

Catalogue of the papers and correspondence of

**ROBERT HILL FRS**

(1899 - 1991)

Compiled by Timothy E. Powell and Peter Harper

Deposited in Cambridge University Library

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**LIST OF CONTENTS**

		Items	Page
GENERAL INTRODUCTION			4
SECTION A	BIOGRAPHICAL	A.1-A.90	10
SECTION B	RESEARCH	B.1-B.329	22
SECTION C	FISH-EYE CAMERA	C.1-C.86	57
SECTION D	CAMBRIDGE UNIVERSITY	D.1-D.40	67
SECTION E	PUBLICATIONS	E.1-E.118	75
SECTION F	LECTURES	F.1-F.53	90
SECTION G	SOCIETIES AND ORGANISATIONS	G.1-G.23	96
SECTION H	VISITS AND CONFERENCES	H.1-H.94	101
SECTION J	CORRESPONDENCE	J.1-J.156	117
INDEX OF CORRESPONDENTS			134



## GENERAL INTRODUCTION

### PROVENANCE

The papers were received from Mrs Priscilla Hill, widow, in July and November 1991 and, per D.S. Bendall, Hill's Royal Society memorialist, in September 1992 and June 1993.

### OUTLINE OF THE CAREER OF ROBIN HILL

Robert Hill (he was known to his friends and colleagues as Robin) was born in Leamington Spa, Warwickshire, on 2 April 1899. He was educated at Bedales School until 1917 when he was admitted to Emmanuel College Cambridge. Before he could begin his university studies Hill became eligible for war service. He joined the Cambridge University Officers' Training Corps but in the autumn of 1917 was drafted into the infantry. In February 1918, after a short spell in training on Salisbury Plain, he was transferred to the Anti-Gas Establishment of the Royal Engineers, based at University College London. In 1919 Hill resumed his studies at Cambridge where he was to remain for the rest of his academic career. He read Chemistry, Physics and Botany in the Natural Sciences Tripos, specialising in Chemistry in Part II and graduated with a first-class degree.

At Bedales School Hill had developed a scientific interest in natural dyes and dyeing techniques. He created his own dyes and in later years Hill made up the paints he used in his water-colour paintings. This interest and his chemistry degree contributed to Hill's first postgraduate research, on inorganic pigments. In 1922 Hill joined F.G. Hopkins's Department of Biochemistry. To his disappointment, he was directed by Hopkins away from plant biochemistry to research on haemoglobin. His work on haemoglobin led to the reversible separation of the pigment and protein components, and to subsequent research on the properties of artificial haemoglobins with other metals replacing the iron of the haem pigment. After a series of papers on the properties of haemoglobin, a mutual interest in haem compounds led in 1926 to collaboration with David Keilin, then working at the Molteno Institute, Cambridge, on the isolation of cytochrome *c*.

Another early interest of Hill's had been meteorology. His first scientific paper was on the sunspots of February 1917. In the early 1920s Hill developed a 'fish-eye' camera, a camera with a lens able to photograph through 180°, and thus able to photograph the whole sky at once. It was first described



at a meeting of the Royal Meteorological Society in 1924. The firm R. & J. Beck Ltd marketed the camera but although the camera aroused much interest it was not widely adopted.

After a visit to Singapore and the Dutch East Indies in 1932 Hill continued his research on haemoglobin with a study of its oxygen binding affinity, especially that of myoglobin (muscle haemoglobin). As with his researches with Keilin this employed spectroscopic methods, at which Hill became adept. In the 1930s Hill turned to plant biochemistry. He worked on the chemistry of anthraquinone colouring matters and other glycosides in plants and in 1938 received a Royal Society grant for work on madder dye. Hill began to study photosynthesis in 1936, with research into oxygen evolution by chloroplasts, work related to his research on haemoglobin. In 1937 he discovered the 'Hill reaction'. When isolated chloroplasts from green plant leaves were illuminated in the presence of certain iron containing salts they produced oxygen while the iron underwent reduction. The amount of oxygen evolved was initially small, requiring considerable ingenuity to measure it and Hill's experience with the spectroscopic determination of small amounts of oxygen in haemoglobin was very important. His discovery of the 'Hill reaction', followed by research on plant cytochromes established his reputation in this field. Despite this and his other research achievements Hill held no higher degree until the award of the Cambridge Sc.D. in 1942.

In 1935 Hill married Priscilla, the sister of his friend E.B. Worthington. They bought Vatches Farm, in Barton near Cambridge. Here Hill grew many of the plants and fruit trees he was to use in his research. Hill's work from 1922 had been supported by a series of research grants from various bodies. In 1943, however, Hill was taken onto the scientific staff of the Agricultural Research Council. He remained working in Cambridge biochemistry department. Hill's interest in plant biochemistry remained broad. He continued research into plant and inorganic pigments and in 1943, in cooperation with the East Malling Research Station, Maidstone, Kent he undertook research on fruit tree rootstocks, much of it on trees grown at Vatches Farm. In 1958 Hill was asked to advise on the biochemistry of tea fermentation by the Nyasaland Tea Association. He visited Nyasaland (Malawi) and helped formulate a biochemical research programme.

Hill continued to receive most recognition for his work on photosynthesis. From the late 1950s Hill concentrated on the energetics of photosynthesis and in 1960 made his second great contribution to photosynthesis research with the discovery, with F.L. Bendall, of the 'Z scheme' of electron transport which linked two photochemical energy conversion processes within photosynthesis. They suggested that the electron carriers shuttle electrons from one photosystem, involving the splitting of water, to a second, able to reduce a protein factor (later identified with the 'methaemoglobin-reducing factor' he had discovered) which transferred the electrons ultimately to carbon dioxide. Hill retired from the Agricultural Research Council in 1966 but his research activities continued little diminished



until his death in 1991. In his later years Hill worked particularly extensively on the wider issue of the application of the Second Law of Thermodynamics to photosynthesis. Although his first major paper on this subject had been rejected for publication, three further papers were published in the 1980s. He continued also to pursue research on natural and inorganic dyes, fruit tree research and meteorology.

Hill was accorded many honours, principally for his contributions to photosynthesis. He was elected a Fellow of the Royal Society in 1946 and was awarded a Royal Medal of the Royal Society in 1963 and the Copley Medal in 1987. He was elected a Foreign Honorary Member of the American Academy of Arts and Sciences in 1971, a Foreign Associate of the US National Academy of Sciences in 1975 and a Foreign Member of the Accademia Nazionale dei Lincei in 1975. In 1963 Hill was made an Honorary Fellow of Emmanuel College Cambridge and in the same year received the Charles E. Kettering Research Award and the First Award for Photosynthesis of the Society of American Plant Physiologists. Hill was elected a Member of the American Society of Biological Chemists in 1964 and received the Finsen Medal of the Comité International de Photobiologie in 1972. He received Honorary Degrees from the universities of Würzburg (1986), Göttingen (1987) and Sheffield (1990).

#### DESCRIPTION OF THE COLLECTION

The material is presented in the order given in the List of Contents. This collection covers almost all aspects of Hill's career.

Section A, Biographical, consists principally of Hill's own records of his career, personal and family correspondence and photographs. It includes summaries by Hill of his research activities and some documentation of honours he received, including his election to the Fellowship of the Royal Society in 1946, and the award of its Royal and Copley medals. The section also includes notebooks used for recording domestic and personal matters.

Section B, Research, is the largest in the collection. It documents all aspects of Hill's research except that relating to the fish-eye camera, which is to be found in section C. The papers in this section document Hill's research from his days at Bedales School to research notes written very shortly before his death, a period of over seventy years. Represented here are Hill's earliest scientific interests in meteorology and dyeing, school and undergraduate notes, Hill's first postgraduate research on inorganic pigments, and his subsequent investigations into the



biochemistry of haemoglobin and haematin, including his collaboration from 1926 with Keilin on the isolation of cytochrome *c*. There is good documentation of his work on photosynthesis including research leading up to his 1937 discovery of the 'Hill reaction', and his and F.L. Bendall's outlining of the 'Z scheme' in 1960. Hill's interest in the relationship of thermodynamics to photosynthesis is particularly well-represented - including a sequence of fifty notebooks used over a period of thirty years from 1960. Hill continued to work in other areas, most of which are represented in this section. These included work on the chemistry of anthraquinone colouring matters in plants in the 1930s, work on dye-stuffs, and collaboration with A.B. Beakbane and others at the East Malling Research Station on the biology of fruit tree rootstocks.

The bulk of the material is in the form of notebooks of various formats, but there are also research notes, graphs, calculations etc. Much of this loose material was found in Hill's folders or envelopes, often identified by subject titles inscribed thereon. At the end of the section is a sequence of photographs found loose.

Section C, Fish-eye camera, provides documentation of Hill's development of the camera in the 1920s and 1930s. There are Hill's notebooks recording his development of the lens system, many photographs taken by Hill using the lens, correspondence relating to the marketing of the camera by R. & J. Beck Ltd, and newspaper and magazine cuttings with photographs taken using the camera. The Whipple Museum of the History of Science, Cambridge holds further stereoscopic photographs and examples of the 'fish-eye' camera.

Section D, Cambridge University, is chiefly research reports on work in progress in plant biochemistry for the Department of Biochemistry annual reports and material relating to the funding of Hill's research from the 1920s until his retirement. Hill's teaching is documented in section F.

Section E, Publications, brings together notes, drafts, correspondence and other related material for some of Hill's work published or intended for publication c.1928-1985. This material has been linked where possible to the list of Hill's publications prepared for his Royal Society memoir by D.S. Bendall at A.12. It includes a number of drafts of Hill's work on the thermodynamic efficiency of photosynthesis, including those of papers submitted for publication to the Royal Society in 1961 and *Nature* in 1980 but rejected as unacceptable. There is also a sequence of editorial correspondence with journals and publishing houses. There is a set of Hill's published papers at E.118.

Section F, Lectures, principally consists of material for Hill's teaching at Cambridge University. It includes notes for lectures and for practical classes in plant biochemistry, chiefly dating from the



1930s and 1950s, and material for a lecture in a series organised by Joseph Needham on the history of biochemistry. There is very little material relating to public and invitation lectures.

Section G, Societies and organisations, is slight. It comprises material relating to eleven British and international organisations. Of particular interest is material relating to the British Photobiology Group (later Society) of which Hill was a founder member in 1955, and the Comité (later Association) International de Photobiologie - Hill was elected an Honorary Member in 1968.

Section H, Visits and conferences, presents a chronological sequence, 1928-1988, of some of Hill's engagements both in the UK and abroad. Those for which most documentation survives are the visit of Hill to Singapore and the Dutch East Indies in 1932, his visit to France in 1947 as part of a Cambridge University/East Malling Research Station arboricultural expedition and a visit to Nyasaland (Malawi) in 1958 to advise on the biochemistry of tea fermentation (and the subsequent establishment of a research programme).

Section J, Correspondence, is a substantial section. Hill rarely kept carbon copies or manuscript drafts of outgoing letters so the correspondence is almost entirely incoming letters. In a few cases Hill made a rough draft of a reply on the letter received. However, there are also a number of Hill's manuscript drafts, particularly those from the late 1970s, that have draft letters to two or more correspondents thereon. There are three extensive sequences of correspondence, from E.J.H. Corner, chiefly relating to Hill's visit to Singapore and the Dutch East Indies in 1932, with staff of the East Malling Research Station, in particular A.B. Beakbane, relating to joint research on fruit tree rootstocks from 1943, and with D.A. Walker, a fellow researcher on photosynthesis from the 1950s. There is also substantial scientific correspondence in section B, retained with other material with which it was found.

There is also an index of correspondents.

#### LOCATION OF OTHER MATERIAL

Hill's letters home from Bedales School and during his First World War service are retained in family hands.

The Whipple Museum of the History of Science, Cambridge holds an example of Hill's 'fish-eye' camera and associated apparatus and further stereoscopic photographs.

#### ACKNOWLEDGEMENTS

We are grateful to Mrs Priscilla Hill and her family for making the papers available and for their advice and encouragement.

We gratefully acknowledge the assistance of Dr D.S. Bendall in providing information and identifying documents, in commenting on sections of the draft catalogue, and in making available a draft of his Royal Society memoir of Hill and material assembled in the course of the preparation thereof.

T. E. Powell

P. Harper

BATH 1994



**SECTION A**

**BIOGRAPHICAL**

**A.1 - A.90**

A.1-A.12	BIOGRAPHICAL AND BIBLIOGRAPHICAL
A.13-A.34	CAREER, HONOURS AND AWARDS
A.35-A.44	DOMESTIC AND PERSONAL NOTEBOOKS
A.45-A.62	MISCELLANEOUS BIOGRAPHICAL MATERIAL
A.63-A.89	PHOTOGRAPHS
A.90	ROYAL SOCIETY MEMOIR

## Biographical

### BIOGRAPHICAL AND BIBLIOGRAPHICAL

- A.1                    *The Times* obituary 21 March 1991.
- Independent* obituary 21 March 1991.
- Daily Telegraph* obituary 23 March 1991.
- A.2                    Obituary by D.S. Bendall and D.A. Walker, 4pp typescript.
- 'Robin Hill. Life and Science' by D.S. Bendall, 3pp typescript.
- This was written by Bendall for Hill's widow, Priscilla, and made available for cataloguing in November 1993.
- List of Hill's research interests, 2pp typescript, prepared by D.J. Hill (son), June 1991.
- A.3, A.4              'R. Hill personal information, also re Plant Biochemistry'. Contents of Hill's envelope so inscribed divided into two for ease of reference.
- A.3                    Miscellaneous manuscript curricula vitae and information on teaching and research, 1930s.
- A.4                    6pp manuscript and 5pp typescript drafts on 'The position of plant biochemistry Proposed reappointment of a lecturer', January 1937.
- A.5                    Curricula vitae 1938, ca.1944, 1945, post-retirement.
- A.6                    Entries for *Who's Who*.



### Biographical

- A.7 Statement and account of Hill's principal scientific publications to ca.1940, probably prepared for his Cambridge University Sc.D. candidature (see A.14), 9pp typescript with extensive manuscript corrections.
- A.8 'Account of scientific investigations and list of publications' by Hill, February 1952, 12pp typescript draft prepared for Hill's application for the Quick Professorship in Biology (see A.18).
- A.9 Correspondence from the Biochemical Society *re* preservation of papers and equipment of importance in the history of biochemistry, and possible recording of Hill's reminiscences.
- A.10 Miscellaneous requests for biographical information or reminiscences etc 1973-1989 and nd.
- A.11 Bibliographies 1941 and 1975.
- A.12 Bibliography prepared by D.S. Bendall for his Royal Society memoir of Hill.  
  
References in this catalogue to Hill's published papers and books are in the form *Bibliog.* no. ... and refer to this bibliography.

### CAREER, HONOURS AND AWARDS

- A.13 Demobilisation from the Army's Anti-Gas Establishment, 1919.  
  
Menu for Cambridge Biochemical Laboratory Dinner in celebration of the knighthood of Professor Hopkins, 14 February 1925.  
  
The menu has many signatures of those present on the back.  
  
Letter of congratulation on Hill's engagement to Priscilla Worthington, 18 December 1934.



### Biographical

- A.14                    Award of Cambridge University Sc.D., 1942.
- Appointment to Scientific Staff of the Agricultural Research Council, 1943.  
                          See also D.22-D.27.
- A.15, A.16            Election to Fellowship of the Royal Society, 1946.
- A.15                    Notice of election; press-cutting; correspondence from the Royal Society  
                          etc.
- A.16                    Letters of congratulation.
- A.17                    Membership of the Biochemical Society.  
                          Election as Member 1948, Emeritus Member 1972.
- A.18                    Application for Quick Professorship of Biology, Cambridge University, 1952.  
                          See also A.8.
- A.19                    Charles F. Kettering Research Award, 1962.  
                          Hill received this award for his outstanding work in the field of  
                          photosynthesis. It was renewed annually until 1969. See also D.28.
- A.20                    Royal Medal of the Royal Society, 1963.  
                          Letters of congratulation.
- A.21                    Election to Honorary Membership, American Society of Biological Chemists,  
                          1964.
- Election to Corresponding Membership, American Society of Plant  
                          Physiologists, 1964.

