smooth muscle in the uterus.

Dorothy Needham retired from active research in 1963 to work on her book Machina Carnis: the biochemistry of muscular contraction in its historical development, published by Cambridge University Press in 1971. Following this she began work on a Sourcebook for the history of biochemistry in collaboration with the historian M Teich. This was unfinished on her death in 1987.

In recognition of her work in Cambridge Dorothy Needham was elected to the Fellowships of three Cambridge colleges; Girton, at which she was educated, Lucy Cavendish, which she helped to found in 1964, and Gonville and Caius, where she was the first woman to be admitted to the Fellowship.

DESCRIPTION OF THE COLLECTION

The material is presented in the order given in the List of Contents. Although by no means comprehensive there are interesting records of many aspects of her life and career.

Section A, Biographical and Personal, is the largest in the collection. It consists chiefly of personal correspondence received from friends and relatives, including a sequence of letters from her husband during his visits abroad, and material documenting Dorothy Needham's involvement with a wide range of charitable, humanitarian and political causes. There is also important correspondence relating to her career 1949-55. Other items of interest include a brief autobiographical account written for Women Scientists: the road to liberation, D Richter ed. (Macmillan, 1982) and a hand-written and illustrated poem by F G Hopkins celebrating the Needhams' marriage in 1924.

Section B, Cambridge University, comprises lectures and other teaching material for Dorothy Needham's biochemistry courses to 1963, correspondence and papers on the funding and administration of her research from 1952 and material relating to Lucy Cavendish College. A little 1930s research work found with the teaching material is also presented.

Section C, Notebooks, consists of large notebooks of varying formats used for lecture notes and drafts, bibliographical references, notes on lectures by others, research data etc., and a sequence of pocket notebooks including a set of 60 containing bibliographical references for Machina Carnis. Among the loose items found enclosed within the larger notebooks were drafts for lectures delivered in China during the war. Also relating to Needham's work in China is a small hand-drawn map at C.78A.

Section D, Publications and Lectures, is patchy in its coverage. There are drafts and proof copies of some of Dorothy Needham's postwar publications and correspondence and papers relating to Machina Carnis. The largest body of material is correspondence, drafts and notes for the unfinished Sourcebook for the history of biochemistry. The section is completed by a short sequence of drafts of postwar lectures and a set of reprints (incomplete).

Section E, Visits and Conferences, is slight. It is a chronological sequence of material recording some of her visits

and conferences between 1954 and 1979. There is also a little material from a visit to Rumania made by Joseph Needham in 1981.

Section F, Correspondence, is not extensive. It contains only two extended sequences of correspondence. As elsewhere in the collection Dorothy Needham's letters are often only represented by rough manuscript drafts. References and recommendations form a separate subsection.

Section G, Non-print Material, consists of slides for microscope work and glass photographic plates, some of which were probably used to illustrate lectures.

There is also an index of correspondents.

ACKNOWLEDGEMENTS

We are very grateful to Dr Joseph Needham FRS for making the material available and to Mrs Kate Perry, Girton College Archivist, for advice and encouragement.

Timothy E Powell
Peter Harper
Bath 1990

SECTION A BIOGRAPHICAL AND PERSONAL A.1 - A.120

A. 1 - A. 9	BIOGRAPHICAL
A. 10 - A. 16	CAREER AND HONOURS
A. 17 - A. 23	DIARIES
A. 24 - A. 75	PERSONAL CORRESPONDENCE
A. 76 - A.112	APPEALS AND CAMPAIGNS
A.113, A.114	PHOTOGRAPHS
A.115 - A.120	MISCELLANEOUS

BIOGRAPHICAL

- A.1 The Times obituary 26 December 1987
 Independent obituary 11 January 1988
- A.2 'Dorothy Mary Moyle Needham'. Typescript draft and
 printed version of Joseph Needham's tribute delivered
 at Gonville and Caius College Chapel 11 February 1988,
 and published in 'The Caian' November 1988.
- A.3 Biographical information supplied for the Girton College
 Cambridge 'Register'.
- A.4 Entries for Who's Who etc. 1973-81.
- A.5 - A.8 'Women in Cambridge biochemistry'.
 In 1978 Needham was approached to write a chapter for
 Women Scientists: the road to liberation, relating her
 personal experiences to the position of women in science.
 The book was edited by D Richter and published by
 Macmillan in 1982.
- A.5 Correspondence from Richter with drafts of Needham's
 replies 1978, 1981.

Biographical and personal

- A.6 Needham's ms notes for her contribution. Also includes draft of Needham's letter to Miss A Duke, Girton College, asking for information on her student career at Cambridge from 1919, with Duke's reply.
- A.7 Heavily corrected typescript drafts of Needham's contribution.
- A.8 6pp typescript copy as sent, September 1978; reviews of Women Scientists 1982.
- A.9 Miscellaneous correspondence re biographical information 1974, 1982.

CAREER AND HONOURS

- A.10 'A professorial plea'. Poem celebrating the marriage of Dorothy Moyle to Joseph Needham, written and illustrated by Sir Frederick Gowland Hopkins. They were married in 1924.
- Ms note to 'Professor [?Hopkins] Oct 29th 1925' on chemical differentiation of cells; ms list of references found with it.
- A.11-A.13 Correspondence re terms and conditions of support for Needham's work in Cambridge 1949-55.
- From 1946-52 Needham's research was supported by the Medical Research Council. In 1952, however, the MRC declined Needham's request for a further extension of her grant on procedural grounds, not wishing to provide long-term funding by renewing short-term grants.
- Needham received support from the Broodbank Fund 1952-55 and from the Agricultural Research Council thereafter. See also B.2 - B.27.

Biographical and personal

- A.11 1949-51.
- A.12 1952. Includes memo to Sir Harold Himsworth from Needham outlining her work from 1920, 28 January, and 'Statement of career' and 'Outline of research program' for her application to the Broodbank Fund.
- A.13 1953, 1955. Re possible Agricultural Research Council support.
- A.14 Election to Honorary Membership of the Biochemical Society, 18 April 1974.
- A.15 80th birthday celebrations, 1976. Includes congratulatory card signed by friends and colleagues, and ms notes for Reply to the Toasts at Lucy Cavendish College Annual Dinner at which her birthday was celebrated.
- A.16 Election to Honorary Fellowship of Girton College, 5 November 1976.

Election to Honorary Fellowship of Gonville and Caius College, 12 October 1979. Needham was the first woman to be elected Honorary Fellow of the College.

DIARIES

- A.17-A.23 Cambridge University pocket diaries.