### Biographical

- A.22 Retirement from the Scientific Staff of the Agricultural Research Council, 1966, and subsequent correspondence *re* superannuation.
- A.23 Election to Honorary Membership, Comité International de Photobiologie, 1968.
- Election to Fellowship, American Academy of Arts and Sciences, 1971.
- A.24 Election as Foreign Associate, US National Academy of Sciences, 1975.
- Election as Foreign Member, Accademia Nazionale dei Lincei, Rome, 1975.
- A.25-A.29 Eightieth Birthday celebrations, 1979.
- A.25-A.28 Cards, telegrams, letters of congratulation. 4 folders.
- A.29 Correspondence *re* events to celebrate the occasion.
- A.30 Opening of Robert Hill Laboratories, Sheffield University, 1980.
- Manuscript draft of Hill's remarks at the opening ceremony.
- Honorary degree, University of Würzburg, 1986.
- See also H.87, H.88.
- A.31 Copley Medal of the Royal Society, 1987.
- A.32 Honorary degree, University of Göttingen, 1987.
- As Hill was unable to travel to West Germany the degree was presented to him in the Library of Emmanuel College Cambridge.



### Biographical

- A.33 Note of congratulation on the fiftieth anniversary of the discovery of the 'Hill Reaction', 1987.
- A.34 Ninetieth Birthday celebrations, 1989.
- Honorary D.Sc., University of Sheffield, 1990.

### DOMESTIC AND PERSONAL NOTEBOOKS

- A.35 Softback notebook used principally for notes on finances 1929, 1933-1941. Most pages not used.
- A.36 Softback pocket notebook inscribed '1937-1938 Notes on Vatches'. Used for notes on the day-to-day running of Vatches Farm.
- Hill purchased Vatches Farm, in the village of Barton near Cambridge, in 1935.
- A.37 Similar format notebook used from the front and from the back for notes on day-to-day running of Vatches Farm, 1938.
- A.38 Hardback pocket notebook used for miscellaneous domestic, financial etc notes 1944. A little intercalated material.
- A.39 Hardback pocket notebook used for miscellaneous notes, including 'German songs' not in Hill's hand, 1946-1947. Most pages not used.
- A.40 Hardback pocket notebook used from the front and from the back for notes on the day-to-day running of Vatches Farm, 1950, 1952-1955. Most pages not used.

### Biographical

- A.41                      Hardback pocket notebook used from the back for Vatches Farm accounts, 1951-1955. Most pages not used.
- A.42                      Hardback pocket notebook inscribed on first page 'Milk book'. Used to record milk yields from Vatches Farm cows 1952-1955. Most pages not used.
- A.43                      Hardback pocket address book inscribed on front cover '1952'. Used principally for addresses of colleagues in the USA.
- A.44                      Pocket diary 1959.

### MISCELLANEOUS BIOGRAPHICAL MATERIAL

#### Family

- A.45                      Joseph Alfred and Clara Maud Hill (parents).  
Two letters only.  
  
Susan Hill (daughter).  
One letter only.
- A.46                      David J. Hill (son).  
Correspondence 1967-1975.
- A.47                      Katharine Hill (sister).  
Correspondence 1928-1975.



### Biographical

A.48 L.R. Wager (brother-in-law of Priscilla Hill).

Postcard from Wager 1928; letter from Wager 1930, from SS Quest ?on British Arctic Air Route expedition (only the first page survives); letter from Wager 1933, on Mount Everest expedition, with newspaper cuttings recording progress of expedition.

See also H.6.

### Personal correspondence

A.49	1920s-1940s	A.52	1977-1979
A.50	1950s, 1960s	A.53	1980-1983
A.51	1970-1976	A.54	1984-1989, nd

### Financial, administration of Vatches Farm etc

A.55 Miscellaneous papers, 1947-1979.

For notebooks used to record domestic and farm matters see above A.35-A.44.

### Charities and appeals

A.56 1937-1980.

### Drawings and paintings

A.57 Catalogue of watercolour paintings by Hill, compiled by D.J. Hill (son), 1994.

A.58 Miscellaneous sketches and water-colours.

## Biographical

### Memorabilia

- A.59                    Air Raid Precautions Handbooks nos. 8 'The duties of Air Raid Wardens' (1938) and 14 'The Fire Guards Handbook' (1942).
- A.60                    *The Times* guide to 'The Night Sky 1953', with 1980s newspaper cuttings of the *The Times's* monthly charts of the night sky intercalated.
- A.61                    'The two cultures' by M. Yudkin, 15pp typescript with manuscript corrections for 'Cambridge Review 10 June 1961'. A response to C.P. Snow's lectures with this title.
- 'The song of the Second Law of Thermodynamics' and Christmas message by A.L. Peck, sent to Hill 1968.
- A.62                    Miscellaneous items, including receipts, manuscript notes on wines.

### PHOTOGRAPHS

- A.63                    First World War group photograph. Hill is fourth from left.
- A.64                    'Prints May 1925'. Contents of Hill's envelope so inscribed. Hill is not featured.
- Photographs taken at Ilfracombe and Lynton, August 1925. Hill is not featured.
- Photograph inscribed on verso 'On the Lake, Routh Park, Cardiff, March 1928'. Not of Hill.
- Photograph inscribed on verso 'Hill (& the Waddingtons) at Thetford [...] 22nd July, '28'.



### Biographical

- A.65 'Irish photos'. Contents of Hill's envelope so inscribed. Photographs from holiday in Ireland ?1929.
- A.66 Group photograph of workers in ?Cambridge biochemistry laboratory. Features F.G. Hopkins but Hill is not featured.
- Group photograph taken outside ?Cambridge biochemistry department. Features F.G. Hopkins. Hill is at the extreme right of the front row.
- A.67-A.78 Photographs taken during visit to Singapore and the Dutch East Indies, 1932 (see H.2-H.9).
- A.67-A.72 'East Indies Photos'. Contents of Hill's envelope so inscribed divided into six for ease of reference: chiefly of scenery, local life etc. At A.72 is miscellaneous material found with the photographs.
- A.73, A.74 '(1)'. Contents of Hill's envelope so inscribed divided into two for ease of reference: photographs taken in Johore, Malaya and Java 1931 and 1932, identified on verso.
- A.75, A.76 '(2)' and 'Malay Photos'. Contents of Hill's envelope so inscribed.
- A.75 Nine photographs taken in Malaya, identified by list compiled February 1953.
- A.76 Photographs taken in Johore, Malaya and Java 1931 and 1932, identified on verso.
- A.77 - Photographs sent to Hill by E.J.H. Corner with correspondence at J.15.
- A.78 Photographs sent to Hill with correspondence at J.16.

### Biographical

A.79 Photographs from trip to Castle Acre, Norfolk, 1934. With covering letter from R.E. Holttum.

'Various prints'. Contents of Hill's envelope so inscribed, possibly from holiday in ?Spain 1930s.

J. Omer-Cooper and E.C. Stoner, 1930s.

A.80 Passport photograph of Hill, 1947.

A.81 Colour photographs and negatives from visit to Nyasaland (Malawi), 1958 (see H.24-H.34).

A.82 Colour photographs of Hill and colleagues at the Charles F. Kettering Laboratory, Yellow Springs, Ohio, April 1963 (see H.41). Those featured are identified on verso.

Key for group photograph of Cambridge biochemistry department, June 1966. The photograph itself was not found.

A.83 Photograph of Hill and colleagues at the International Conference on the Photosynthetic Unit, Gatlinburg, Tennessee, 1970 (see H.53, H.54). This was sent to Hill in 1979 on the occasion of his eightieth birthday.

Contents of Hill's envelope: Hill and C.S. French at Hotel Astoria, Stresa, June 1971, and photosynthesis experiment, 1973.

Bob Pilcher and Danny McMillan, May or June 1971.

A.84 Colour photograph of Hill and ?D. Krogmann, 1972.

Sir Rudolph and Lady Peters, 1972.



### Biographical

A.85                    Photographs of Sixth International Congress on Photobiology, Bochum, West Germany, August 1972 (see H.66-H.68). Participants featured are identified on verso.

Colour photographs of Hill and colleagues in Australia, February 1973. With covering letter from L.H. Grimme.

A.86                    Group photograph of Gordon Research Conference on Regulatory Mechanisms in Photosynthesis, Tilton Academy, New Hampshire, August 1973 (see H.73). With key.

A.87                    Portrait photographs of Hill taken by W.F. Bertsch, August 1976.

A.88                    Colour photographs of the Hills with Margaret Newman, Vatches Farm, March 1978. With covering letter from Newman.

Colour photographs of Hill with Chinese visitors, sent to Hill 1982 (see G.19).

A.89                    Colour photographs taken during visit to Vatches Farm, summer 1985. With covering letter from wife of American colleague featured.

### ROYAL SOCIETY MEMOIR

The list of publications prepared by D.S. Bendall for his Royal Society memoir of Hill is at A.12.

A.90                    'Correspondence relating to the RS memoir on R.Hill by D.S. Bendall'.

**SECTION B                      RESEARCH**

**B.1 - B.329**

The papers in this section document Hill's research from his days at Bedales School to research notes written very shortly before his death, a period of over seventy years. Represented here are Hill's earliest scientific interests in meteorology and dyeing, on which he worked while still at school, school and undergraduate notes, Hill's first postgraduate research on inorganic pigments, and his subsequent investigations in the biochemistry of haemoglobin and haematin, including his collaboration from 1926 with D. Keilin on the isolation of cytochrome *c*. There is good documentation of his work on photosynthesis including research leading up to his 1937 discovery of the 'Hill reaction' and his and F.L. Bendall's outlining of the 'Z scheme' in 1960. Hill's interest in the relationship of thermodynamics to photosynthesis is particularly well-represented - including a sequence of fifty notebooks used over a period of thirty years from 1960.

Although Hill's reputation was founded largely on his work in photosynthesis he continued to work in other areas, most of which are represented in this section. These included dye-stuffs, the chemistry of anthraquinone colouring matters and other glycosides in plants in the 1930s, and the biology of fruit tree rootstocks, carried out in collaboration with A.B. Beakbane and others at the East Malling Research Station from 1943.

Not represented in this section is material relating to Hill's development of a camera with a fish-eye lens capable of taking photographs at 180°. This is documented in section C.

The bulk of the material is in the form of notebooks of various formats, but there are also research notes, graphs, calculations etc. Much of this loose material was found in Hill's folders or envelopes, often identified by subject titles inscribed thereon. These titles have been reproduced in the catalogue entries. At the end of the section is a sequence of photographs found loose.

Where applicable reference has been made to the list of publications prepared by D.S. Bendall for his Royal Society memoir of Hill (A.12) in the form *Bibliog.* no. ...

B.1-B.206	NOTEBOOKS
B.207-B.323	RESEARCH NOTES
B.324-B.329	PHOTOGRAPHS



## Research

### NOTEBOOKS

Most of the records of Hill's research are preserved in the form of notebooks. They are presented in a roughly chronological sequence, from school notebooks from Bedales to notes written shortly before his death.

Some of these notebooks were used by Hill for work on a variety of topics, thus the same notebook might have notes on lenses, dyes and photosynthesis. Many have intercalated material, including manuscript notes and jottings, but also dried leaves and ferns and samples of dyed fabric. Many later notebooks are paginated (almost invariably Hill numbered only the righthand page) and some have the page numbers of important work listed on front cover or first page of the notebook.

Not all the dates of Hill's found in the notebooks are necessarily reliable. A number of earlier notebooks have lines in Hill's own code or language, eg B.39.

Inserted at the front of number of the notebooks, or sequences of notebooks, are explanatory notes by D.S. Bendall, a Cambridge colleague of Hill's and his Royal Society memorialist, identifying the topics of research in the notebook. These have been used in the catalogue entries with the indication DSB.

- B.1 Bedales School hardback notebook labelled on front cover 'Mechanics'. Used 1915, with later calculations August 1983. Paginated 1-48, later pages not numbered.
- B.2 Bedales School hardback notebook labelled on front cover 'Magnetism & Electricity'. Nd. A little intercalated material.
- B.3 Hardback notebook used for notes on physics, earliest date August 1916. Some of the work has been marked.
- B.4 Hardback exercise book inscribed on front cover 'Essays'. Used for school essays on philosophical, literary and scientific issues. Includes work on 'The problems of the coming Peace' and 'Ten years hence'. Most pages not used. The work has been marked.
- B.5 Softback pocket notebook labelled on front cover 'Clouds BB 1917-1919?' Used for notes on and poem about clouds by BB (?Barbara Burnham), and notes on preparation of dyes 1919. The work on dyes is paginated 1-100. A little intercalated material.

### Research

- B.6 Softback notebook stamped inside front cover 'Cambridge University O.T.C. [Officer Training Corps]'. Used for work on dyes 1918, and later notes on mechanics. A little loose material intercalated including Cavendish Laboratory question paper for 'Mechanics VI', nd, and letter from Hill to A.E. Heath, 30 March 1920.
- Front pages of the notebook are missing.
- B.7 Exercise book inscribed on front cover 'Botany'. Used for notes and sketches on 'the Wallflower', 'the Lily' and 'the Pine'. Nd but probably first year undergraduate. Loose at front is instruction sheet for elementary botany practical work, dated 6 February 1919.
- B.8 Exercise book used for botanical notes and sketches. Nd but probably undergraduate. Some of the work has been marked.
- B.9 Softback notebook used for botanical notes and sketches, earliest date 23 January 1919.
- B.10 Softback pocket notebook inscribed inside front cover 'Hill III'. Used from the front principally for work on dyeing, January - Long Vacation 1919, and from the back for miscellaneous jottings.
- B.11 Hardback notebook inscribed on front cover 'P. Madders'. Used for work on algae and indigo, mathematical calculations (earliest date 27 June 1919) and for later notes and plant specimens 1942-1954.
- B.12 Softback notebook used from the front for notes on botany lectures of J.C. Willis and for sketches of plants (earliest date 13 October 1919), and from the back for botanical sketches and notes.
- B.13 Softback notebook used for miscellaneous notes on dyeing, botany, weather phenomena and photography ca.1919-1920 (earliest date 25 December 1919). Intercalated material includes dye samples. Paginated 1-181.



### Research

- B.14 Softback notebook inscribed on first page 'R.Hill. Emmanuel Practical Physics'. Used from the front and from the back for undergraduate notes on physics practical work. Intercalated material includes notes on preparation of chemicals. These have been initialled by 'W.H.M[jills]'. and 'R.H.A.' and one set is dated 28 February 1921.
- B.15 Exercise book labelled on front cover 'R. Hill. Emmanuel Coll. Cambridge Practical Physics'. Undergraduate notes, nd.
- B.16 Softback notebook inscribed on first page 'R. Hill. Emmanuel Col'. Used for undergraduate physics notes, nd. A little intercalated material.
- B.17 Softback notebook used for undergraduate notes on practical work in chemistry, earliest date 10 August 1920. Some work has been initialled by 'R.H.A.'.
- B.18 Softback pocket notebook used principally for work on dyeing, August 1920 - February 1921.
- B.19 Softback notebook used from the front and from the back for practical work in chemistry, earliest date 13 October 1920. A little intercalated material.
- B.20 Paper bound notebook inscribed on front cover 'Organic. Mills. October term 1920'. Used for notes on lectures on organic chemistry by W.H. Mills.
- B.21 Paper bound notebook inscribed on front cover 'Organic. Mills. May term 1921'. Used for notes on lecture on organic chemistry by W.H. Mills.
- B.22 Hardback notebook labelled on front cover 'British Mosses. List of species [...] Made from the 1907 census catalogue. 1921.' Used ca.1921-1922 with later entries 1930 and 1932. Paginated 1-278 with index of mosses at front.  
  