A.17	1959-60	A.21	1965-66
A.18	1960-61	A.22	1980-81
A.19	1963-64	A.23	1982-83
A.20	1964-65		

Biographical and personal

PERSONAL CORRESPONDENCE

- A.24-A.65 Arranged alphabetically. The material is chiefly letters received by Needham. Outgoing correspondence is poorly documented by a very few carbon copies and some rough ms drafts.
- A.24 Baldwin, E H F and P M 1968-80
E H F Baldwin was Demonstrator (1936-43) and Lecturer (1943-50) in Biochemistry at Cambridge. Most of the correspondence is with Baldwin's widow.
- A.25 Balinska, I 1966-81
- A.26,A.27 Bernal, E 1972-81 and nd
Eileen Bernal was the widow of J D Bernal. The correspondence chiefly concerns CND activities.
- A.26 1972-78 A.27 1980-81, nd
- A.28 Burbidge, P G 1979, 1981
1979 correspondence is chiefly re the presentation of J Needham's Science and Civilisation in China to Chairman Hua by Mrs Thatcher on his visit to Britain in November.
- Chambers, F 1962-81
- A.29 Chin-I 1970-78 and nd
- A.30 Cohen, J A and Cohen-Welter 1956, 1969-81

Biographical and personal

A.31	Delay, M R and U	1965, 1970-81 and nd
A.32,A.33	The Flear Family 2 folders	1957,1971-81 and nd
A.34	Frost, H	1970-77
A.35	The Gorringer Family	1969-83 and nd
A.36	Hibberd, H	1970-81 and nd
A.37	Iriyagolle, I Iriyagolle was a research student of J Needham's in the 1960s.	1966-81
A.38	Keighley, A	1970-76 and nd
A.39	Krause, G and J	1968-80
A.40	Lehmann, H Lehmann was Professor of Clinical Biochemistry at Cambridge 1967-77.	1968-82 and nd
	The McCollester Family	1966-73 and nd
A.41	Miall, M	1977-82
	Montefiore, H W Montefiore was Dean of Gonville and Caius College 1954-63. He was appointed Bishop of Birmingham in 1978.	1978-81

Biographical and personal

- | | | |
|-----------|---|----------------------------------|
| A.42 | Moyle, J | 1965-83 and nd |
| | Jeremy Moyle was Needham's nephew. | |
| A.43 | Moyle, J and P | 1964-81 |
| | John Moyle was Needham's brother. | |
| A.44-A.52 | Needham, J | 1940,1967,1977-86 |
| | Chiefly letters and postcards sent home by Joseph Needham during visits abroad. In the course of these visits the Needhams were prolific correspondents but unfortunately no drafts or copies of Dorothy's letters to her husband were found. Joseph's letters are of considerable importance because they give detailed accounts of his activities abroad. | |
| A.44 | Telegram sent by J Needham from Osborne Laboratory, Newhaven, Connecticut, 25 September 1940, stating 'Please reply whether all right'. The telegram is annotated 'Merciful preservation we've had.' | |
| A.45-A.52 | Visits. | |
| A.45 | 1967 August. | Corsica, Leeds |
| A.46 | 1977 June-July. | Mexico, USA |
| A.47 | 1978 April. | New York |
| A.48 | 1979 September-November. | Switzerland, Hong Kong |
| A.49 | 1980 May | USA |
| A.50 | 1981 August-September | Rumania, China, Japan, Hong Kong |
| A.51 | 1982 August | Belgium, Norway |
| | 1983 August | Stockholm, Venice |
| | 1983 October-November | Singapore, USA |

Biographical and personal

- | | | |
|------|--|----------------------|
| A.52 | 1984 August-September. China, Taiwan | |
| | 1986 May. West Germany | |
| | 1986 December Japan | |
| A.53 | The Nowinski Family | 1962-79 |
| A.54 | The Pollitt Family | 1972 |
| A.55 | Rajchman, M | 1967-73 and nd |
| A.56 | Rapkine, S M | 1963-82 |
| A.57 | The Reid Family | 1968-82 |
| A.58 | Shoenberg, C F | 1969, 1977-78 and nd |
| | Catherine Shoenberg worked under Needham 1955-63.
See F.7-F.16. | |
| A.59 | Silva, M | 1972-80 |
| | Teich, M | 1975-82 |
| | Teich worked with Needham on a 'Sourcebook for the
history of biochemistry'. See D.38-D.63. | |
| A.60 | Teryuo, U | 1974-82 |
| A.61 | van Heyningen, W E | 1960-79 and nd |
| A.62 | Wakid, N W | 1969-81 |
| | Wakid was a British Council scholar working under
Needham 1956-58. See F.17-F.20. | |

Biographical and personal

A.63-A.65 Williams (née Cawkwell), J M 1973-82 and nd
Jennifer Williams worked under Needham on the biochemistry of the uterus to 1962. She was invited to co-author the Royal Society's Biographical Memoir of Needham.

A.63	1973-76	A.65	Nd
A.64	1977-82		

A.66-A.71 Correspondence, arranged chronologically.

A.66	1957-71	A.69	1978-79
A.67	1972-74	A.70	1980-81
A.68	1975-77	A.71	1982

A.72-A.75 Undated correspondence.
4 folders.

Biographical and personal

APPEALS AND CAMPAIGNS

Needham supported a wide range of pressure groups, voluntary organisations and charities campaigning for human rights, nuclear disarmament, animal welfare etc. She also supported a number of Cambridge groups.

The material is presented in an alphabetical sequence, with some indication of the nature of Needham's involvement given where appropriate. However, many of the causes supported are not documented by correspondence but only by printed appeals annotated by Needham to indicate the response.

A.76-A.78	Amnesty International	1976-81
	Needham wrote many letters on behalf of prisoners of conscience, and fragmentary ms drafts of some of these survive.	
A.76	Amnesty International literature.	
A.77	Ms drafts of Needham's letters on behalf of prisoners.	
A.78	Correspondence received in reply to the preceding.	
A.79	Animal Aid	Nd
	Animals' Vigilantes	1981
A.80	Anti Nuclear Campaign	1981

Biographical and personal

A.81	British Deaf Association	1978-79
	Cambridge Association for Social Welfare	1977
	Cambridge Drawing Society	1976, 1978
	Cambridge Preservation Society	1978
A.82	Cambridge University Newcomers' Club	1971-74
	Needham helped to found this club, established in 1971 under the aegis of the Society for Visiting Scholars, to improve 'arrangements for introducing new senior members and visiting scholars to Cambridge'.	
A.83-A.85	Campaign for Nuclear Disarmament (CND)	1977-82
A.83	Correspondence on nuclear disarmament and CND activities 1979-82.	
A.84	CND literature.	
A.85	Miscellaneous background material.	
A.86	Caribbean Labour Solidarity	1979
	China Policy Study Group	1982
	J Needham was a Sponsor.	
	Christian Aid	1982
	Church of England Children's Society	1979
A.87	Compassion in World Farming	1977-79
A.88	Defence and Aid Fund	1982-83
	El Salvador Committee for Human Rights	1981