See also B.204-B.206.
- B.23 Softback pocket notebook inscribed on spine 'Pigments Inorganic'. Used for notes 1921 (earliest date 10 March).

### Research

- B.24                      Softback pocket notebook inscribed inside front cover 'Pigments...Dec 1921'. Used for notes 1921-ca.1923. A little material intercalated.
- B.25                      Softback pocket notebook used principally for work on haemoglobin, haematin etc. Latest reference 1922.
- B.26                      Hardback 'manuscript book' used from the front for sketches of cloud, notes on globin, and from the back for notes on lenses and fish-eye camera. Loose note at back dated April 1923.
- B.27                      Softback notebook used for bibliographical references, work on haemoglobin and haematin and other notes ca.1924-1926 (earliest date 18 September 1924).
- B.28                      Softback notebook used principally for notes on and samples of dyeing ca.1924-1928 (earliest date 1 October 1924).
- B.29                      Softback pocket notebook inscribed on spine '1920 - 1950'. Used for work on haemin, haemoglobin etc ca.1924, and a few later jottings 1958, including note at back of ?examination results of 'E.H. [Edwin Hill] 'Summer 1958'. A little intercalated material.
- B.30                      Softback pocket jotter used ca.1924. Includes notes on haemoglobin and haemin paginated 1-14.
- B.31                      Softback notebook used for notes 'probably [...] for a talk given to the Natural Science Club on 5/6/25 on "Hemispherical Photography" ' (DSB), and later notes 1943-1948 and 1959.
- B.32                      Softback pocket notebook used from the front and from the back for miscellaneous notes, references and bars of music (earliest date 9 December 1925).
- B.33                      Notebook used for work on globin, haemin etc 1926-1929 (earliest date 4 May 1926). A little intercalated material.



### Research

- B.34 Pocket notebook used for work on haemoglobin, dyeing etc ca.1926-1927 (earliest date 6 July 1926). Photographs loose at front taken with fish-eye camera.
- B.35 Softback pocket notebook used for notes 1927-1929 (earliest date 28 July 1927) and work on chlorophyll etc 1948-1950.
- B.36 Softback pocket notebook used from the front for notes on experiments 1927-1936 (earliest date 6 August 1927), and from the back for miscellaneous notes.
- B.37 Softback notebook used for work on pigments and dyeing 1927-1932 (earliest date 17 November 1927). Includes dyed fabric samples. A little intercalated material.
- B.38 Softback pocket notebook used from the front for work on haemoglobin May 1928, and from the back for lists of plants found during visit to France June. Most pages not used.
- Hill visited France in June 1928 to attend the Congrès international du vin et du pin maritime in Bordeaux. See H.1.
- B.39 Softback pocket notebook used from the front for notes 1928 and 1944 (earliest date 20 July 1928), and at the back for bibliographical references. A little material intercalated. Most pages not used.
- B.40 Notebook used for notes 1928-1930 (earliest date 11 August 1928). Includes work on chloroplasts.
- B.41 Softback notebook used for work on haemoglobin and globin March 1930 - March 1932. Intercalated material includes duplicated typescript sheets on preparation and properties of porphyrins for 'Part II Practicals'.
- B.42 Softback notebook inscribed on front cover 'Inorganic pigments'. Used from the front for work on pigments 1931-1933, 1940 and 1945-1946 (earliest date 18 December 1931), and from the back for notes 1933. Paginated 1-47, later pages not numbered. A little intercalated material.

### Research

- B.43 Softback pocket notebook used principally for work on haemoglobin in muscle 1932-1933, 1935-1936 (earliest date 5 January 1932). A little intercalated material.
- B.44 Pocket sketchpad used for dye stains 1932-1964 (earliest date 20 March 1932).
- B.45 Pocket sketchpad used for botanical and other sketches 1932 and 1948, and dye stains 1957-1965, 1970 and 1974.
- B.46 Hardback pocket notebook used for miscellaneous notes and references 1932-1933 (earliest date 2 April 1932). Includes notes on Fuller's Earth and Kimmeridge Clay.
- B.47 Softback notebook inscribed on first page 'June. 1932'. Used for work on plant dyes July - September 1932. Paginated 325-405, later pages not numbered, with indexes of plants and persons after the paginated sequence. This index refers to plants in other notebooks (paginated 1-324). Intercalated material includes letter from R.E. Holttum, 22 August 1967.
- B.48-B.51 'Haemoglobin series of notebooks with consecutively numbered pages' (DSB), 1933-1939. Each notebook is also individually identified by a note by DSB.
- B.48 Used March 1933 - January 1935. Paginated 1-81. A little intercalated material.
- B.49 Used March 1933 - May 1935. Paginated 82-156. Intercalated material includes correspondence.
- B.50 Used August 1935 - October 1936. 'Includes first expts on chloroplasts p.217 et seq' (DSB). Paginated 157-234. Intercalated material.
- B.51 Used November 1936 - February 1939. 'Notebook in Haemoglobin series but records expts with chloroplasts' (DSB). Paginated 235-292, later pages not numbered. A little intercalated material.



### Research

- B.52 Softback pocket notebook used for work on dyeing September 1933 - November 1935. Includes samples of dyed fabrics. A little intercalated material.
- B.53 Hardback pocket notebook used for miscellaneous notes for Part II practicals, references, calculations etc, earliest date January 1934.
- B.54 Softback notebook inscribed on front cover 'Plants in Garden'. Used for work July 1934 - August 1945.
- B.55-B.65 Series of notebooks inscribed ' $\Phi$ ' and numbered from I to XI, 1935-1952. All but XI are softback notebooks.
- ' $\Phi$  seems to refer to the component of leaf extracts which supported  $O_2$  evolution by chloroplasts in the light. Also referred to as "leaf zymine". This work led to isolation of protein known as "methaemoglobin reducing factor" - now called ferredoxin' (DSB).
- B.55  $\Phi$  I. Used August 1935 - July 1936. Paginated 1-139 (pagination begins from April 1936).
- B.56  $\Phi$  II. Used July - November 1936. Paginated 1-176. A little intercalated material.
- B.57  $\Phi$  III. Used November 1936 - May 1937. Paginated 1-174. A little intercalated material.
- B.58  $\Phi$  IV. Used May 1937 - March 1938. Paginated 1-147. A little intercalated material.
- B.59  $\Phi$  V. Used September 1937 - June 1938. Paginated 1-174. A little intercalated material.
- B.60  $\Phi$  VI. Used June 1938 - February 1940. Paginated 1-175. A little intercalated material. Lacks front cover.

### Research

- B.61                     $\Phi$  VII. Used from the front April 1940 - February 1941, and from the back April - July 1940. Paginated 1-100 (later pages unnumbered). A little intercalated material.
- B.62                     $\Phi$  VIII. Used May 1941 - June 1945. Paginated 1-176.
- B.63                     $\Phi$  IX. Used ca. February 1942 - April 1943. Paginated 1-176. A little intercalated material.
- B.64                     $\Phi$  X. Used May 1943 - December 1944. A little intercalated material.
- B.65                     $\Phi$  XI. Hardback. Used June 1948 - August 1952. A little intercalated material.
- B.66                    Pocket notebook used for miscellaneous notes, bibliographical references, dyed fabrics etc 1936-1937 (earliest date 30 March 1936). Lacks cover.
- B.67                    Softback notebook used from the front principally for notes on the literature, latest bibliographical reference 1937, and lecture notes, and from the back for miscellaneous notes. Paginated 1-44, later pages not numbered. Intercalated material.
- B.68                    Softback pocket notebook used for miscellaneous notes and references c.1938-1939.
- B.69                    Hardback notebook inscribed inside front cover 'R. Scarisbrick'.  
  
'Scarisbrick's notebook on experiments with chloroplasts' (DSB). Notes and graphs mostly in Scarisbrick's hand but including notes by Hill from February 1939. Paginated 1-73, later pages not numbered. Intercalated material at back includes some dated 1978.



### Research

- B.70                      Hardback notebook inscribed inside front cover 'R. Scarisbrick. Biochemistry Lab. Cambridge'. Notes and calculations mostly in Scarisbrick's hand but including notes by Hill. Used from May 1939 - November 1940. Paginated 171, later pages not numbered.
- B.71                      Softback pocket notebook used for miscellaneous notes, including records of milk yield from cows at the Hill family home at Vatches Farm, ca.1942-1946.
- B.72                      Hardback notebook labelled on front cover 'Wild & Stray Fruit Trees'.  
  
The pages of the notebook have been used from the front for work on fruit trees June 1944 - February 1950, and from the back for accounts in shorthand (not in Hill's hand). Thus the first page of fruit tree work has the last page of accounts on verso.
- B.73                      Hardback notebook labelled on front cover 'Wild & Stray fruit trees'.  
  
'Mostly fruit trees [work] June 1944 - April 1949. Last part of the notebook includes calculations etc relating to Galton's ogive. Note description of ogive on front inside cover' (DSB).  
  
Paginated 1-32 for fruit tree notes and 1-20 for ogive notes. A little intercalated material.
- B.74                      Hardback notebook. Loose note at front identifies it as 'Book II of 'An investigation on the Properties of Galton's ogive''. Used January - February 1945. Paginated 1-118.
- B.75                      Hardback notebook inscribed on first page 'Book III' of work on Galton's ogive. Used February - July 1945. Paginated 1-62, later pages not numbered.
- B.76                      Notepad used from the front for horticultural notes on work at Bredon, Worcestershire, 5-14 August 1944. Lacks front cover.  
  
The pages of the notebook have been used from the back for accounts in shorthand (not in Hill's hand). Thus the first page of fruit tree work has the last page of accounts on verso.

### Research

- B.77-B.79 Series of notebooks used for work on chloroplast and related subjects, numbered 01 - 03.
- B.77 Softback notebook inscribed inside front cover 'Book 01'. Used from June 1945 - July 1948. Paginated 1-162. A little intercalated material.
- B.78 Hardback notebook inscribed on first page 'Book 0.2 July 1948 - June 1950'. Paginated 1-153. A little intercalated material.
- B.79 Hardback notebook inscribed on cover '1950-51' and on first page 'Book 03'. Used September 1950 - April 1952. A little intercalated material.
- B.80 Softback pocket jotter used for work on fruit trees July - December 1945, and on nutrient composition of plants October 1947.
- Front pages of the notebook are missing.
- B.81 Softback pocket jotter used principally for work on fruit trees July 1945 - April 1948.
- B.82, B.83 Hardback notebooks used for work on elementary conics, 1946-1949.
- 'This seems to be a mathematical exercise which was a direct sequel to "An investigation of Galton's Ogive" ' (DSB).
- Loose notes, graphs etc found with the notebooks are at B.248-B.250 below.
- B.82 Inscribed on front cover 'Elementary conics I'. Paginated 1-72. A little intercalated material.
- B.83 Inscribed on front cover 'Elementary conics II' and inside front cover 'March 1948'. Paginated 1-24, later pages not numbered. A little intercalated material.
- B.84 Loose-leaf binder used for work on fruit trees September 1946 - December 1953.



### Research

- B.85                      Hardback notebook used for work on fruit trees, from the front 1947-1949, and from the back 1946-1947.
- B.86                      Softback pocket notebook used principally for notes on fruit trees. Used during visit to France May - June 1947. See H.11-H.18.
- B.87                      Softback notebook used for miscellaneous notes 1947-1949 (earliest date 4 June 1947). Some later intercalated material includes 'Light induced optical changes in green leaves' by Hill and W.D. Bonner, 9pp typescript, *Bibliog.* no. 70 (1963).
- B.88                      Notebook inscribed on front cover 'Inverse functions'. Used for work on inverse functions and fruit trees from the front 1947-1951 (earliest date 11 July 1947), and from the back 1947-1948.
- B.89                      Hardback notebook inscribed on front cover '(June, July 1948)'. Used for work on chloroplasts May 1948 - June 1951. Includes work with F.R. Whatley and H.E. Davenport. Paginated 1-68. Intercalated material.
- B.90                      Hardback notebook used for 'fruit tree work Oct 1949 - Sep 1955 mainly' (DSB), also later work 1956-1957. Paginated 1-73. Samples sellotaped to pages. A little intercalated material.
- B.91                      Hardback notebook inscribed on front cover 'Jan 1950' and 'Prisms'. Used for work on lenses ca.1950-1955. Paginated 1-51, later pages not numbered. A little intercalated material.
- B.92                      Hardback notebook inscribed on front cover 'July 1951'. Used principally for work on chloroplasts 1951 - 1953. Paginated 1-36, later pages not numbered. A little intercalated material.
- B.93                      Hardback notebook inscribed on front cover '1952-3'. Used for work on dyeing April 1952 - October 1953. Includes many samples of dyed fabrics. A little intercalated material including sheet of dye stains.

### Research

- B.94                      Hardback notebook labelled on front cover 'Nov 11th 1952 Robert Hill Stanford'. Used for work on chlorophyll 1952 - 1958. Most pages not used. Intercalated material including ms draft 'Some observations on the nature Reactions of a [?]non-cytochrome haem-protein compound obtained from Rhodospirillum', 6pp.
- B.95                      Hardback notebook labelled on front cover 'Potentials. Cyt b. succinate'. Used July 1953 - December 1954. A little intercalated material.
- B.96                      Hardback notebook inscribed on front cover '1953-1954'. Used chiefly for notes on dyeing October 1953 - December 1954. Includes samples of dyed wool. A little intercalated material, including Bulletin no.1 of Cambridge Branch of Association of Scientific Workers, 1952, used for manuscript notes.
- B.97                      Notebook used for work on fruit trees at Vatches Farm May 1954 - September 1963.
- B.98                      Hardback notebook labelled on front cover 'R. Hill 1955 1956'. Used chiefly for work on dyeing, January 1955 - March 1957. Includes samples of dyed wool. A little intercalated material.
- B.99                      Hardback notebook used for miscellaneous work on dyes, haemoglobin, weather, lenses 1955-1956, earliest date 24 April 1955. Much intercalated material.
- B.100                     Softback pocket jotter used for miscellaneous notes, references, addresses etc July - August 1955. Possibly used during visit to Holland.
- B.101                     Softback pocket jotter used for miscellaneous notes and references July - August 1955, and 1960. Possibly initially used during visit to Holland in 1955.



### Research

- B.102                      Hardback notebook used 1957, 1959 and 1960. Paginated 1-57.  
  
                                 'Originally an exptl notebook 1957    Oct 1960 - Dec 1960 used as a  
                                 notebook on thermodynamics of photosynthesis. Includes a critique of the  
                                 original Duysens paper - p.25' (DSB).
- B.103                      Hardback notebook used for work on lenses and on haemoglobin 1956 -  
                                 1959 and 1973, earliest date 9 April 1956. Paginated 1-36, not all pages  
                                 numbered. A little intercalated material.
- B.104                      Softback 'Ledger'. Used for miscellaneous notes, nd, and for record of  
                                 moneys paid by those attending photobiology meeting, Cambridge, 28-29  
                                 September 1956.  
  
                                 Pages at front of the notebook are missing.
- B.105                      Hardback notebook used for work on chloroplasts and dyeing April 1957 -  
                                 June 1958. A little intercalated material.
- B.106                      Hardback notebook labelled on front cover 'R. Hill 1957- '. Used for work on  
                                 dyeing May 1957 - October 1958, with later material 1971-1972.  
                                 Intercalated material.  
  
                                 Intercalated material chiefly concerns the exhibit of Hill and J.T. Braunholtz  
                                 of 'Chinese Green, or Lokao - a traditional plant dye stuff' at the Royal  
                                 Society Conversazione on 26 June 1958.
- B.107                      Hardback notebook used for work on dyeing June 1958 - April 1959.  
                                 Includes samples of dyed fabrics. Paginated 1-69, later pages not  
                                 numbered.
- B.108                      Exercise book inscribed on front cover 'numerical 1958', 'HbO<sub>2</sub>', 'and  
                                 quantum efficiency + thermodynamic discussion 8 pages from end Jan  
                                 1972'. Paginated on righthand page 1c-43c, later pages not numbered.

### Research

- B.109                      Hardback notebook labelled on spine 'April 1959 June 1962'. Used for work on chloroplasts, dyeing. Some notes July 1960 in hand of 'FRW [F.R. Whatley]'. Includes samples of dyed fabrics. Paginated 1-126. A little intercalated material.
- B.110                      Notebook used for work 1960, 1976-1986. Paginated 1-61, later pages not numbered.
- 'Back of book - graphs of expts done with F.R. Whatley 1960 Mostly a graph book for thermodynamics & efficiency of photosynthesis 1976-86 [Book was] Known as "Whatley" ' (DSB).
- B.111-B.160                Series of exercise books used for work on thermodynamics and efficiency of photosynthesis 1960 - 1990. Numbered I - LI, but the sequence lacks XLIV.
- B.111                      I. Used ca.December 1960 - January 1961. Paginated 1-57.
- B.112                      II. Used January - February 1961. Paginated 1-55.
- B.113                      III. Used February - March 1961. Paginated 1-47.
- B.114                      IV. Used ca.March 1961. Paginated 1-42, later pages not numbered.
- B.115                      V. Paginated 1-55.
- B.116                      VI. Paginated 1-49.
- B.117                      VII. Used 1961. Paginated i, 1-49.
- B.118                      VIII. Used 1961, earliest date 24 May 1961. Paginated i, 1-42.
- B.119                      IX. Used 1961, earliest date 30 July 1961. Paginated i, 1-49.



**Research**

- B.120 X. Paginated 1-49.
- B.121 XI. Used July - September 1961. Paginated 1-50. A little intercalated material including correspondence *re* paper by Hill 'Light filters and thermodynamic efficiency of photochemical reactions' submitted to the Royal Society, September 1961. Not published. See E.27-E.38.
- B.122 XII. Used October - November 1961. Paginated 1-52. A little intercalated material.
- B.123 XIII. Used December 1961 - January 1962. Paginated 1-49. A little intercalated material.
- B.124 XIV. Used from February 1962. Paginated 1-54. A little intercalated material.
- B.125 XV. Used April - August 1962. Paginated 1-52. A little intercalated material.
- B.126 XVI. Used August - November 1962. Paginated 1-54.
- B.127 XVII. Used October - December 1962. Paginated 1-49.
- B.128 XVIII. Used from December 1962. Paginated 1-49. A little intercalated material.
- B.129 XIX. Used January - October 1963. Paginated 1-47. A little intercalated material.
- B.130 XX. Used from August 1963. Paginated 1-49. A little intercalated material.

**Research**

- B.131                   XXI. Used October 1963 - April 1964. Paginated 1-49. A little intercalated material.
- B.132                   XXII. Used February 1965, and 1975 - 1976. Paginated 1-50. A little intercalated material, some dated 1977.
- B.133                   XXIII. Used November 1976 - September 1977. Paginated 1-48. A little intercalated material including papers *re* events to mark the retirement of N.E. Good, 1986.
- B.134                   XXIV. Used September 1977 - March 1978. Paginated i, 1-49. A little intercalated material.
- B.135                   XXV. Used March 1978 - January 1979. Paginated 1-50. A little intercalated material.
- B.136                   XXVI. Used April 1979 - March 1980. Paginated 1-48. A little intercalated material including letter 1985.
- B.137                   XXVII. Used March - December 1980. Paginated 1-48. A little intercalated material.
- B.138                   XXVIII. Used January - September 1981. Paginated 1-50. A little intercalated material.
- B.139                   XXIX. Used September 1981 - February 1982. Paginated 1-50.
- B.140                   XXX. Used February - August 1982. Paginated 1-50.
- B.141                   XXXI. Used September 1982 - February 1983. Paginated 1-48.



**Research**

- B.142 XXXII. Used February - October 1983. Paginated 1-48. A little intercalated material.
- B.143 XXXIII. Used October 1983 - January 1984. Paginated 1-49. A little intercalated material.
- B.144 XXXIV. Used January - July 1984. Paginated 1-49. A little intercalated material.
- B.145 XXXV. Used May - August 1984, July 1985. Paginated 1-49.
- B.146 XXXVI. Used August - December 1984, February 1985. Paginated 1-53.
- B.147 XXXVII. Used December 1984 - March 1985. Paginated 1-64.
- B.148 XXXVIII. Used March - July 1985. Paginated 1-47. A little intercalated material.
- B.149 XXXIX. Used July - October 1985. Paginated 1-48.
- B.150 XL. Used November - December 1985. Paginated 1-49.
- B.151 XLI. Used January - April 1986. Paginated 1-49.
- B.152 XLII. Used April - December 1986. Paginated 1-52, later pages not numbered.
- B.153 XLIII. Used ?February - September 1987 but includes references to earlier work. Paginated 1-49. Some intercalated material, including note referring to loss of book XLIV.

### Research

- B.154 XLV. Used September 1987 - January 1988. Paginated 1-39. A little intercalated material.
- B.155 XLVI. Used January - July 1988. Paginated 1-39. A little intercalated material.
- B.156 XLVII. Used July - December 1988. Paginated 1-37. A little intercalated material.
- B.157 XLVIII. Used September - December 1988. Paginated 1-47.
- B.158 XLIX. Inscribed on first page 'Mathematics required for application to quantal mechanics physical and biological'. Used December 1988 - March 1989. Paginated 1-30, later pages not numbered or used.
- B.159 L. Used February - July, November 1989. Paginated 1-64. A little intercalated material.
- B.160 LI. Used July 1989 - January 1990. Paginated 1-31, later pages not numbered or used.
- B.161 Notebook used 1960-1962, 1977. Paginated 1-39. Covers loose.  
  
'pp 1-5 Laboratory graph book of various exptl data 1960-62 pp9-39 used as graph book for calculations & diagrams for paper in Takamiya memorial volume Plant & Cell Physiology Special Issue 1977 [*Bibliog.* no. 89]' (DSB).
- B.161A Softback notebook used February 1961 - March 1980 for miscellaneous notes on fruit tree work, and vegetables etc grown at Vatches Farm. Paginated 1-35, later pages not numbered. A little intercalated material.
- B.162 Hardback notebook used from the back for notes during visit to France, May - August 1961, and from the front for work ca.1962. Most pages not used. Loose notes at back dated August 1989.



### Research

- B.163                      Hardback notebook used for notes, calculations on thermodynamics and the efficiency of photosynthesis, various dates 1961-1984, earliest date 19 June 1961. Paginated 1-59. A little intercalated material.
- 'Known as Graph Book A' (DSB).
- B.164                      Hardback notebook labelled on spine June 1962 March 1966'. Used for work on chloroplasts, dyeing. Includes samples of dyed wool. Paginated 1-124. Intercalated material includes photographs of cells.
- B.165                      Hardback notebook used for work on dyeing February 1963 - November 1975. Paginated 1-48 on righthand pages, later pages not numbered. A little intercalated material.
- B.166                      Softback notebook used for work on thermodynamics and efficiency of photosynthesis 1963, 1976, 1977, earliest date 16 March 1963. Paginated 1-17. Lacks front cover.
- B.167                      Hardback notebook inscribed on front cover 'Potential succinate'. Used during visit to USA March - April 1963. Paginated 1-75. A little intercalated material.
- The pagination is continued in B.168 below.
- B.168                      Hardback notebook used during visit to USA, April - August 1963. Paginated 76-95, later pages not numbered.
- Loose at front is softback jotter used for addresses, names etc during earlier visit to USA ca.1959-1960.
- The pagination continues from B.167 above.
- B.169                      Hardback foolscap notebook used for extensive calculations on thermodynamics and efficiency of photosynthesis from ca.1963, earliest date 24 November 1963 but later references 1970s. Many references to preparatory work in rough books (see above B.111-B.160). Paginated 1-68. Intercalated material is dated 1986-1988.

### Research

- B.170                      Hardback foolscap notebook used for extensive calculations on thermodynamics and efficiency of photosynthesis. Similar to B.169 above but undated, with references 1981. Many references to preparatory work in rough books (see above B.111-B.160). Paginated 1-68. A little intercalated material is dated 1988.
- B.171                      Softback notebook inscribed on front cover 'Schistostega'. Used for work September - October 1965. Most pages not used.
- B.172                      Hardback notebook used for work on chloroplasts, dyeing, and miscellaneous references February 1966 - December 1968. Paginated 1-119. A little intercalated material. Front and back covers loose.
- B.173                      Hardback pocket notebook used for miscellaneous notes, addresses, names and references during visits overseas May 1968 - September 1969.
- B.174                      Hardback notebook used for work on dyeing December 1968 - November 1971. Includes samples of dyed wool. Paginated 1-75. Some intercalated material.
- B.175                      Softback notebook inscribed on front cover 'Liebermann R.Hill 1968-'. Used for notes on work of C. Liebermann and Hill's studies arising, 1968 - January 1971. Paginated 1-15, most pages not numbered.
- Relates to Hill's joint publication 'The phenol dyestuff of Liebermann as an acridian derivative', *Bibliog.* no. 79 (1970). See E.43-E.52.
- B.176                      Hardback pocket notebook inscribed on first page 'R. Hill 1969-1970' and 'to May 1971'. Used for miscellaneous notes, addresses, references. Intercalated material includes letter 1974.
- B.177                      Hardback pocket notebook inscribed on first page '1971-1972'. Used chiefly for notes on work of Joseph Priestley, notes on dyeing, miscellaneous addresses and references, March - December 1971. Covers loose.
- Relates to Hill's paper 'Joseph Priestley (1733-1804) and his discovery of photosynthesis in 1771', *Bibliog.* no. 83 (1972). See E.54-E.59.



### Research

- B.178                      Hardback notebook inscribed on front cover '...Priestley material'. Used for Hill's notes on history of photosynthesis. Most pages not used. Intercalated material includes group photograph of members of 'Bioch Lab 1950'.
- 'Notebook on History of Photosynthesis and especially Joseph Priestley Used in connexion with lecture to 2nd International Congress on Photosynthesis 1972' (DSB).
- B.179                      Hardback notebook used for work on dyeing November 1971 - July 1980. Includes samples of dyed wool and plants. Paginated 1-67, later pages not numbered. A little loose intercalated material. Covers loose.
- B.180                      Hardback pocket notebook used for miscellaneous notes, addresses, sketches, principally used during visit to Australia, December 1972 - July 1973.
- B.181                      Hardback pocket notebook used for miscellaneous notes, addresses, sketches, ca. August 1973 - July 1976. A little intercalated material.
- B.182                      Hardback pocket notebook used from the front for miscellaneous notes 1977-1980 including history of work on photosynthesis, and from the back for notes on history of work on photosynthesis May 1973. Paginated 1-62. A little intercalated material.
- B.183                      Softback notebook labelled on front cover 'Jan 1977 literature refs to PS [photosynthesis]. Nov 1978 comments "Old book" 1977-1979'. Paginated 1-50. Some intercalated material.
- B.184                      Hardback notebook labelled on front cover 'Literature etc on chloroplast proteins and cytochromes' and 'p16- efficiency of quantum conversion in photosynthesis'. Used ca. 1978, earliest date 23 July 1978. Paginated 1-17, most pages not numbered or used. A little intercalated material including draft letters 1989.
- B.185                      Exercise book inscribed on front cover 'Refs etc for energy in photosynthesis March 1980' and 'NIAVIS addresses Greece'. Used 1980-1988. Paginated 1-18, later pages not numbered or used. A little intercalated material.

### Research

- B.186                      Hardback pocket notebook inscribed on front cover '1980-1984'. Used for notes (including notes on lectures by others), references, addresses etc November 1980 - February 1984.
- B.187                      Softback notebook inscribed on front cover 'Nov 1982 [*sic*] - April 23 1983'. Used for work on thermodynamics and efficiency of photosynthesis ca.1980-1984. Paginated 1-38. A little intercalated material.
- B.188                      Hardback notebook inscribed on front cover 'Nov 15 1983...' and 'Report for Sheffield 1984 July...'. Used for work on radiant energy 1983-1984 and for drafts of 'Report for Sheffield ARC unit of Photosynthesis' 1984 and 1985 (*Bibliog.* nos. 95 and 97). Paginated 1-8, most pages not used or numbered. A little intercalated material.
- B189-B.192                Series of four softback notebooks used for work on thermodynamics and efficiency of photosynthesis 1984-1989. Numbered I-V on front cover (number III missing, though see B.193).
- B.189                      I. Inscribed on front cover '1984-1986'. Used May 1984 - March 1986. Paginated 1-39.
- B.190                      II. Inscribed on front cover '1986 - Aug 87'. Used from March 1986. Paginated 1-39.
- B.191                      IV. Inscribed on front cover 'For mathematical observations and experiments on theory 1986-'. Used August 1986 - October 1988. Paginated 1-34, later pages not numbered. Loose note at back dated 16 September 1989.
- B.192                      V. Inscribed on front cover 'graph book V January 31 1989'. Used to July 1989. Paginated 1-5, most pages not numbered or used.
- B.193                      Softback notebook, of same make as those at 159-162 but unnumbered. Inscribed on front cover 'For natural observations and Experiments Aug 8 1987-'. Used to April 1989. Paginated 1-15, most pages not numbered or used. A little loose material at back of notebook dated 1988.

This may be the third of the notebooks from the sequence at B.189-B.192.



### Research

- B.194                      Softback pocket notebook inscribed on front cover 'Reprints Throw away etc from May 16 1984 Also Refs 1984'. Most pages not used.
- B.195                      Exercise book inscribed on front cover 'General References July 16 1985 -'. Used for miscellaneous notes and references to October 1988. Paginated 1-20, most pages not numbered or used. A little intercalated material including letters 1983 and 1987.
- B.196                      Exercise book inscribed on front cover 'April 11th 1986...day/day notes'. Used for miscellaneous personal and scientific notes to September 1989. Paginated 1-39.
- B.197                      Exercise book inscribed on front cover 'Refs 1986-'. Used April 1986 - December 1987. Paginated 1-13, most pages not numbered or used.
- B.198                      Exercise book inscribed on front cover 'Notes for possible publication 14 April 1986-'. Used to draft 'The relation between the light and dark process in photosynthesis'.
- B.199                      Pages of notebook (covers missing) inscribed 'Rough book III 1986'. Used for calculations on efficiency of photosynthesis. Paginated 1-20.
- B.200                      Exercise book inscribed on front cover 'Dec 26, 1987...Day to day notes'. Used for miscellaneous personal and scientific notes to April 1989. Paginated 1-42.
- B.201                      Exercise book inscribed on front cover 'August 10th 1988...Day to day Notes'. Only one page used.
- B.202                      Exercise book inscribed on front cover 'Dec 1st 1988 Day to day Notes'. Used for miscellaneous personal and scientific notes to January 1991 (some entries, including last entry, not in Hill's hand). Paginated 1-37, later pages not numbered.

### Research

- B.203                      Pocket jotter used principally for notes on samples of dyed fabric. Most pages not used. Nd.
- B.204-B.206              Exercise books used for photographs of mosses. Nd.
- B.204 and B.206 were originally Hill's sister Katharine's exercise books used for 'Physiology' and 'Writing' respectively but her notes have been removed by Hill.
- See also B.22.
- B.204                      Inscribed on front cover 'R. Hill Mosses'. Used at front for list of mosses. Most pages not used.
- Intercalated are photographs of mosses, some mounted and identified.
- B.205                      Inscribed on front cover 'Photographs of mosses. Rough prints'. Photographs of mosses pasted to pages of the book, numbered I to XXV.
- Intercalated are photographs of mosses, some mounted and identified.
- B.206                      Photographs of mosses pasted to the pages of the book, most in numbered sequence XXVI to XXXIX.