Biographical and personal

- | | | |
|-------------|--|------------|
| A.89 - A.91 | Farm and Food Society | 1973-82 |
| | This Society campaigned for humane farming.
Needham wrote to her MP on a number of occasions
on behalf of the Society. | |
| A.89 | Correspondence 1973-76. | |
| A.90 | Correspondence 1977-82. | |
| A.91 | Farm and Food Society literature. | |
| | | |
| A.92 | Friends of the Earth | 1981-83 |
| | <u>Re</u> the proposed Sizewell B Pressurized Water Reactor. | |
| A.93 | Greek Relief Fund | 1976, 1980 |
| | Help the Aged | 1977-78 |
| | Horder Centre for Arthritics | 1977 |
| | International Christian Relief | 1981-82 |
| | Labour Party | 1978-81 |
| A.94 | Liberation | 1976, 1982 |
| A.95 | Medical and Scientific Aid for Vietnam,
Laos and Kampuchea. | 1977-82 |
| A.96 | Medical and Scientific Committee for
Soviet Jewry. | 1974-82 |
| | Also includes copy of Needham's letter to Dr David Owen,
UK Foreign Secretary, <u>re</u> Soviet dissidents Orlov,
Ginzburg and Scharansky, 19 December 1977. | |

Biographical and personal

A.97	Minority Rights Group	1982
A.98	Movement for the Ordination of Women	1981
A.99	Newnham Against the Bomb	1981, nd
	Newnham Residents Association	1980
A.100	Oxfam	1978-82
	People's Progressive Party (Guyana)	1977
A.101, A.102	Rita Nightingale Society	1978-80
	Rita Nightingale was imprisoned by the Thai authorities for allegedly smuggling heroin. The campaign mounted by the Rita Nightingale Society helped win her release in 1980.	
A.101	Correspondence 1978-80.	
A.102	Background material on the case.	
A.103	Russell Committee against Chemical Weapons	1982
	Save the Children Fund	1978-79
A.104	Scientists Against Nuclear Arms	1981-83
A.105	Social Democratic Party	1981
	Society for the Protection of Science and Learning Ltd.	1978
A.106	Society for Visiting Scientists	1948
	Needham was a member of a 'Special Committee appointed to examine the finances and administration of the Society'.	

Biographical and personal

- | | | |
|-------------|---|---------|
| A.107,A.108 | TAPOL - British Campaign for the Defence of Political Prisoners and Human Rights in Indonesia | 1978-83 |
| | Needham wrote a number of letters on behalf of human rights and political prisoners in Indonesia. | |
| A.107 | Correspondence 1978-81. | |
| A.108 | TAPOL literature. | |
| A.109 | UNIPAL - Universities' Educational Fund for Palestinian Refugees | 1977-82 |
| | Material 1981-82 is <u>re</u> the closure of Birzeit University by the Israeli authorities. | |
| A.110 | United Nations Association | 1977 |
| | Women's International League for Peace and Freedom | 1981-82 |
| A.111,A.112 | World Disarmament Campaign | 1979-82 |
| | 2 folders | |
| PHOTOGRAPHS | | |
| A.113 | 'Photographs of me and G-D [Gwei Djen Lu] 1975'.
Four colour photographs found in envelope so inscribed. Two feature Needham. | |
| | Two colour photographs taken during visit to the Needhams by R Huang July 1981. Both feature Needham. With covering letter. | |
| | Four black and white passport photographs of Needham. Nd but probably post-decimalisation (1971). | |
| A.114 | Three black and white photographs of Cambridge University occasion. Two feature J Needham. | |

Biographical and personal

MISCELLANEOUS

- A.115 Exercise book used intermittently June 1946 -
November 1967 probably to record books borrowed
from the Needhams' private library.
- A.116 Correspondence 1970-72, 1976 re disposal of journals
and other material.
- A.117 'Science for People' Women's Collective issue c.1975.
- A.118 Copy of letter from Sir Frederick Gowland Hopkins to
Sir Walter Fletcher re their 1915 joint Croonian Lecture.
This letter was discovered in 1976 and a copy sent to
Needham.
- A.119 'The idea of the self', 10pp ms draft. Nd.
- A.120 1966, 1981, nd. Includes memorabilia.

SECTION B

CAMBRIDGE UNIVERSITY

B.1 - B.33

B. 1 - B.23	TEACHING
B.24 - B.29	FUNDING AND ADMINISTRATION OF RESEARCH
B.30 - B.33	LUCY CAVENDISH COLLEGE

TEACHING

See also C.2, C.5-C.9

B. 1 - B.13 'Old lectures'. Contents of Needham's bulky folder so inscribed, divided into thirteen for ease of reference. Includes significant non-lecture material at B.1 and B.2.

B.1 'Linkage of chemical changes in muscle' by Needham and others, 3pp typescript, 28 February 1935, reporting on work extending the findings of J K Parnas and colleagues; ms notes on the work of Parnas, October 1935.

Letter to Needham from R Gaddie, 2 December 1935, re queries arising from an article by Gaddie and C P Stewart. With Needham's ms notes and a reprint of the article.

B.2 Ms notes on experiments conducted 23 September - 14 October 1938.

B.3, B.4 'Lecture IV'. 60pp typescript. Latest bibliographical reference 1941. See also C.8.

2 folders.

Cambridge University

- B.5 'Transfer of phosphate and energy in the living cell',
lecture to Academia Sinica Chemistry Institute,
August 1944. 6pp typescript.

The lecture was published in Biochemical Bulletin
no.47, 20 January 1945.

Ms notes on contributions of A Szent-Györgyi,
V A Engelhardt and A E Braunstein at 'Moscow Conference'
20 June 1945.

- B.6 'Muscle contraction: the nature of the machine and
the elaboration of the fuel', 12pp typescript (page 2
missing) with ms notes on the verso of pages 1, 3 and 4.
Nd.

- B.7 'The working of the muscle machine', 6pp typescript, nd.

'Structure of proteins, with special reference to the
muscle machine', 12pp ms, nd.

- B.8 - B.13 Miscellaneous pages of ms and typescript lecture notes,
probably originally kept in a loose-leaf notebook.

6 folders.

- B.14 - B.16 'Pt II Class sheets Practical'. Contents of Needham's
folder so inscribed: duplicated typescript sheets,
some with ms annotation. Also a few ms notes for
practicals. 1949-53.

3 folders.

- B.17 - B.22 'Pt II and PG lectures. 1960 Rumanian lectures'.
Contents of Needham's bulky folder so inscribed: ms
drafts of untitled lectures, not all complete, sometimes
with several dates reflecting the reuse of the same
material over several years. The latest date is 1966.