### RESEARCH NOTES

- B.207-B.210              Undergraduate chemistry manuscript notes 1919-1923.
- B.207                      'Organic chemistry', 'The terpenes and essential oils', 'Aldehydes' notes, April - Long Vacation 1919.
- B.208                      'Inorganic pigments', May 1921, 'Cyanogen', 'Complex salts', 'Haemoglobin & pyrol'.
- B.209                      'Anthraquinone', notes on the literature, notes on metals.



**Research**

- B.210                    General notes.
- B.211                    'Report of haemoglobin results I.R.D. Sept 1923. Summary is included in paper to CUNSC [Cambridge University Natural Sciences Club] (1924)'. 21pp manuscript.
- B.212                    ?Hand-made pad labelled 'Dye-plants used in native dyeing of wool. Collected By John G. Merne, Innishannon, Co. Cork'. Typescript notes on native Irish dyes and wool-dyeing techniques, sent to Hill by Merne, 2 September 1929.
- B.213                    'Beit Reports'. Contents of Hill's envelope so inscribed: typescript reports of experimental work carried out 1933-1938.
- Hill was a Beit Memorial Fellow 1929-1938. For his research report 1929-1930 see D.20.
- B.214-B.216            'Chemistry of plant products'. Contents of Hill's box folder so inscribed divided into three for ease of reference.
- B.214                    Notebook used principally for work on dyes 1933-1935, 1942. Includes samples of dyed fabrics. Cover missing.
- B.215                    Correspondence 1947, 1948; manuscript notes.
- B.216                    Printed papers 1938, 1971.
- Also in this folder were manuscript notes and photographs from Hill's visit to France in 1947 with an arboricultural expedition. See H.11-H.18, the material from this folder is at H.13.
- B.217, B.218            'HORT. 1938-40 Sand & soil greenhouse etc'. Contents of Hill's envelope so inscribed divided into two for ease of reference: correspondence from suppliers of seeds, plants etc 1937-1939.

### Research

- B.219-B.223 'Notes on research 1939-1948'. Contents of Hill's envelope so inscribed divided into five for ease of reference.
- B.219 1938-1941. Includes 'Observations on chloroplastids' by C.S. Hanes, February, March 1939; 'Research now in progress' by Hill, 17 January 1940; ' "Photosynthesis" for An Report 1941'.
- B.220 1942, 1943. Includes 'Tetrapyrrolic compounds in plants' by Hill, paper presented to meeting of the Biochemical Society, London, 13 November 1943 (*Bibliog.* no. 34); 'Biological considerations arising from the moisture relations of colloids impregnated with cobalt chloride' and 'Cobalt chloride paper as an indicator of atmospheric humidity' by M.E. Solomon, ca.1943.
- B.221 1944-1948. Chiefly correspondence.
- B.222 Nd. Includes 'The study of the biochemical functions of minor elements in plants' by Hill, report of work in progress and future investigations; fabric sample from 'African woman's dress'.
- B.223 Printed material.
- B.224 Manuscript lists of dyes, c.1940.
- B.225, B.226 'Notes 1940-'. Contents of Hill's envelope so inscribed divided into two for ease of reference.
- B.225 Graphs 1937; 'The formation of fat in moulds' by A. Kleinzeller, 4pp typescript, 27 July 1942; 'The formation of fats in yeasts', 3pp typescript, nd.
- B.226 Manuscript and typescript notes, correspondence, etc chiefly 1942-1943.
- B.227-B.232 'Thermodynamics on synthetic biological reactions'. Contents of Hill's box folder so labelled divided into six for ease of reference. Notes etc ca.1940-1949.



### Research

- B.227, B.228            Contents of Hill's folder of manuscript notes with contents list inscribed on front cover:  
'1 Thermodynamics 2 Activation Energy [...] 3 Photochemistry 4 Free Radicals semiquinones and step up reactions 5 Quantum numbers and atomic structure 6 Thermal conductivity of liquids [...] 7 kinetic theory of gases and solutions. 1940 - 1943'. 2 folders.
- The notes on activation energy were removed by Hill from this folder and are to be found at B.229 below.
- B.229, B.230            'Thermodynamics of biological synthetic reactions (relations with H<sub>2</sub>O)'. Contents of folder so inscribed divided into two for ease of reference.
- B.229                    Correspondence 1948 and nd; notes and drafts 1947, 1948; notes on activation energy (originally at B.227, B.228 above).
- B.230                    Printed material.
- B.231                    (?Undergraduate) manuscript notes on 'Physical chemistry'; manuscript notes on work on thermodynamics, May 1947.
- B.232                    Miscellaneous notes, 1947, 1949, nd.
- B.233                    'Composts - sprays - & manures CULT IV'. Contents of Hill's envelope so inscribed: correspondence from suppliers of seeds, plants, equipment etc 1942-1949.
- B.234                    Contents of Hill's binder: manuscript notes on the literature, calculations etc 1944.
- B.235                    Manuscript notes January, March 1944. Includes notes on haemoglobin, fruit trees.
- B.236                    Manuscript graphs and figures, *re* fruit trees at East Malling Research Station, June, November - December 1944.

**Research**

- B.237                      Miscellaneous manuscript and typescript notes and calculations *ca.*1944.
- B238, B.239              'May 1945 Res. Programmes, etc    Also E.M. A.B.B[eakbane]. report summaries on rootstock work'. Contents of Hill's envelope so inscribed divided into two for ease of reference: manuscript and typescript notes and drafts.
- B.240                      Manuscript notes *re* fruit trees, plant growth 1945.
- B.241-B.243              Contents of Hill's folder divided into three for ease of reference
- B.241                      Manuscript and typescript drafts on work in hand on 'The Madder Glycosides and biochemical background', 'Oxygen and chloroplasts' and 'The application of biochemical methods to a horticultural problem'.
- B.242, B.243              Miscellaneous correspondence, notes and graphs, chiefly relating to work on fruit trees 1945-1948. 2 folders.
- B.244, B.245              'Unit of PI Bioch Data on Commonwealth Potato Collection'. Contents of Hill's envelope so inscribed divided into two for ease of reference.
- B.244                      Duplicated typescript 'Empire Potato Collection. List of lines available [...] up to 31 December 1946'.
- B.245                      'Report from the Agricultural Research Council Unit of Plant Biochemistry, Cambridge' by Hill, H.E. Davenport and C.S. Hanes; manuscript notes and graphs.
- B.246                      Miscellaneous manuscript and typescript notes chiefly on fruit tree work 1946.
- B.247                      Mounted photographs of fruit trees, mostly taken April 1946. Found with preceding.



**Research**

- B.248-B.250      Manuscript notes, graphs, figures and calculations found with notebooks on 'Elementary conics'. 1946-1949. See above B.82, B.83. 3 folders.
- B.251              'Ø 1947'. Contents of Hill's folder so labelled: manuscript notes 1947-1950, including notes on 'M. Dixon's lecture [...] Mitochondria & the citric cycle'.
- B.252-B.255      'Potatos'. Contents of Hill's box folder so inscribed divided into four for ease of reference.
- B.252              Correspondence, manuscript notes 1947-1949.
- B.253              Duplicated typescript annual reports of the Commonwealth Potato Collection 1948 and 1949.
- B.254              Duplicated typescript 'Commonwealth Potato Collection. List of lines available [...] up to 31 December 1948'.
- B.255              Exercise book inscribed 'Pigments' on front cover. Used for work on potato tubers. Not in Hill's hand. Intercalated graphs.
- B.256              Manuscript notes on fruit tree work 1947.
- B.257              'Boychenko'. Contents of Hill's envelope so inscribed: off-prints of papers on chloroplasts by E.A. Boychenko 1943 and 1944; manuscript note by E. Ashby on Boychenko's 'Work on photosynthesis of isolated chloroplasts Based on R. Hill's work', 10 December 1948
- B.258              Manuscript notes and graphs *re* fruit tree work 1948.
- B.259              'Old plans in Field Garden'. Ms notes and graphs *ca.*1948-1952.

### Research

- B.260 'ARC Mineral def. Comm. A.C. Chibnall'. Contents of Hill's folder so inscribed: 'Chromatographic behaviour and chemical structure 1. Some naturally occurring phenolic substances' by E.C. Bate-Smith and R.G. Westall, 12pp duplicated typescript + summary, table and figures. ?1949. With manuscript calculation by Hill attached.
- B.261 Typescript list of 'Pershore seedlings', manuscript notes on fruit tree work 1949.
- B.262 Manuscript notes and graphs, not in Hill's hand. 1940s.
- B.263, B.264 Contents of Hill's folder divided into two for ease of reference: miscellaneous notes, graphs, calculations etc chiefly relating to trees in the 'big field' ?at Vatches Farm 1949-1957.
- B.265 Manuscript notes on fruit tree work 1950.
- B.266 'Budding plans'. Manuscript notes 1950-1953.
- B.267 Manuscript notes on fruit tree work 1951-1952.
- B.268 Envelopes containing cards with notes on appearance, texture and taste of plums from sample trees, 1952. Found with preceding.
- B.269 Manuscript notes on fruit tree work 1953-1955.
- B.270, B.271 'About Bausch & Lomb Gratings'. Contents of Hill's envelope so inscribed divided into two for ease of reference: correspondence *re* purchase of diffraction grating from Bausch & Lomb Optical Co., Rochester, New York. 1953-1955.
- B.272, B.273 'Earlier notes on Eff.[iciency] of P.S. [Photosynthesis]'. Contents of Hill's folder so inscribed divided into two for ease of reference. 1955-1979.



### Research

- B.272 Manuscript notes, bibliographical references, correspondence.
- B.273 'Thermodynamics of the conversion of diluted radiation' by P.T. Landsberg and G. Tonge, 18pp photocopied typescript + figures, sent to Hill 5 February 1979.
- B.274 Manuscript notes on fruit tree work 1956-1958.
- B.275 'Programme of research' on phosphorylating activity in plants, submitted to the Agricultural Research Council by Hill ca.1959.
- B.276 Manuscript calculations.  
  
The calculations are identified as 'Notes to do with design of spectroscope RH tried to build in 1950-60s' (DSB).
- B.277 Miscellaneous manuscript and typescript notes, 1950s.
- B.278-B.281 '1960 Tsou King cytochrome data'. Contents of Hill's envelope so inscribed divided into four for ease of reference.  
  
This work was done while Hill was Visiting Professor of Chemistry, Oregon State College, Corvallis.
- B.278 Hardback exercise book used from the front for experimental work with T.E. King January - March 1960, and at the back for notes on the literature etc including entries dated March and April 1960. Printed pagination 1-120.
- B.279 'Oxidation and reduction of component b of the cytochrome in heart muscle preparation'.  
  
25pp manuscript and 16pp typescript drafts of paper by Hill and King, with covering letter from King, 5 April 1960. Not listed in *Bibliog.* and probably not published.
- B.280, B.281 Manuscript notes and data. 2 folders.

### Research

- B.282 'Odd sheets from calc books'. Contents of Hill's envelope so inscribed: miscellaneous notes, calculations relating to work on thermodynamics and efficiency of photosynthesis. Includes items dated 1963, 1977, 1978, 1981.
- B.283 'Schistostega'. Contents of Hill's folder so inscribed: correspondence, manuscript notes, graphs etc *re* schistostega, some items dated 1965. Also includes 1970 correspondence *re* visit by Hill to University of Pennsylvania.
- B.284 'The reactions leading to indigo formation in chloroplasts of damaged woad leaves', 2pp typescript research proposal, 1967 or later.
- B.285 Miscellaneous manuscript notes and graphs, not all in Hill's hand, 1960s. Includes draft letter to N.F. Mott 2 April 1962.
- B.286 'Old notes & calcs'. Contents of Hill's envelope so inscribed: manuscript notes, correspondence, drafts, calculations etc 1972-1982.
- B.287 Pages of manuscript notes 'from 1972-1975 Notebook'.
- B.288 Letters from R.S. Knox, 1975 and 1979, with photocopy of paper by Knox 'Photosynthetic efficiency and exciton transfer and trapping', annotated by Hill.
- B.289 Miscellaneous manuscript notes and graphs, 1970s.
- B.290-B.293 '1980-1983 Odd math work'. Contents of Hill's envelope so inscribed divided into four for ease of reference.
- B.290-B.292 Manuscript calculations, paginated 1-88. 1980-1981. 3 folders.
- B.293 Correspondence 1980, calculations and notes 1981-1982.



### Research

- B.294 'June 1980 - Aug 1983. Eff. of P.S. etc' Contents of Hill's envelope so inscribed: miscellaneous notes, pages of drafts etc.
- B.295 Contents of Hill's envelope: manuscript notes including work dated 2 August 1980.
- B.296 'Discussion with Pete Rich Autumn 1980'. Contents of envelope so inscribed: letters from P.R. Rich 1980, manuscript notes and calculations 1979-1980.
- For material relating to Hill's collaborative work with Rich see E.91-E.107.
- B.297, B.298 Contents of Hill's binder divided into two for ease of reference: manuscript notes on thermodynamics and the efficiency of photosynthesis 1981-1984.
- B.299 Drafts of letters to G. Porter 1981 and 1982, with photocopy of paper by Porter 'The transfer and storage of chemical and radiation potential', sent to Hill for comment. With manuscript annotation by Hill.
- B.300-B.303 'Obsolete 1981 - May 10 1983'. Contents of Hill's envelope so inscribed divided into four for ease of reference: manuscript notes, pages of drafts, calculations.
- B.304 'LA/RAD'. Contents of Hill's folder so inscribed. Includes sequence of manuscript notes paginated I-XVIII and dated 21 July - 30 August 1983.
- B.305 Manuscript notes on the thermodynamic efficiency of photosynthesis, 1980-1984.
- B.306 Manuscript notes on the thermodynamic efficiency of photosynthesis, 1985-1989.
- B.307-B.309 Annotated papers by others. 3 folders.

### Research

- B.310                      Miscellaneous bibliographical references.
- B.311-B.314                Miscellaneous manuscript notes on fruit tree work. Nd. 4 folders.
- B.315-B.317                Printed background material *re* fruit tree work. 3 folders.
- B.318-B.323                Miscellaneous manuscript notes, principally *re* work on chloroplasts and thermodynamics of photosynthesis. Nd. 6 folders.

### PHOTOGRAPHS

- B.324                      'British Dye Plants', April 1919.
- 'Photos of Plums April 1946'. Contents of Hill's envelope so inscribed.
- Young fruit trees, April 1948.
- B.325                      '1957 Photos of chloroplasts [...] From F.V. [?Mercer]'.  
  
B.326                      'June 10th 1960 Crystals [...] Negs + prints'. Contents of Hill's envelope so inscribed'.  
  
                                  The crystals are probably those of the protein discovered by Hill and named 'methaemoglobin reducing factor' and at the time of publication (*Bibliog.* no. 62, 1960) known as 'photosynthetic triphosphopyridine nucleotide reductase' and eventually known as 'ferredoxin' (information from DSB).
- B.327                      Photographs of chloroplasts sent to Hill by A.D. Greenwood, June 1968. With covering letter.
- B.328, B.329                Miscellaneous photographs. 2 folders.



SECTION C

FISH-EYE CAMERA

C.1 - C.86

Hill had a long-standing interest in meteorology. In the early 1920s he began to work on a camera equipped with a 'fish-eye' lens which could photograph through 180° and thus take photographs of the whole sky at one instant. Using a pair of fish-eye cameras one could calculate the height of clouds. In addition to photographing the whole sky Hill's camera it was also possible to photograph the whole of the inside of a building, town square etc.

The first form of lens was described by Hill in 'A lens for whole sky photographs', *Quarterly Journal of the Royal Meteorological Society* 50 (1924), 227-232 (*Bibliog.* no. 7) where it aroused considerable interest. Hill approached R. & J. Beck Ltd and had a number of experimental lens designed before camera was marketed by them.

The camera went under a number of names; the 'Robin Hill camera', 'Hill's cloud camera', 'Whole-sky camera' etc. It is probably best known, however, as the fish-eye camera.