6 folders.

Cambridge University

- B.23 Biochemistry Department Part II reading lists,
some annotated. 1960s.

FUNDING AND ADMINISTRATION OF RESEARCH

- B.24 1953, 1955. Research report 1952-53; 'Memorandum
on the study of uterus muscle', 19 April 1955.
- B.25 1958-59. Renewal of 1955 Agricultural Research
Council grant (See A.11-A.13).
- B.26 1960. Renewal of 1958 ARC grant; award of Royal
Society grant.
- B.27 1961. Includes research report for the Royal Society,
July.
- B.28 1962. Applications for support from the Broodbank
Fund, US National Institutes of Health and the
Leverhulme Trust for work on a book on the biochemistry
of muscle contraction (published 1971 as Machina Carnis,
see D.14-D.31); research report to Royal Society
20 August.
- B.29 1963-65. Support for C F Shoenberg. Shoenberg
had worked as a research assistant of Needham's
(see also F.7-F.16); Leverhulme Trust award; research
reports 1963 and 1964-65.

Cambridge University

LUCY CAVENDISH COLLEGE

Needham was elected a Fellow of this all-women's College in 1964. Needham was a member of the women's dining club from which the College originated.

B.30 - B.32 General correspondence and papers 1976-82.

3 folders.

B.33 References, 1981-82.

SECTION C

NOTEBOOKS

C.1 - C.78A

- C.1 Hardback notebook inscribed on first page 'D M Needham Biochemical Lab. Cambridge'. Used from the front for notes on a ?series of three lectures on enzymes by M Dixon, October and November 1939; notes on lectures by J F Danielli (April 1941), T R R Mann (1941), W S Feldberg (17 October 1942), S J Bach and M Dixon; and notes on proceedings of Society for Experimental Biology Conference on Wound healing 22 September 1943.
- Pasted onto three pages near the front are a collection of humorous wartime press-cuttings.
- C.2 Green hardback looseleaf notebook labelled on front cover 'Old Part II lectures (1st lot)' and on spine 'III'. Contains ms lecture notes on muscle contraction, latest bibliographical reference 1940.
- Loose ms notes are enclosed at front of book. Loose at back is an untitled 14pp ms and typescript draft beginning 'During the last 100 years, there has been an enormous amount of work on the biochemistry of muscle', January 1954, annotated 'Manchester'.
- C.3 Dark blue 'Cantab' looseleaf notebook used for typescript and ms notes on the literature. Latest bibliographical reference 1951.
- C.4 Black hardback looseleaf notebook containing copy of J D Bell's D.Phil. thesis (Cambridge 1955) 'Studies in the effect of adrenal cortical hormones on aspects of liver metabolism'. June Bell was a research student of Needham's.
- C.5 Looseleaf notebook used for 'Part II lectures Carbohydrate metabolism Oxidative phosphorylation...'. Ms and typescript pages of lecture notes. The second page is dated '9.5.58'. See C.6, C.7 and C.8, C.9 for material found loose at front and back of notebook.

Notebooks

- C.6, C.7 Material found loose at front of preceding.
- C.6 57pp typescript lecture notes on 'Aerobic contraction
Aerobic phosphorylation Unstriated muscle Heart
Acetylcholine Interfibre spaces'. Stamped
'British Council Cultural Scientific Office, Chungking'.

Needham served with the British Scientific Mission in
China 1944-45.
- C.7 Miscellaneous typescript and ms pages of lecture notes
and references. Latest bibliographical reference 1961.
- C.8, C.9 Material found loose at back of C.5.
- C.8 'Lecture IV'. Typescript and ms draft. Latest
bibliographical reference 1941. See also B.3, B.4.
- C.9 Miscellaneous ms and typescript pages of lecture notes,
references etc. Latest bibliographical reference 1961.
- C.10 Red hardback notebook inscribed on front cover 'IV'
used from the front for experimental data 23 April 1960 -
13 December 1961. At the back are miscellaneous notes
including 'conversation with Dr Filton Jackson July 17th 61'
and 'conversation with K Bailey June 26th 1961'.

Loose at front of book is correspondence and data from
Brenda [?] 1963 and 1964. Loose ms notes and data
are enclosed at back of book.
- C.11-C.70 60 looseleaf pocket notebooks used for notes on the
literature for Machina Carnis (D.14-D.31). These
notebooks were housed in three specially made wooden boxes.

Notebooks

C.11-C.70...

C.11-C.69 are brown plastic covered notebooks, most of which were labelled by Needham with the chapter number and/or subject to which they referred. C.67-C.69 are unlabelled. C.70 is a different format notebook found with the series.

C.11	'CH.1A'	C.31	'CH.12 SM./THEOR. Pt.2'
C.12	'CH.1B'	C.32	'CH.12 SM./THEOR. Pt.3'
C.13	'CH.2A'	C.33	'CH.12 SM./TONOMURA'
C.14	'CH.3'	C.34	'CH.14 INTACT A'
C.15	'CH.4'	C.35	'CH.14 INTACT B'
C.16	'CH.5 PG'	C.36	'CH.14 INTACT C'
C.17	'CH.6 ATP 1'	C.37	'CH.15 RIGOR'
C.18	'VII STRUCTURE 1'	C.38	'CH.16 RESPIRATION A-D'
C.19	'VII STRUCTURE 2'	C.39	'CH.16 RESPIRATION E-J'
C.20	'CH.8 ATP-ACTO-MY Pt.1'	C.40	'CH.16 RESPIRATION K-L'
C.21	'CH.8 ATP-ACTO-MY Pt.2'	C.41	'CH.16 RESPIRATION M-R'
C.22	'CH.9 ACTIN'	C.42	'CH.16 RESPIRATION S-T'
C.23	'CH.9 ACTIN & TMB'	C.43	'CH.16 RESPIRATION U-Z'
C.24	'CH.9 MYOSIN'	C.44	'17 OXID. PHOS. 1'
C.25	'CH.9 PROTEINS'	C.45	'17 OXID. PHOS. 2'
C.26	'CH.9 TROPOMYOSIN'	C.46	'18 REGULATION 1'
C.27	'CH.10 MECHANISMS Pt.1'	C.47	'18 REGULATION 2'
C.28	'CH.10 MECHANISMS Pt.2'	C.48	'18 REGULATION 3'
C.29	'CH.11 SLID.MECH. Pt.1'	C.49	'19 DEVELOPMENT'
C.30	'CH.12 SM./THEOR. Pt.1'	C.50	'19 RED & WHITE 1'

...

Notebooks

C.11-C.70...

C.51	'19 RED & WHITE 2'	C.60	'SMOOTH MUSCLE'
C.52	'19 SLOW/HEART'	C.61	'SMOOTH MUSCLE 2'
C.53	'19 SLOW/HEART 2'	C.62	'23 SMOOTH MUSCLE 3'
C.54	'20,21 DENERVATION/ GLYCOGEN S.D.'	C.63	'RELAXATION A-G'
C.55	'21 DYSTROPHIES 1'	C.64	'RELAXATION H-L'
C.56	'21 DYSTROPHIES 2'	C.65	'RELAXATION M-T'
C.57	'21 HOLDING MECH'	C.66	'RELAXATION U-Z'
C.58	'21 INSECT FLIGHT'	C.67	Unlabelled
C.59	'21 PHOSPHAGENS'	C.68	Unlabelled
		C.69	Unlabelled
C.70	Black hardback looseleaf pocket notebook. Unlabelled.		

C.71-C.77 7 pocket notebooks, same format as C.11-C.69, chiefly
used for notes on the literature. 1960s.

C.78 Leather-bound pocket notebook inscribed on inside cover
'D M Needham Master's Lodge Caius College'. Used
from the front for notes 18 October and 3 December on
a planned 1972 Royal Society Symposium, and notes on
talks by H Huxley 24 January and A G Szent Györgyi
29 January 1973. At the back are miscellaneous notes
on the literature etc. Most pages not used. Photograph
found enclosed in pocket at front of book. See also C.78A.

C.78A Hand-drawn plan possibly of wartime journey made between
Chungking [Chongqing], and Baochi [Baoji] and Sian [Xi'an].
Found in pocket at front of C.78.

Very fragile.

SECTION D

PUBLICATIONS AND LECTURES

D.1 - D.74

D. 1 - D.63 PUBLICATIONS

D.64 - D.73 LECTURES

D.74 REPRINTS

D.1 'Myosin and adenosinetriphosphate in relation to muscle contraction', Meyerhof-Festschrift (Amsterdam, c.1949).

2nd proof copy with ms corrections.

D.2, D.3 'Adenosinetriphosphate and the structural proteins in relation to muscle contraction' in ed. F F Nord Advances in Enzymology 8 (1952), 151-197.

D.2 53pp typescript + references.

D.3 Proof copy with ms corrections.

D.4 'Energy production in muscle', British Medical Bulletin 12 (1956), 194-198.

Extensively annotated reprint.

Letter from Academic Press expressing disappointment Needham 'cannot accept the editorship of the book on the Physiology of Muscle', 10 January 1956.

D.5 'Biochemistry of muscular action', in ed. G H Bourne The structure and function of muscle vol.II (Academic Press New York, 1960).

This chapter was revised and retitled for the 2nd edition of the book published in 1972. See D.32-D.36.

Proof copy with ms corrections; review, royalty statements 1964, 1965.

Publications and lectures

- D.6 'Molecular aspects of the contractile mechanism of the uterus and its changes during pregnancy' ?Unpublished. Latest bibliographical reference 1960.
- 14pp typescript with ms corrections.
- D.7 'Contractile proteins in smooth muscle of the uterus', Physiological Reviews 42 (1962) Supplement 5, 89-96.
- Proof copy with ms corrections.
- D.8 'The proteins of the dilution precipitate obtained from salt extracts of pregnant and non-pregnant uterus' by Needham and J M Williams, Biochemical Journal 89 (1963), 534-545.
- Proof copy with ms corrections.
- Letter commenting on draft (not found) of 'Proteins of the uterine contractile mechanism', Biochemical Journal 89 (1963), 552-561.
- Invitation to contribute to Revue roumaine de Biochemie 3 (1966).
- D.9 'A biochemical and electron microscope study of the contractile proteins in vertebrate smooth muscle', with C F Shoenberg et al, Biochemische Zeitschrift 345 (1966), 255-266.
- Proof copy with ms corrections.

Publications and lectures

- D.10 'Biochemistry of the myometrium' with C F Shoenberg,
in ed. R M Wynn Cellular Biology of the Uterus
(New York, 1967), 291-352.
- Correspondence; review; royalty statements 1965-68,
1972.
- D.11 Review of D Keilin, The History of Cell Respiration
and Cytochrome (Cambridge, 1966). In ISIS, 58 (1967),
423.
- 4pp typescript; correspondence.
- 'Proteins of the contractile mechanism in vertebrate
smooth muscle' in Handbook on the physiology of the
alimentary canal Vol.II (American Physiological Society,
1968).
- Letter only.
- D.12 'Professor E Lundsgaard', obituary in Nature 222 (1969),
804.
- Correspondence with Professor Christian Crone, University
of Copenhagen 1969, re the obituary; typescript draft;
proof copy.
- D.13 Untitled 9pp typescript draft beginning 'If Szent Györgyi
had called attention to dicarboxylic acids then in 1937
Hans Adolf Krebs (1900-)...brought out the special
place of tricarboxylic acid ...'. Latest bibliographical
reference 1970.

Publications and lectures

- D.20 Correspondence with colleagues re comments on drafts, advice and information, permission to use figures etc. 1970-71.
- D.21 Letters of appreciation, congratulation etc. 1971-73.
- D.22 Reviews of Machina Carnis from UK journals.
- D.23 Reviews of Machina Carnis from overseas journals.
- D.24 Royalty statements and related correspondence 1971-82.
- D.25 Miscellaneous promotional etc., material.
- D.26 Card index of bibliographical references. Probably used for Machina Carnis.
- D.27,D.28 'Machina carnis'. Contents of Needham's folder so inscribed: ms notes and references, errata, typescript references etc.

2 folders.
- D.29-D.31 'Odd references etc might be useful later'. Contents of Needham's A4 envelope so inscribed. D.31 is 1968 tablet diary the backs of whose pages have been used for bibliographical references.

3 folders.
- D.32-D.36 'Biochemistry of muscle', in ed. G H Bourne The structure and function of muscle vol.III (2nd edition, Academic Press New York, 1972).

See D.5.

Publications and lectures

- D.32-D.34 Typescript draft paginated 1-80a.
3 folders.
- D.35 Correspondence 1969-70. Includes invitation (declined)
to write a second chapter for the book on 'History of
muscle research'.
- D.36 Correspondence 1971-73.
- D.37 Review of H A Krebs, Otto Warburg, Zellphysiologe -
Biochemiker - Mediziner, 1883-1970 (Stuttgart, 1979).
In Annals of Science 37 (1980) 108.

4pp typescript draft with ms correction; 3pp typescript
as sent.
- D.38-D.63 'Sourcebook for the history of biochemistry 1740-1940',
with M Teich.