C.1-C.17	NOTEBOOKS
C.18-C.30	RESEARCH NOTES AND DRAFTS
C.31-C.46	CORRESPONDENCE
C.47-C.77	PHOTOGRAPHS
C.78-C.86	PRINTED MATERIAL

### Fish-eye camera

#### NOTEBOOKS

These notebooks were used by Hill for technical notes on lenses and other aspects of the camera, notes on photographs taken, and meteorological data. Many have photographs taken with the camera pasted to pages.

See also the notebooks in section B, some of which (for example B.5) have references to Hill's meteorological interest or work on the camera.

- C.1 Notebook inscribed on first page '180° Camara [*sic*] "Fishes view camara" Sept 1922'. Photographs taken with the camera pasted to the pages with a note of technical information and sometimes of date and time. A little loose intercalated material including meteorological maps from newspapers July 1924.
- C.2 Softback pocket notepad inscribed on front cover 'Fish Eye Notes 1923 -'.
- C.3 Softback pocket notebook used from the front and from the back for notes on cloud formations and photographs taken of them 1923-1925 (earliest date July 1923). A little intercalated material including meteorological maps from newspapers March 1927.
- C.4 Notebook inscribed on first page 'Three experiments with the 4 inch lens. Calculations'. Used from April 1924. Photographs pasted to pages. A little intercalated material.
- C.5 Similar format notebook used July 1924 - January 1933. First page has note of 'Determination of cloud heights with the fish eyes'. Photographs pasted to pages. Intercalated material includes annotated copy of 'A lens for whole sky photography', *Bibliog.* no. 13 (1926).
- C.6, C.7 Hardback notebooks identified by D.S. Bendall, Hill's Royal Society memorialist as 'Notebooks apparently relating to the Robin Hill camera'.
- C.6 Notes, 1924.



**Fish-eye camera**

- C.7 Notes, nd. Paginated 1-67, later pages not numbered.
- C.8 Softback notebook used 1926 (earliest date 2 February). A little intercalated material including botanical sketches, 1920, and photographs.
- C.9 Similar format notebook, nd.
- C.10 Softback notebook used 1926. Includes photographs of interior of Ely Cathedral pasted to pages.
- C.11 Notebook used 1927-1930. Includes notes on photographs taken with earlier lenses. Photographs pasted to pages. A little intercalated material.
- C.12 Hardback notebook used September 1929 - December 1930. Photographs taken with the camera pasted to pages.
- C.13 Softback notebook used principally for notes on camera September - October 1929. At front of notebook is work on haemoglobin.
- C.14 Hardback notebook used April 1930 - October 1932. Photographs pasted to pages. Intercalated material includes photographs and 1932 calendar.
- C.15 Softback pocket notebook used from the front August - September 1930 and from the back September - October 1930.
- C.16 Softback notebook used February 1964 for work on notes in C.14. Most pages not used.
- C.17 Softback notebook inscribed on front cover 'Diagrams + Graphs'. Nd.

### Fish-eye camera

#### RESEARCH NOTES AND DRAFTS

- C.18 Manuscript notes various dates 1923-1930. Includes manuscript notes on '2 Fish eyes. Jan 1929', specification for improved fish-eye camera.
- C.19 Optical Convention, London, 12-17 April 1926.  
  
Hill's camera was exhibited by R. & J. Beck Ltd and Hill gave a paper 'A lens for whole sky photography', *Bibliog.* no. 13 (1926).  
  
Programmes; correspondence; report on Hill's paper and lens from *Engineering*; etc.
- C.20 1p manuscript description of '180° camera' by Hill; manuscript and typescript data for construction of cameras from Gold Coast mahogany; 3pp manuscript note 'Apparatus with lens optics for hemispherical photography' by Hill.
- C.21 1920 brochure of 'Verrerie Scientifique Spéciale pour l'Astronomie, l'Optique et la Photographie' of Parra-Mantois & Cie, Croissy-su-Seine, France. Intercalated material, some dated 1946-1950.
- C.22 Manuscript ?reworking of 1920s and 1930s camera data.
- C.23 'Lens'. Contents of Hill's envelope so inscribed: miscellaneous papers.
- C.24-C.27 Miscellaneous notes, calculations, graphs, sketches etc. 4 folders.
- C.28-C.30 Newspaper cuttings of weather maps and events of meteorological interest, 1920s and 1930s. 3 folders.



### Fish-eye camera

#### CORRESPONDENCE

- C.31-C.37                      Correspondence with R. & J. Beck Ltd, 1922-1938, 1964.
- This firm manufactured Hill's fish-eye camera. The correspondence is almost exclusively from R. & J. Beck Ltd to Hill. It includes specifications for the lenses and royalty statements.
- C.31                              1922-1925. Includes letter *re* possible modification of the camera for use by the Royal Air Force, 20 January 1925.
- C.32                              1926.
- C.33                              1927.
- C.34                              1929. Includes draft letter from Hill, 11 April, *re* specification for lens.
- C.35                              1930-1938.
- C.36                              Royalty statements from cameras sold 1925-1932.
- C.37                              1964, nd. Correspondence 1964 *re* possible redesign of the camera.
- C.38-C.46                      Correspondence from others.
- C.38                              1923-1925. Includes correspondence arising from Hill's 1924 paper describing the camera.
- C.39                              1926-1929.

### Fish-eye camera

- C.40 1929-1930. Correspondence from 'Mondiale' re publication of pictures from the camera in German science journals and fish-eye photographs of interiors of British cathedrals.
- C.41 1930. Correspondence re and arising from visit to De Bilt Observatory, Holland.
- Hill visited De Bilt Observatory in August where he demonstrated his camera. He hoped to be able to use the camera on a visit to the Dutch East Indies planned for 1931 and wished to have the official sanction of the Dutch meteorological office. Arising from the visit C. Schoute suggested practical possibilities for the lens as a drift measuring device and range finder. He suggested a patent be taken out and the German company Zeiss approached to manufacture the apparatus.
- The correspondence principally relates to Schoute's ideas for the camera and his efforts to have the adapted camera patented. The material also includes 2pp typescript draft for the patent application 'Improvements in photographic lenses' and newspaper cuttings, one relating to the R101 disaster suggesting better study of cloud movements might have prevented the disaster.
- C.42 1932-1934. Chiefly correspondence from E. Leitz (London) re manufacture of colorimeter.
- C.43 1937. Correspondence from Daily Express, British Movietone News Ltd and others. Includes 2pp typescript note on the camera, possibly written by Hill for the *Amateur Photographer*.
- For pictures taken with the camera by the *Daily Express* see C.79.
- C.44 1954, 1963, 1964. Correspondence 1964 is chiefly re fish-eye lenses manufactured by others (see also C.37).
- C.45 1976, 1978, 1991. Includes correspondence re deposit of the prototype of Hill's 180° lens and of an early camera in the Whipple Museum of the History of Science, Cambridge.
- C.46 Nd and miscellaneous.



### Fish-eye camera

#### PHOTOGRAPHS

These are almost all photographs or plate glass negatives of clouds or buildings taken with Hill's fish-eye camera. Some photographs were found in Hill's envelopes, sometimes with a title and occasionally a date inscribed thereon. Where present these have been reproduced in the catalogue entries. Most of the individual photographs are undated and unidentified.

Not all the photographs are fish-eye photographs, some were produced from sections of the fish-eye photographs 'corrected' to produce a normal image. With one exception (C.67) the photographs are monochrome.

- C.47                    1922, 1924.
- C.48                    'Leamington April 1923'.  
  
                          'Leamington' July 1923.  
  
                          'Misc. clouds'. One dated 5 July 1923.
- C.49                    'Doubtful ones' August, September 1923.
- C.50                    'Cloud survey Cambridge 1923 Sept. 24-30th'. Photographs identified by reference number on verso referring to list of photographs.
- C.51                    'Buttermere July 10 [-11]' 1924.  
  
                          'July 17 1924'.
- C.52                    'Baltimore Aug 1924'.  
  
                          'Madeira 1925' (not fish-eye).  
  
                          'Ely'. ?1926 (see C.10).

**Fish-eye camera**

- C.53 'Fisheyes Weathermaps'. September, October 1930.  
  
'Fish eyes 1930'.
- C.54 '1930s Prints'.
- C.55 1930.
- C.56-C.64 'Fisheye Clouds'. Contents of Hill's box file so inscribed divided into nine for ease of reference.
- C.56 Mounted photograph of lightning at Grantham, 1917 (not fish-eye).  
  
'Prints of clouds etc. CSL', one photograph only dated 1924 (not fish-eye).
- C.57 '1930 single spares + 1929'  
  
Fish-eye photographs in envelope post-marked July 1933.
- C.58 'Clouds'. Nd.
- C.59 'Fish eye...' Nd.
- C.60 'Enlargements (6") of clouds (for Atlas) calculated corrected for illumination but not shaded'. Nd.
- C.61, C.62 'Second class enlargements Not spare'. Nd. 2 folders.
- C.63 'Odd stereoscopic prints'. Nd.



**Fish-eye camera**

- C.64                      Miscellaneous. Nd.
- C.65                      'Fish Eye photos from Kath. 1992'. Nd.
- C.66                      'Fish eyes in duplicate. Clouds'. Nd.  
  
                              'Odd fish eyes'.
- C.67                      Untitled envelope. Includes three-colour fish-eye photograph.
- C.68-C.72                Miscellaneous undated fish-eye photographs. 5 folders.

**Plate glass negatives and slides**

None of the plates are dated.

- C.73                      Box labelled '3', 'Boxgrove...' 7 plates, 3¼ inch<sup>2</sup>.
- C.74                      Box labelled 'unbound slides of clouds'. 7 plates, 3¼ inch<sup>2</sup>.
- C.75                      Unlabelled box. 14 plates, 4¼ x 3¼ inch.
- C.76                      Photograph wallet containing 7 envelopes of individual plates, 4¼ x 3¼ inch.
- C.77                      6 plates, 3¼ inch<sup>2</sup>.

**Fish-eye camera**

**PRINTED MATERIAL**

Includes instructional and advertising material for camera, lens and the developing of photographs, newspaper cuttings relating to Hill's camera and related matters, reprints of papers by others. Reprints of Hill's articles on whole-sky photography may be found with the copies of his other publications at E.118.

C.78-C.81            Press cuttings.

C.78                1924, 1925, 1930.

C.79                1937 March.

C.80                1937 April, October.

C.81                1962, 1964, 1969, 1971.

C.82                Reprints by others.

C.83-C.86           Advertising and instructional material. 4 folders.

At C.83 is copy of the *Journal of Scientific Instruments* 2 (January 1925), advertising the Hill camera.



**SECTION D**

**CAMBRIDGE UNIVERSITY**

**D.1 - D.40**

Hill never held a University post at Cambridge. His work in the Department of Biochemistry was supported by external funding from 1923 to his retirement in 1966. His prewar research was supported by a series of research grants from various sources while the principal supporter of Hill's postwar research was the Agricultural Research Council. Hill was a member of the ARC's scientific staff from 1943.

Hill gave lectures in Biochemistry from 1924, initially on respiratory pigments, later on photosynthesis and plant biochemistry. He also organised practicals from 1935. Hill's teaching material is in section F.

D.1-D.16	BIOCHEMISTRY DEPARTMENT
D.17-D.29	FUNDING OF HILL'S RESEARCH
D.30-D.39	GENERAL AND MISCELLANEOUS
D.40	EXAMINING

Cambridge University

BIOCHEMISTRY DEPARTMENT

- D.1-D.7                    General Biochemistry Department correspondence and papers.  
  
Principally duplicated typescript papers for staff meetings, teaching schedules and lists of students for the period 1952-1959 and 1964.
- D.1                        1929, 1947, 1951. Includes 'Needs of the Department of Biochemistry for the Quinquennium beginning 1 August 1947'.
- D.2                        1952-1954.
- D.3                        1955. Includes exchange with F.G. Young *re* future of Low Temperature Research Station, Cambridge.
- D.4                        1956.
- D.5                        1957-1959. Includes departmental 'Quinquennial estimates 1957-1962'.
- D.6                        1964-1966. Includes letter of thanks for Hill's membership of the Staff Meeting on his retirement from the department.
- D.7                        1969-1987 and nd.
- D.8-D.13                 Hill's reports on work on plant biochemistry for departmental annual reports 1952/53 - 1972/73.
- D.8                        1952/53.  
  
1953/54.  
  
1954/55.



**Cambridge University**

D.9	1955/56.
	1956/57.
	1957/58.
D.10	1958/59.
	1959/60.
	1960/61.
D.11	1963/64.
	1964/65.
	1965/66.
D.12	1966/67.
	1967/68.
	1968/69.
D.13	1969/70.
	1970/71.
	1971/72.
	1972/73.
	1975. Letter only.

### Cambridge University

- D.14, D.15      Research reports and proposals of other workers in plant biochemistry in the department.
- D.14              Joan Keilin, November 1945; A.R. Trim, ca.1946; F.R. Whatley, nd; W.F. Bertsch, nd.
- D.15              D.S. Bendall, 1954.
- D.16              Laboratory manual in plant biochemistry, 48pp duplicated typescript.
- D.16A             Papers *re* 50th Anniversary Celebrations of the Department of Biochemistry, 9 May 1974. Includes 6pp manuscript draft of 'tribute to the memory of F.G. Hopkins' delivered by Hill on the occasion.

### FUNDING OF HILL'S RESEARCH

- D.17              **Department of Scientific and Industrial Research**  
Hill held a research studentship for work on haemoglobin 1923-1925.  
Research report, 21pp typescript.
- D.18              **Medical Research Council (MRC)**  
Hill held a research grant from the Haemoglobin Committee 1926-1927.  
Letters from MRC *re* grant; report for March-June 1927, 1p typescript.
- D.19              **Royal Commission for the Exhibition of 1851**  
Hill held a senior studentship 1927-1929.  
Letter from Royal Commission; research reports 1927-1928, 4pp typescript, and 1928-1929, 1p typescript.



**Cambridge University**

- D.20                    **Beit Memorial Fellowships for Medical Research**
- Hill was a Beit Memorial Fellow 1929-1935 and a Senior Beit Memorial Fellow 1935-1938.
- Letters *re* award; research report 1929-1930, 5pp typescript.
- For Hill's research reports for the period 1933-1938 see B.213.
- D.21                    **Leverhulme Trust**
- Hill applied to the Leverhulme Trust for a research fellowship, *ca.*1939.
- Manuscript drafts of application.
- D.22-D.27            **Agricultural Research Council (ARC)**
- Hill was appointed to the ARC's scientific staff to work on plant biochemistry in 1943 at the recommendation of A.C. Chibnall (see A.14). He was initially appointed for three years. He remained a member of the Cambridge biochemistry department.
- D.22                    Manuscript drafts of application to ARC for support for work in plant biochemistry, various dates 1943-1945. Includes draft letter to Chibnall, May 1944.
- D.23                    Manuscript and typescript drafts of letter to ARC from Hill setting out his past, present and intended future scientific activities, May 1945; letter from ARC, October 1945.
- D.24                    Research proposal of C.S. Hanes sent to Hill for comment, 5 March 1947; miscellaneous material 1948-1958.
- D.25                    Application for research grant to support work on biochemistry of chloroplasts in relation to photosynthetic phosphorylation by F.L. Myers (later Mrs F.L. Bendall), March 1958 and renewal 1960.
- D.26                    Correspondence and papers 1959-1964, including correspondence *re* ARC support for work of R.P.F. Gregory on photosynthesis, and agreement to extend Hill's contract by two extra years to 1966.

**Cambridge University**

D.27 Correspondence 1968-1969

'Note on the relative importance of agricultural research problems from the view-point of plant biochemistry' by ?C.S. Hanes, 2pp typescript, nd.

D.28 **Charles F. Kettering Foundation**

Hill received research awards from the Charles F. Kettering Foundation for work on photosynthesis from 1963 to 1969. See A.19.

Correspondence *re* awards.

D.29 **Royal Society**

Hill received funding from the Scientific Investigations Grant-in-aid for 1972-1974.