Needham and M Teich began work on this book following
the publication of Machina Carnis. It was intended
for publication by Harvard University Press but not
completed before Needham's death.
- D.38 Undated letter to E H Madden, State University of
New York, Buffalo, re publishing the planned Sourcebook
in the 'Source-Books in the History of the Sciences'
series edited by Madden; letter from Teich to Needham
re proposed coverage of the book, 29 April 1974;
letter from Harvard University Press to Teich re layout,
22 January 1979.
- D.39 'Publishers' addresses'. Contents of Needham's
envelope so inscribed: addresses of publishing houses
and journals for requests to reproduce material.

Publications and lectures

D.40-D.62 Typescript drafts.

D.40-D.42 'I Enzymes: fermentation and digestion. From the
 end of the 18th century to the 1890s.' 92pp.

 3 folders.

D.43-D.46 'I ENZYMES'. pp.1-116.

 4 folders.

D.47,D.48 'II PHOTOSYNTHESIS'. pp.1-49.

 2 folders.

D.49-D.51 'III RESPIRATION'. pp.1-98.

 3 folders.

D.52-D.56 'V PROTEINS'. pp.1-159 (incomplete). No draft
 numbered IV was found.

 5 folders.

D.57-D.59 'V Carbohydrates'. pp.1-94.

 3 folders.

D.60-D.62 'VI LIPIDS'. pp.1-87.

 3 folders.

D.63 Miscellaneous typescript and ms references, extracts
 from the literature, pages of drafts etc.

 1 box.

Publications and lectures

LECTURES

- D.64 Letter from E H F Baldwin, 25 September 1956, re two Public Lectures to be given by Needham at University College, London, probably later that year.
- D.65 'On the contractile mechanism of uterus muscle'. Latest bibliographical reference 1962.

7pp typescript + references.
- D.66 Untitled 12pp ms draft beginning 'Since the pioneer work of Csapo, beginning about fifteen years ago, it has been realised that from the uterine smooth muscle a protein can be extracted'. Annotated 'Tokyo 1964'.

A version of this lecture was published as 'Proteins of the contraction mechanism' in Pharmacology of smooth muscle - Proceedings of the 2nd International Pharmacological Meeting, Prague, 20-23 August 1963, 87-94.
- D.67 'Nineteenth century conceptions of energy utilisation by muscle, 11th International Congress on the History of the Sciences, Warsaw and Krakow, 24-29 August 1965.

6pp typescript with ms corrections.
- D.68,D.69 'Machina carnis; a chemical history of muscular contraction', Lectures in honour of Einar Lundsgaard, 28-29 September 1967.
- D.68 23pp typescript with ms corrections. Although Needham's lecture was entitled 'Machina carnis' after the book on which she was working (D.14-D.31), the lecture concentrates on Lundsgaard's contributions to the 'understanding of energy provision in muscle'.
- D.69 Correspondence re arrangements with C Crone and D R Wilkie; programme; memorabilia.

Publications and lectures

- D.70 'Development of our knowledge of energy provision for muscle contraction'. Annotated 'Lecture given at Kuala Lumpur Sept 1971'.
- 25pp ms; ms notes.
- D.71,D.72 'Muscle contraction: from the Greeks to the sliding mechanism', Redfearn Memorial Lecture, Leicester University, 19 March 1973. This was also delivered at the University of Guelph, Canada, in 1972. See E.8.
- D.71 20pp typescript + notes for blackboard diagrams and list of slides.
- D.72 Correspondence with H L Kornberg re arrangements.
- D.73 'Chinese scientists revisited - 1972', lecture delivered at Bristol University, 10 May 1973, and Leicester.
- 19pp typescript with ms corrections (one dated April 1972); ms notes; notice for Bristol lecture.

REPRINTS

- D.74 Incomplete set of reprints of articles by Needham (those 1939-50 in bound volume); author's annotated copy of Machina Carnis, 1 box.

SECTION E

VISITS AND CONFERENCES

E.1 - E.11

- E.1, E.2 Hungarian Physiological Society 20th Conference, Budapest, July 1954. Needham spoke on 'Some preliminary observations on the protein fractions of the uterus, and on the ATPase activity of this organ'.
- E.1 Typescript draft of Needham's contribution.
- E.2 Conference pocket notebook used by Needham for notes on the proceedings.
- E.3 Mittelrheinische Gesellschaft für Geburtshilfe und Gynäkologie 117th meeting, Mainz, 22-24 July 1955. Needham spoke at a Symposium on contractile protein of the uterus on 'Die Zusammensetzung der Proteine und die Adenosintriphosphatase Aktivität in der Uterus-Muskulatur normaler ovariectomierter und schwangerer Tiere'.
- Correspondence re arrangements; programme, duplicated typescript ?summary of Needham's contribution.
- E.4 Visit to USA, November 1961.
- Invitation to visit University of California Medical Center during visit.
- Invitation to International Symposium on the arterial wall, Brussels, 22-24 May 1962.
- E.5 Invitation to Symposium on the mechanism of labour, Würzburg, 31 May - 2 June 1964.
- Invitation to Symposium on Muscle, Budapest, September 1966.

Visits and conferences

- E.6 2nd International Symposium on Angiology, Fribourg, Switzerland, 21-22 June 1968. Needham chaired two sessions.
- Correspondence; annotated programme.
- E.7 Invitation to meeting on molecular biology and ultra-structure in the systematics of the higher group, Cambridge, 24-26 March 1969.
- Invitation to conference on the history of biochemistry and molecular biology, Brookline, Massachusetts, 21-23 May 1970.
- E.8 Visit to Canada November-December 1972.
- Needham gave seminars on 'Muscle contraction: From the Greeks to the sliding mechanism' (See D.71,D.72) at the University of Guelph, and on biochemistry of muscle at the University of Toronto.
- Correspondence re arrangements.
- E.9 Invitation to conference on the history of bioenergetics, Brookline, Massachusetts, 11-13 October 1973.
- University of Cambridge meeting on 'Of timeliness and promise - sterile and fruitful approaches in the development of biochemistry', 4 December 1978.
- Annotated programme only.
- E.10 Visit to Cyprus May-June 1979.
- The Needhams visited Cyprus under the auspices of the British Council.
- Itineraries; Dorothy Needham's ms journal for 21-31 May.
- E.11 Annotated memorabilia from Joseph Needham's visit to Rumania 1981. See A.50.

SECTION F

CORRESPONDENCE

F.1 - F.38

F. 1 - F.21

GENERAL SCIENTIFIC CORRESPONDENCE

Correspondence with individuals. In alphabetical order with an indication of information of particular biographical, historical or scientific interest.

F.22 - F.27

SHORTER SCIENTIFIC CORRESPONDENCE

In chronological order.

F.28 - F.38

REFERENCES AND RECOMMENDATIONS

Correspondence

F.1	Astbury, W T	1949
	'Contraction of actomyosin fibrils under the action of ATP'.	
F.2	Bailey, K	1962, 1963
F.3	Cohen, J A	1952, 1954, 1963
F.4	Hill, A V	1965, 1967
	1967 correspondence <u>re</u> correlation between actomyosin ATPase activity and muscle shortening.	
F.5	Hoet, J P	1967
	Chiefly <u>re</u> visit to Cambridge	
F.6	Kalckar, H M	1963-66, 1977
F.7 - F.16	Shoenberg, C F	1950-1974 and nd.
	Catherine Shoenberg, wife of the physicist David Shoenberg, returned to scientific research in 1955 as a member of Needham's research team working on 'biochemistry of the uterus'.	
	Most of the material relates to Needham's subsequent efforts before her retirement to find appropriate facilities and funding for Shoenberg's work on contractile mechanism of vertebrate smooth muscle.	
F.7	1950, 1956, 1958.	

Correspondence

- | | | |
|-----------|---|-----------------|
| F.8 | 1960. <u>Re</u> laboratory accommodation. | |
| F.9 | 1961, 1962 Mar-May. | |
| F.10 | 1962 June-July. Includes typescript draft 'Pseudopia in vertebrate smooth muscle cells' by Shoenberg. | |
| F.11 | 1963. Chiefly <u>re</u> laboratory accommodation. | |
| F.12 | 1964-66. Includes 1966 research reports. | |
| F.13 | 1967, 1969. Includes Shoenberg's 1967 account of her work with Needham. | |
| F.14 | 1970, 1972. Chiefly <u>re</u> grant applications. Includes 'Report' of planned investigation into the sliding filament mechanism in vertebrate smooth muscle. | |
| F.15 | 1973-74. Correspondence 1973 <u>re</u> grant applications. | |
| F.16 | Nd. | |
| F.17-F.20 | Wakid, N W | 1957-67 and nd. |
| | Wakid was a British Council Scholar studying under Needham's supervision for his PhD 1956-58. | |
| F.17 | 1957-59. Chiefly re joint papers. | |

Correspondence

F.18 1960. Chiefly re joint papers.

F.19 1961. Joint papers; references.

F.20 1962-67, nd.

F.21 Weber, H H

1970-71

Re Weber's Meyerhof Memorial Lecture.

SHORTER SCIENTIFIC CORRESPONDENCE

F.22 1949-59

F.25 1968-69

F.23 1961-65

F.26 1971-82

F.24 1966-67

F.27 Nd

Correspondence

REFERENCES AND RECOMMENDATIONS

F.28-F.30	Examining
F.31-F.33	Appointments and Grant Applications
F.34-F.38	Elections to the Royal Society

Examining

F.28	1956-65	F.30	Nd
F.29	1966-73		

Appointments and Grant Applications

F.31	1952-60	F.33	1970, 1974
F.32	1963-69		

Elections to the Royal Society

F.34	1964-81	F.37	1973
F.35	1967-68	F.38	1974-80
F.36	1969-72		

SECTION G

NON-PRINT MATERIAL

G.1 - G.10

This section comprises microscope slides and photographic plates, some probably used for illustrating lectures and/or publications.

- G.1 - G.3 Microscope slides with labelled sections of uterus muscle. 3 sets.
- G.4 Microscope slides, labelled either '1' or '2'.
 1 set.
- G.5 - G.8 82mm x 107mm glass photographic plates. 4 boxes.
- G.9 51mm x 253mm glass photographic plates. 1 bundle.
The plates were found in pairs or singly, in paper wrapping or in envelopes. A note found with the bundle is inscribed '6/7.3.57 H acto mero myosin enzymically [?] inactive'.
- G.10 51mm x 253mm glass photographic plates. 1 box.

INDEX OF CORRESPONDENTS

ACADEMIC PRESS, INC.	D.4,D.5,D.35,D.36
ADELMAN, M R	F.25
AGRICULTURAL RESEARCH COUNCIL	A.13,B.25-B.27,B.29 F.8,F.11-F.13
ALLEY, Rewi	A.69
AMNESTY INTERNATIONAL	A.76-A.78
AMOROSO, Emmanuel Ciprian	F.35,F.38
ANDREEN, Andrea	A.66,A.67
ASTBURY, William Thomas	F.1
BAILEY, Kenneth	F.2 See also F.23
BALAIS, Robert	F.27
BALDWIN, Ernest H F	A.24,D.64,F.28
BALINSKA, Irena	A.25
BANERJI, Goutom G	A.67
BÁRÁNY, Michael	F.23
BASTHOLM, E	D.21
BATE-SMITH, Edgar Charles	F.11
BAUER, H	F.31
BENDALL, J R	F.32
BERNAL, Eileen	A.26,A.27

Index of correspondents

BERNAL, John Desmond	See A.26
BLAXTER, Sir Kenneth (Lyon)	F.38
BODDE, Derk	A.69,A.70,A.72
BOURNE, Geoffrey H	D.32,D.35,D.36,F.22
BOYCOTT, Brian Blundell	F.34
BRINK, Charles Oscar	A.68
BRUMWELL, J R Marcus	A.106
BRYDEN, David J	D.20
BUCHTHAL, Fritz	F.27
BUESS, Heinrich	D.21
BÜLBRING, Edith	F.11
BURBIDGE, Peter G	A.16,A.28,D.19,F.21
BURTCHAELL, James T	A.69,A.70
CALNE, Sir Roy (Yorke)	F.26
CAMBRIDGE UNIVERSITY PRESS	D.15,D.17-D.19,D.24
CAMPAIGN FOR NUCLEAR DISARMAMENT	A.83-A.85
CARSTEN, Mary E	F.23
CHADWICK, Ruth Romaine	A.82
CHAMBERS, Frances	A.28

Index of correspondents

CHAPLAIN, R A	F.24
CHAPPELL, John Brian	F.24
CODE, Charles Frederick	D.11
COHEN, Jacob Antonie	A.30,F.3
COHEN, Ruth Louisa	F.8
COHEN-WELTER, Willy A	A.30
COLLINGWOOD-WHITTICK, M	A.66-A.68
COX, Sir (Ernest) Gordon	F.13
CRONE, Christian	D.12,D.69
<u>DAILY TELEGRAPH</u>	A.83
DALY, Ivan de Burgh	F.7
DANIEL, E E	F.32
DAVIES, Robert Ernest	D.35,F.22
de HAAN, E J	F.25
DELAY, Ute	A.31
DRESEL, Elisabeth Irmgard Brigitte	F.22,F.31
DREW, John	A.68
DUBOWITZ, V	D.35
DUKE, A	A.6