Application for grant; correspondence 1971-1975.

**GENERAL AND MISCELLANEOUS**

D.30, D.31 Cambridge University administration.

D.30 Correspondence and papers, chiefly *re* supervision of research students, 1943-1954.

D.31 Proposals for extension of the Laboratory of Molecular Biology.

D.32 Emmanuel College.

Hill became an Honorary Fellow of the College in 1963.

Chiefly menus and invitations for social events 1947-1989.



**Cambridge University**

- D.33 Cambridge University Botanic Garden.  
Correspondence and papers 1953-1986.
- D.34-D.38 Clubs and societies.
- D.34, D.35 Cambridge University Natural Science Club
- D.34 Rules; programmes 1921-1925, 1935.
- D.35 Letter *re* election of Hill as Honorary Member 1950; programmes 1954-1955, 1962, 1974-75; letter of thanks for talk to the Club, 9 June 1972.
- D.36 Cambridge Natural History Society  
Notice of election 1936, with copy of rules; 1990 *conversazione* (celebrating the 1940 *conversazione* at which Hill gave an exhibition on Madder dye).
- D.37 Cambridge Morris Men  
Menu for Feast, 20 April 1929, signed by those present; notices of Annual Morris and Feast 1975, 1980, 1982-1984.
- D.38 Cambridge Drawing Society  
Constitution; notice of meeting 1945.  
  
Cambridge Union Society  
Appeal 1962.  
  
Blackman Club  
Programmes of meetings 1981, 1982.
- D.39 Replies to Hill's social invitations; menu from Commemoration of Dr Drosier 7 May 1927.

**Cambridge University**

**EXAMINING**

D.40 Examiners' reports etc for Cambridge University higher degrees, 1953-1970.



**SECTION E**

**PUBLICATIONS**

**E.1 - E.118**

E.1-E.112

DRAFTS

E.113-E.117

EDITORIAL CORRESPONDENCE

E.118

REPRINTS

## Publications

### DRAFTS

A chronological sequence of material relating to publications or to the intention to publish. Where applicable reference has been made to the list of publications prepared by D.S. Bendall for his Royal Society memoir of Hill (A.12) in the form *Bibliog.* no. ...

- E.1 'Chapter 1 Porphyrins'.  
  
Manuscript draft, possibly of lecture intended for publication. Latest bibliographical reference 1927.  
  
Hill's book review of *The Respiratory Function of the Blood. Part II* by J. Barcroft  
  
1p typescript, ca.1928.
- E.2 'The preparation of a Tetrapyrtydyl'. Not listed in *Bibliog.*  
  
Manuscript drafts. Latest bibliographical reference 1930.
- E.3 'Cytochrome oxidase in flowering plants', *Bibliog.* no. 30 (1939).  
  
Manuscript and typescript drafts. The typescript is paginated 64-76.
- E.4 'The reduction of ferric oxalate by isolated chloroplasts', with R. Scarisbrick, *Bibliog.* no. 31 (1940).  
  
Manuscript and typescript draft.
- E.5 'The behaviour of wireworms in response to chemical stimulation', with W.H. Thorpe *et al*, *Bibliog.* no. 37 (1947).  
  
32pp manuscript draft.



### Publications

- E.6 Collaborative work on trace elements in plants, with H.K.F. Blaschko, 1944-1947.
- Correspondence from Blaschko, including manuscript data and typescript drafts sent to Hill.
- In his letter of 30 January 1947 Blaschko refers to possible publication of the work but it is not listed in *Bibliog.*
- E.7 'Ranunculin: the precursor of the vesicant substance of the buttercup', with R. van Heyningen, *Bibliog.* no. 39 (1951).
- Duplicated typescript and manuscript draft; correspondence; manuscript notes etc.
- E.8 'Oxiredution in chloroplasts', *Bibliog.* no. 43 (1951).
- Letter only.
- E.9, E.10 Untitled paper, with J.H.C. Smith and A. Benitez. Not listed in *Bibliog.*
- E.9 13pp typescript + figures.
- E.10 Correspondence 1952-1953. Letter from C.S. French to Hill includes typescript 'Comments on fluorescence spectra measurements of chloroplasts, seed coats, and protochlorophyll solutions, measured November 11 to 27, 1952, with Robin Hill' and other data.
- E.11 'The cytochrome *b* component of chloroplasts', *Bibliog.* no. 50 (1954).
- 5pp typescript; 6pp typescript + references, figures etc; correspondence; manuscript graphs
- E.12-E.15 *Photosynthesis*, with C.P. Whittingham, *Bibliog.* no. 51 (1955).
- E.12 Proof copy of book with extensive corrections and amendments, including intercalated material. Possibly for second edition.

### Publications

- E.13 Manuscript drafts; typescript draft 'The chloroplast reaction' by Whittingham, 10pp + references; 'Recent research in photosynthesis', addendum to book 'added 1956', 8pp typescript.
- E.14 Material found with preceding. Includes 'The influence of triphosphopyridine nucleotide and other physiological substances upon oxygen evolution from illuminated chloroplasts' by L.J. Tolmach, 20pp typescript + references, tables etc; and letter to Hill from S. Ochoa *re* azide inhibition, 23 April 1951.
- E.15 Correspondence with publishers, Whittingham, E.J. Maskell and others, 1952-1964.
- E.16-E.20 Practical Plant Biochemistry.  
  
Hill and E. Watchorn prepared a collaborative book based on Cambridge University plant biochemistry lectures and practicals. Only two chapters were completed and it was not published.
- E.16, E.17 'Practical Plant Bioch (1955) E.W. & R.H.' Contents of Hill's envelope so inscribed divided into two for ease of reference.
- E.16 'Chapter One. Carbohydrates', 48pp typescript.
- E.17 'Chapter Two. Glycosides, Aglycones and related substances'. 48pp typescript, with manuscript lists of corrections.
- E.18 'Original Mss'. Contents of Hill's folder so inscribed: manuscript drafts of sections of chapter two.
- E.19, E.20 'Chapter 2'. Contents of Hill's folder so inscribed divided into two for ease of reference: manuscript drafts of sections of chapter two; duplicated typescript teaching material.



### Publications

- E.21 'The activity of chloroplasts in the reduction of a natural hydrogen acceptor'.  
Not listed in *Bibliog.*
- 7pp typescript draft with manuscript corrections, annotated 'for Journal of Exp Botany (SEB)'; 'Discussion', 2pp typescript; miscellaneous material found therewith, various dates 1952-1955.
- E.22 'Oxidation-reduction potentials', *Bibliog.* no. 57 (1956).
- Correspondence from editor 1952, 1954; manuscript notes found therewith.
- E.23 'Crystallisation of a photosynthetic reductase from a green plant', with F.L. Bendall, *Bibliog.* no. 62 (1960).
- 3pp manuscript; 2pp typescript; correspondence from H.E. Davenport *re* the paper.
- E.24 'A comparison between photosynthetic triphosphopyridine nucleotide reductase from *Chlorella* and higher plants', with F.L. Bendall, *Bibliog.* no. 63 (1960).
- 4pp manuscript.
- E.25 'Function of two cytochrome components in chloroplasts: a working hypothesis', with F.L. Bendall, *Bibliog.* no. 65 (1960).
- Typescript drafts; correspondence from Bendall.
- E.26 'The nature and possible function of chloroplast cytochromes', with W.D. Bonner, *Bibliog.* no. 66 (1961). See also H.36.
- 10pp typescript + references, tables etc; figures.
- E.27-E.38 'Light filters and thermodynamic efficiency of photochemical reactions'.
- This paper, the first Hill prepared on the thermodynamic efficiency of photosynthesis, was submitted to the Royal Society for publication in its *Proceedings* in 1961. It was never published. A closely related paper 'Photosynthesis and thermodynamics' was submitted to *Nature* at the same time, but subsequently withdrawn by Hill.

### Publications

Hill returned to this paper in the 1970s and, with P.R. Rich, produced a number of papers on the subject in the 1980s (see E.91-E.107).

- E.27 'Preliminary manuscript'.
- E.28 Revised 20pp manuscript.
- E.29 Incomplete typescript ?first draft, with pages of manuscript notes, figures and letter from N. Sheppard, 2 February 1961 enclosing comments by J. Agar.
- E.30 20pp typescript, with extensive manuscript corrections; letter to G. Weber 3 October 1961 thanking him for agreeing to look at the draft.  
  
The draft is annotated on title page 'This is a first copy and should be returned to RH for retyping [...]' and '(Received 25 September 1961) Reviewed by RH November 23 1977'.
- E.31 Legends for figures; manuscript notes *re* the preceding draft 4 October 1961.
- E.32 Typescript drafts of paper sent to *Nature* 25 September 1961.
- E.33 Correspondence *re* paper and referees' comments thereon, 1962.  
  
Includes comments of referees and Hill's 4pp typescript reply to criticisms made.
- E.34, E.35 Manuscript and typescript pages for redrafting of paper. 2 folders.
- E.36 Figures for paper, returned by Royal Society October 1963.



### Publications

- E.37 Manuscript and typescript notes, pages of drafts etc.
- E.38 Later manuscript notes 1979, 1981, 1982.
- E.39 'The relation of oxygen evolution to carbon assimilation with isolated chloroplasts', with D.A. Walker, *Bibliog.* no. 73 (1967).  
15pp typescript.
- E.40 'Energy conservation in chloroplasts'. Not listed in *Bibliog.*  
Rough manuscript draft and notes. Latest reference 1968.
- E.41 Invitation to write an article on 'Photosynthesis' for Italian *Encyclopaedia of the Twentieth Century*, 20 November 1969. Hill expressed interest but there is no further documentation.
- E.42 'The growth of our knowledge of photosynthesis', *Bibliog.* no. 78 (1970).  
Memorandum of Agreement only. See F.45-F.47.
- E.43-E.52 'The phenol dyestuff of Liebermann as an acridian derivative', with G.R. Bedford and B.R. Webster, *Bibliog.* no. 79 (1970).  
This paper was initially drafted by Hill as sole author. Bedford and Webster, of the ICI Biological Chemistry Department, who analysed samples of compounds investigated by Hill and provided interpretations of the results, were named as co-authors in the final paper.
- E.43 Manuscript draft of original paper by Hill 'Liebermann's phenol dyestuff as an acridian derivative'.
- E.44 Typescript draft of original paper, 15pp + tables and figure.
- E.45 Typescript draft of final paper.

### Publications

- E.46                      Revised typescript draft of final paper, with extensive manuscript correction. Covering letter from Bedford, 6 January 1970.
- E.47, E.48                Correspondence between Hill and co-authors, and others 1968-1971.
- E.47                      1968-1969.
- E.48                      1970-1971.
- E.49-E.52                Miscellaneous notes, graphs, pages of drafts etc 1965-1969. 4 folders.
- E.53                      'Photosynthesis and the chloroplast - historical outline', *Bibliog.* no. 82 (1971).  
  
Correspondence with publishers 1971; photographs for possible illustrations.
- E.54-E.59                'Joseph Priestley (1733-1804) and his discovery of photosynthesis in 1771', *Bibliog.* no. 83 (1972).  
  
This paper was delivered at the 2nd International Congress of Photosynthesis Research, Stresa, Italy, 24-29 June 1971.
- E.54                      Correspondence with G. Forti, Congress organiser *re* Hill's paper.
- E.55                      Correspondence *re* pictures of Priestley with which to illustrate the paper. Also includes Hill's manuscript list of pictures, statues, medallions etc of Priestley.  
  
Hill also sought to obtain illustrations of Priestley for a paper by a Swiss colleague.
- E.56, E.57                Photographs for possible illustrations, most identified on verso. 2 folders.



### Publications

- E.58, E.59      Background material: chiefly photocopies of pages from Priestley's 1772 paper 'Observations on different kinds of Air', *Philosophical Transactions of the Royal Society*. At E.58 is letter from W.D. Bonner *re* visit to the Priestley House museum in Pennsylvania.
- E.60              'Leslie William Mapson 1907-1970', *Bibliog.* no. 84 (1972).  
  
Letter from Royal Society; photocopied biographical material; copy of Hill's Biographical Memoir annotated as 'Ref copy for [Dictionary of] Nat Biog'. See below E.78.
- E.61, E.62      'A note of some old and some possible new redox indicators', *Bibliog.* no. 85 (1972).
- E.61              Manuscript drafts and pages of drafts.
- E.62              Typescript drafts and pages of drafts; letter from G.R. Bedford *re* draft of the paper, 14 February 1972.
- E.63              'Days of visual spectroscopy', *Bibliog.* no. 86 (1975).  
  
Brief editorial correspondence 1973, 1974.
- E.64              'Max Rudolf Lemberg F.R.S.', with M. Dixon. Not listed in *Bibliog.* Published in *The Times* obituary column 2 May 1975.  
  
Manuscript draft and notes; copy of published obituary.
- E.65              'Uncoupling of electron transport by anionic quinonoid redox indicator dyes', with A.R. Crofts *et al*, *Bibliog.* no. 87 (1976)  
  
3pp manuscript; 4pp manuscript.
- E.66-E.70      'Fotosintesi', *Bibliog.* no. 88 (1976).
- E.66              Manuscript drafts of sections of the paper.

### Publications

- E.67 Manuscript and typescript legends for figures etc.
- E.68 25pp typescript draft of the first half of the paper, sent to Italy 9 August 1973.
- E.69 53pp typescript.
- E.70 Correspondence, principally with publishers, 1971-1975.
- E.71-E.77 'Some tentative questions about radiant energy and its conversion in chloroplasts', *Bibliog.* no. 89 (1977).
- E.71, E.72 Manuscript drafts and pages of drafts. 2 folders.
- E.73 13pp typescript proof with manuscript corrections.
- E.74 Off-print, annotated by Hill with 'Corrections for this first effort'.
- E.75 Editorial correspondence 1976, 1977.
- E.76, E.77 Manuscript notes, pages of drafts etc. 2 folders.
- E.78 'Leslie William Mapson 1907-1970'. Not listed in *Bibliog.*  
Written 1977-1978 for *Dictionary of National Biography*. See E.60 above.  
Brief correspondence; 4pp manuscript.



### Publications

- E.79-E.90            Work on energy conversion in photosynthesis.
- This material dates from the late 1970s. Hill prepared a number of drafts, with different titles, but none are listed in *Bibliog*. The drafts were worked on from 1977 to the 1980s and may have formed the basis for later collaborative work with P.R. Rich (see E.91-E.107). In the course of this work Hill received advice from A.M. Lesk of the Medical Research Council Laboratory of Molecular Biology, Cambridge. See also J.86, J.87.
- E.79-E.81            'Thermochemical and photochemical aspects of photosynthesis'.
- E.79                 Manuscript notes and pages of drafts, dated between March 1977 and June 1980.
- E.80                 10pp incomplete manuscript draft dated November 1977, with extensive corrections; photocopied manuscript 'Introduction' annotated 'March 29 1978 with A. Lesk in Molec Biol'; 2pp photocopied manuscript ?summary.
- E.81                 13pp typescript with extensive manuscript annotation and correction.
- E.82, E.83           'The question of the efficiency of quantum conversion in photosynthesis'.
- E.82                 Manuscript notes and pages of drafts, dated between December 1978 and May 1983.
- E.83                 Photocopied manuscript draft with manuscript corrections and comments in red ink by Hill and blue ink by Lesk; 1p typescript notes on 'The question of the efficiency of quantum conversion in photosynthesis' dated 6 December 1978 and headed with manuscript note 'prepared for meeting P.T. Landsberg and Arthur Lesk in London [...]'.
- E.84-E.89           'A question concerning efficiency of energy conversion in photosynthesis'/ 'An enquiry into efficiency of energy conversion in photosynthesis'.
- E.84, E.85           Manuscript notes and pages of drafts dated between November 1979 and June 1980. 2 folders.