Index of correspondents

EBASHI, Setsuro	A.68,F.26
EDSALL, John Tileston	A.68,E.7,E.9,F.25
EDWARD, Anthony W F	F.26
ELLIOTT, Gerald	F.23,F.27
ELLIOTT, Kenneth Allan Caldwell	A.67,A.68,A.70,A.71
ENGELHARDT, Vladimir Aleksandrovich	D.21
FALLDING, Margaret Hardy	E.8
FARM AND FOOD SOCIETY	A.89-A.91
FATT, Paul	A.83
FEUER, G	F.31
FLEAR, Cecil T G	A.32,A.33
FRITZ, Irving Bandas	F.24
FROST, Honor	A.34
GABELOVA, Nina A	D.20
GADDIE, Robert	B.1
GOODALL, Forrest R	F.23
GORONWY-ROBERTS, Goronwy Owen, Baron	A.101
GORRINGE, Peter	A.35
GUTMANN, E	F.24,F.25

Index of correspondents

HAMOIR, G	F.23,F.25
HANSON, (Emmeline) Jean	F.9,F.34
HARDING, J J	F.23
HARLAND, Elisabeth	A.66,A.68
HARVARD UNIVERSITY PRESS	D.38
HASSELBACH, Wilhelm	D.35
HATFIELD (née MIALL), Frances Margaret	A.41
HEALD, Peter Joseph	F.32,F.33
HELE, Mary E Priscilla	F.31
HIBBERD, Hope	A.36
HILL, Archibald Vivian	D.20, F.4
HIMSWORTH, Sir Harold (Percival)	A.11,A.12
HOET, J P	F.5
HOLLAND, D L	F.29
HONIG, Carl Robert	F.24
HOPKINS, Sir Frederick Gowland	See A.10
HOWELL, M L	A.9
HUXLEY, Sir Andrew Fielding	D.20,F.12,F.15
HUXLEY, Hugh Esmor	F.8,F.34
IRIYAGOLLE, Indrani	A.37

Index of correspondents

JAISLE, Franz	F.23
KALCKAR, Herman Moritz	F.6
KAY, Cyril M	F.23
KEIGHLEY, Aylwin	A.38
KENDRICK, Carol	A.83
KOMINZ, David Richard	D.20
KRAUSE, Gerhard	A.39
KREBS, Sir Hans Adolf	F.34,F.35
LASZT, L	E.6
LE FANU, Mark	A.69
LEHMANN, Hermann	A.40
LEVERHULME TRUST	B.28,B.29,F.14
LIANG Chi Chin	F.32
LINFOOT, Joyce	B.30
LISSMANN, Hans Werner	F.25
LUNDGAARD, Einar	D.69,F.6 See also D.12
McCOLLESTER, Duncan L	A.40,F.33

Index of correspondents

McILWAIN, Henry	F.23
McQUILLEN, Kenneth	A.16
MADDEN, E H	D.38
MANN, Thaddeus Robert Rudolph	D.21
MEDICAL RESEARCH COUNCIL	A.11-A.13
METHUEN & COMPANY LIMITED	D.15
MITCHELL, Joseph Stanley	F.4
MOMMAERTS, Wilfried F H M	E.4
MONTEFIORE, The Rt.Rev. Hugh William	A.41
MOTT, Sir Nevill (Francis)	A.82,F.8,F.11
MOYLE, Jeremy	A.42
MOYLE, John	A.43
MURRAY, Keith Anderson Hope, Baron	F.14
NEEDHAM, Joseph	A.13,A.26,A.44-A.52,F.22
NEUBERGER, Albert	D.15
NOWINSKI, Wiktor W	A.53,D.21
NUFFIELD FOUNDATION	F.32,F.33
OFFER, Gerald W	F.28

Index of correspondents

OGSTON, Alexander George	F.38
OWEN, David Anthony Llewellyn	A.96
OXFORD UNIVERSITY PRESS	D.15
PALATÝ, Vladimír	F.24
PANTIN, Carl Frederick Abel	F.8,F.11
PARK, Jane Harting	D.36
PARTRIDGE, S Miles	F.28
PERRY, Samuel Victor	F.20,F.23,F.29,F.34
PETERS, Sir Rudolph Albert	A.16,F.35,F.37
PIRIE, Antoinette ('Tony')	F.35-F.38
PIRIE, Norman Wingate	F.35,F.37,F.39
POLLITT, Geoffrey	A.54
PRINGLE, John William Sutton	F.24
RADU, Horia	D.21
RAJCHMAN, Marie	A.55
RANDLE, Sir Philip John	F.34
RAPKINE, Sarah M	A.56
RHODES JAMES, Robert Vidal	A.78,A.83,A.90,A.101

Index of correspondents

RICHTER, Derek	A.5,A.8
ROSS, Robert	E.7
ROUGHTON, Francis John Worsley	B.28
ROYAL SOCIETY	A.13,B.25-B.28,D.21,F.12, F.15,F.36-F.38
RÜEGG, J Caspar	D.20,F.24,F.27
RUSHTON, William Albert Hugh	F.35
SALT, George	A.68
SCHIRMER, Heiner	D.20
SCHOTT, G D	F.29
SCHWALM, H	E.3,E.5
SCIENCE PRESS PTY LIMITED	A.9
SHOENBERG (née FISCHMANN), Catherine Felicitée	A.58,D.20,F.7-F.16
SILVA, Mahindar	A.59
SLATER, Sir William (Kershaw)	A.13,B.25,B.26
SOBIESZEK, Apolinary	F.33
SOCIETY FOR CULTURAL RELATIONS WITH THE USSR	F.22
STEELE, Sydney	A.66-A.68
STRAUB, F B	E.5

Index of correspondents

SYNGE, Richard Laurence Millington	F.35
SZENT-GYÖRGYI, Albert	F.9
SZENT-GYÖRGYI, Andrew Gabriel	F.23
TEICH, Mikuláš	A.59,D.21,D.38
TERYUO, Ushiyama	A.60
TONOMURA, Y	D.20
UNDERWOOD, Edgar Ashworth	D.21
URAKAWA, Norimoto	F.23
van HEYNINGEN, William Edward ('Kits')	A.61,D.21
VASILE, Marza D	F.24
WADDINGTON, Conrad Hal	A.13
WADE, H W R	A.16
WAKID, Nabil W	A.62,F.17-F.20
WEBER, Hans Hermann	D.20,D.21,F.21
WEEDS, Alan G	D.21,F.24
WEIS-FOGH, Torkel	F.13,F.14
WILKIE, Douglas Robert	D.69

Index of correspondents

WILLIAMS (née CAWKWELL), Jennifer M	A.63-A.65
WILLMER, E N	A.90
WRINCH, Dorothy	F.25
WYNN, Ralph Matthew	D.10
YOUNG, Sir Frank (George)	A.13,B.25,B.26,F.7,F.8, F.10,F.11,F.24,F.26,F.34