### Publications

- E.86                    10pp photocopied typescript + 1p photocopied manuscript appendix, with manuscript corrections and annotations by Lesk.
- E.87                    Correspondence from Lesk, one letter only dated, 24 June 1979; manuscript notes. Found with preceding.
- E.88, E.89             Contents of Hill's heavily annotated folder divided into two for ease of reference: manuscript and typescript notes, drafts etc *re* efficiency of quantum conversion in photosynthesis. Some items dated 1982 and 1983.
- The annotated folder is at E.89.
- E.90                    'Energy conversion in chloroplasts'.
- 9pp typescript with manuscript corrections and annotations, nd.
- E.91-E.107            Collaborative work on the efficiency and process of photosynthesis, with P.R. Rich.
- Hill and Rich published three joint papers, *Bibliog.* nos. 91 (1981), 93 (1982) and 94 (1983).
- E.91-E.102            'Efficiency of photosynthesis. A modified diagram for the "Z" scheme', *Bibliog.* no. 91 (1981).
- This paper was Hill's contribution to the annual report of the Agricultural Research Council's Sheffield-based research group with which Hill was associated in the 1980s. Versions had been submitted to *Nature* in 1980 and 1981 but not published in that journal.
- E.91                    6pp typescript + figure, annotated 'As sent for ARC Res Gr [...] for 1981 Ann Rep'; annotated copy as published with manuscript notes attached.
- E.92                    Figures (on plastic for overhead projector); background material. Found with preceding.
- A note at E.91 by Hill's Royal Society memorialist D.S. Bendall suggests the material at E.91 and E.92 was probably brought together for a seminar given in the Cambridge University Biochemistry Department.



### Publications

- E.93-E.95 'All old versions'. Contents of Hill's folder so inscribed divided into three for ease of reference.
- E.93 Typescript drafts, with manuscript annotation.
- E.94 Manuscript drafts.
- E.95 Manuscript and typescript drafts of 'Appendix'; manuscript notes.
- E.96 6pp typescript draft + references etc as submitted to *Nature*, with extensive manuscript correction and annotation.
- E.97 Correspondence from J.R. Maddox, editor of *Nature*; referees' comments on paper; response of Hill and Rich; letter from G. Porter *re* second version of the paper, 24 April 1981; manuscript notes.
- E.98, E.99 Photocopies of papers on bioenergetics by C.W.F. McClare. 2 folders.  
  
Hill was interested in McClare's work on the application of thermodynamics to biological processes. McClare believed that classical thermodynamics was inadequate for the description of these processes.
- E.100-E.102 Miscellaneous background material. 3 folders.
- E.103 'A note on the ARC conference "What limits photosynthesis" ', *Bibliog.* no. 93 (1982). See also H.85.  
  
Copy of paper; figures.
- E.104, E.105 'A physical interpretation for the natural photosynthetic process', *Bibliog.* no. 94 (1983).  
  
A version of this paper was submitted to *Nature* in 1981 but not published in that journal.

### Publications

- E.104                   7pp manuscript; 12pp typescript with extensive manuscript correction and annotation; manuscript notes.
- E.105                   17pp typescript 'Final copy sent 11 Nov 1981'; brief correspondence with J.R. Maddox, editor of *Nature*; exchange *re* publication in *Proc. Natl. Acad. Sci., U.S.A.*
- E.106, E.107           'Efficiency of photosynthesis for C<sub>3</sub> species of green plants'.  
  
A note by D.S. Bendall at E.106 observes  
'These appear to be mostly various drafts, dating from 1982, of a review intended for *Nature*, but apparently never completed.'  
  
Typescript drafts and pages of drafts. Latest dated 1983. 2 folders.
- E.108                   'Cytochromes and redox systems in photosynthesis', *Bibliog.* no. 92 (1982).  
  
7pp manuscript; 6pp typescript with extensive manuscript corrections from page 4; miscellaneous notes and correspondence.
- E.109, E.110           'The dynamic aspect of photosynthesis', *Bibliog.* no. 96 (1985).
- E.109                   Manuscript and typescript draft.
- E.110                   20pp typescript + figures; editorial correspondence.
- E.111                   'The relation between light and dark processes in photosynthesis. Not listed in *Bibliog.*  
  
4pp typescript '1st version' and 5pp typescript 'New version', both with manuscript corrections, ca.1986; letter from D.S. Bendall *re* the draft.
- E.112                   Rough manuscript draft on biological oxidation, nd.



## Publications

### EDITORIAL CORRESPONDENCE

Arranged alphabetically by publisher or journal title.

E.113	<i>Archives of Biochemistry and Biophysics</i>	1951-1955
	Refereeing.	
E.114, E.115	<i>Nature</i>	1954, 1957
E.114	1954. Refereeing.	
E.115	1957. Review, refereeing.	
E.116	<i>Photosynthesis Research</i>	1986, 1988
	<i>Phytochemistry</i>	1966
E.117	Miscellaneous.	

### REPRINTS

E.118	Published papers 1924 - 1986, some with manuscript annotations by Hill.
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**SECTION F**

**LECTURES**

**F.1 - F.53**

F.1-F.47

DEPARTMENTAL TEACHING

F.48-F.53

PUBLIC LECTURES



## Lectures

### DEPARTMENTAL TEACHING

For teaching material on plant biochemistry used by Hill and E. Watchorn as the basis for a planned text book see E.16-E.20.

- F.1 Softback notebook used for notes for 'Lectures & practicals 1930'. Much intercalated material including duplicated typescript instruction sheets for practical work.
- F.2-F.7 Bundle of Hill's manuscript notes for lectures and practical work 1932-1936.
- F.2 'Resp. pigments 1932 1st lecture Wed 17th [...]'; '4th lecture 1932'; 'Porphyrins 1934'; '4th lecture 1934 Feb 5th Cytochrome'.
- F.3 '1st lecture Jan 28 1935'; 'Respiratory pigments 2nd lecture 1935'.
- F.4 'Cytochrome 3rd lecture 1935 Feb 11'; 'Part II Respiratory pigments II 1935'.
- F.5 'Respiratory pigments 1st lecture 1936 Jan 20th'; 'Second lecture Jan 27th'; 'Third lecture'.
- F.6 Preparation of proto porphyrins; Helicorubin and cytochrome.
- F.7 Miscellaneous notes, chiefly haemoglobin and chlorophyll.
- F.8-F.15 'Lectures & Practicals Blood Pigments'. Contents of Hill's folder so inscribed divided into eight for ease of reference: manuscript notes for lectures and practical work 1935-1944.
- F.8 'Part I 1st lecture 1935'; 'Part I 2nd lecture'.

### Lectures

- F.9 'Respiratory pigments 2nd lecture revised 1938'; 'Respiratory pigments 3rd lecture 1938'; 'Respiratory pigments [...] 1939'.
- F.10 'Respiratory pigments 4th lecture 1941 May 24'; 'Respiratory pigments 4th lecture 1942'; 'Blood pigments 3rd lecture 1944' (chiefly notes for 1942 lectures on blood pigments).
- F.11 'Respiratory pigments 4th lecture', nd
- F.12-F.15 Miscellaneous pages of lecture notes, duplicated typescript sheets. 4 folders.
- F.16-F.24 'PG & Pt II Lectures'. Contents of Hill's box folder so inscribed divided into nine for ease of reference: manuscript notes for lectures and practical work 1936-1958.
- F.16 'Plant biochemistry Second Lecture Feb 6 1936 Nitrogen metabolism'; 'Plant biochemistry 1943 2nd Carbohydrate metabolism Oct 26'.
- F.17 Lectures 1952-1953: 'I Jan 23'; 'II Photosynthesis in living cell'; 'III Measurement of photosynthesis [...]'; 'IV Enzymes related to carboxylation'.
- F.18 'Photosynthesis III. 1953'; 'Postgraduate lectures 1954 II', 'III' and 'IV'.
- F.19 List of lectures for Part II and postgraduate students 1955; Part II 'CO<sub>2</sub> [systems] 21 Jan 1955'; postgraduate lectures 2-5 and 8, 1955.
- F.20 Notes for various Part II and postgraduate lectures 1956, 1957 and 1958.
- F.21 Poster of 'Complete photosynthesis of Pheoporphyrin A<sub>5</sub>, dimethyl ester'.



### Lectures

- F.22 Envelope of 'References'.
- F.23, F.24 Miscellaneous pages of lecture notes, duplicated typescript sheets. 2 folders.
- F.25 Notebook labelled on front cover 'Plant biochemistry'. Used for teaching notes, lists of class members etc October Term 1936 - 1958. Intercalated material.
- F.26 Softback notebook inscribed on front cover 'Pt II practicals'. Used for notes on practicals, lists of class members etc October 1936 - 1961. Intercalated material.
- F.27-F.36 Contents of Hill's box folder divided into ten for ease of reference: lecture notes, duplicated typescript sheets for practical work and other teaching material for plant biochemistry 1937 - 1943 (very little material is dated).  
  
The material was found in great disorder and in poor condition.
- F.27 Exercise book inscribed on first page 'Plant biochemistry Michaelmas Term 1939'. Not in Hill's hand. Most pages not used. A little intercalated material.
- F.28 'Practical Plant Biochemistry (Part II Botany)', manuscript notes not in Hill's hand.
- F.29-F.31 Duplicated typescript sheets. 3 folders.
- F.32-F.36 Manuscript notes, references etc. 5 folders.
- F.37 Manuscript notes for 'Plant biochemistry 3rd lecture 1939. Carbohydrates'; 'Respiration 1939. 4th lecture Nov 4'.

### Lectures

- F.38-F.40            Miscellaneous manuscript notes and duplicated typescript sheets for plant biochemistry teaching 1949 - 1959 and nd. 3 folders.
- F.41, F.42            'Practical botany'. Contents of Hill's envelope so inscribed divided into two for ease of reference: duplicated typescript sheets.
- F.41                 'Plant physiology' field classes I-III and V, 1953 and 1956; 'Practical physiology' classes I-VIII, Michaelmas Term 1953.
- F.42                 'Practical physiology' classes I-VIII, Easter Term 1956; 'Practical physiology' classes I-VIII, Michaelmas Term 1956.
- F.43                 Typescript and duplicated teaching material on haematin and blood, 1956 and nd.
- F.44                 Hardback notebook identified by a note at the front by D.S. Bendall, Hill's Royal Society memorialist, as 'Mostly notes for lectures 1961-1965'.
- F.45-F.47            History of biochemistry lecture course.
- In 1958 Hill was invited by J. Needham to give a lecture on the history of photosynthesis. The lecture series was published by Cambridge University Press in 1970 (*Bibliog.* no. 78), Hill's lecture under the title 'The growth of our knowledge of photosynthesis' (see E.42).
- F.45                 Correspondence 1958, 1965, 1968.
- F.46                 'Green thoughts in a green shade: the growth of our knowledge of photosynthesis', manuscript draft of Hill's lecture.
- F.47                 Manuscript notes, pages of drafts etc.



## Lectures

### PUBLIC LECTURES

The documentation of Hill's public and invitation lectures is very scanty. Some material relating to lectures delivered by Hill during conferences or visits abroad may be found in section H.

- F.48                      Manuscript notes identified by attached note by D.S. Bendall  
'This seems to be the text of a talk given to the Emmanuel College Natural Science Club on Thursday Feb 2nd 1922, with the title 'Some psychological aspects of Art'.
- F.49                      'Talk to EMRS [East Malling Research Station] Staff Dec 16 1947'.  
Contents of Hill's envelope so inscribed: manuscript notes for talk on visit to France earlier that year (see H.11-H.18).
- F.50                      Letter from Honorary Secretary, Aberdeen University Biological Society  
thanking Hill for lecture, 28 February 1964.
- F.51-F.53                Manuscript drafts for lectures, nd. 3 folders.

<b>SECTION G</b>	<b>SOCIETIES AND ORGANISATIONS</b>	<b>G.1 - G.23</b>
	ASSOCIATION OF SCIENTIFIC WORKERS	G.1
	BRITISH PHOTOBIOLOGY GROUP (later SOCIETY)	G.2-G.9
	COMITÉ (later ASSOCIATION) INTERNATIONAL DE PHOTOBIOLOGIE	G.10-G.12
	IMPORTS SUBSTITUTION PANEL	G.13
	INFORMATION EXCHANGE GROUP	G.14
	INSTITUTE OF BIOLOGY	G.15
	INTERNATIONAL UNION OF BIOLOGICAL SCIENCES	G.16
	PLANT PHENOLICS GROUP	G.17
	ROYAL SOCIETY	G.18-G.21
	UNIVERSITY OF DURHAM	G.22
	UNIVERSITY OF LONDON	G.23



**Societies and organisations**

**ASSOCIATION OF SCIENTIFIC WORKERS**

**1940**

G.1 Programme, Lent Term 1940.

**BRITISH PHOTOBIOLOGY GROUP (later SOCIETY)**

**1954-1983**

The British Photobiology Group was established on 26 January 1955 at a meeting convened by J.A.V. Butler and chaired by Hill. According to an account of the Group circulated at the 4th International Photobiology Congress in 1964 (H.42) it was formed 'for the purpose of bringing together biologists, chemists and physicists with an interest in this field, for scientific discussions and other activities, and to explore possibilities of international co-operation'. Hill was a member of the Group's committee to 1957.

G.2 Correspondence 1954 *re* establishing a British photobiological organisation.

G.3 Correspondence and papers *re* January meeting and formation of Group, January - March 1955.

G.4 Correspondence and papers April - August 1955.

G.5 Correspondence and papers for first meeting of Group, 3 October 1955. Hill spoke on photosynthesis research. Includes Hill's manuscript notes.

G.6 Papers for meetings November 1955, January and March 1956.

G.7 Correspondence and papers 1957, 1959.

G.8 Agenda for meeting of British Photobiology Society 24 September 1970; address list of members September 1974; draft letter by Hill *re* history of society 1983; letter *re* annual meeting, nd.

G.9 Photobiology Bulletin April 1983.

### Societies and organisations

#### COMITÉ (later ASSOCIATION) INTERNATIONAL DE PHOTOBIOLOGIE

1968-1983

The first international organisation for work in photobiology, the Comité International de la Lumière, was established in 1922. It changed its name to the Comité International de Photobiologie in 1951 and became the Association International de Photobiologie in 1976. The primary role of the organisation was to organise the International Photobiology Congresses.

Hill was elected an Honorary Member of the Comité in 1968 (see A.23) and received a Finsen Medal for contributions to photobiology in 1972 (see H.66-H.68). Hill served on the Finsen Administration Sub-Committee.

The material is principally duplicated typescript papers for meetings, reports of activities etc.

G.10 1968, 1972, 1973, 1974.

G.11 1976, 1978.

G.12 1980, 1982, 1983, 1984.

#### IMPORTS SUBSTITUTION PANEL

1949

Hill was asked by S. Zuckerman to advise the Panel, of which he was chairman, in its consideration of unconventional methods of food production.

G.13 Correspondence and papers *re* Panel meeting, 1 December 1949.

#### INFORMATION EXCHANGE GROUP No. 1

1963-1964

This Group exchanged information on work on oxidative phosphorylation and terminal electron transport.

G.14 Membership lists; memos.



**Societies and organisations**

**INSTITUTE OF BIOLOGY**

**1950**

G.15                      Invitation to join the Institute.

**INTERNATIONAL UNION OF BIOLOGICAL SCIENCES**

**nd**

G.16                      Hill's report to the Subcommittee on the Nomenclature of Cytochromes, 2pp typescript.

**PLANT PHENOLICS GROUP**

**1957**

G.17                      Programme and list of participants at inaugural meeting, Cambridge, 9 April 1957. Hill is listed as a participant.

**ROYAL SOCIETY**

**1948-1989**

Hill was elected a Fellow of the Royal Society in 1946. He was awarded a Royal Medal in 1964 and the Copley Medal in 1987.

G.18                      General correspondence and papers 1968-1979.

G.19                      Papers *re* visits of Chinese scientists 1981, 1982 (see A.88).

G.20, G.21                Elections and research appointments. 2 folders.

G.20                      1948, 1953, 1964, 1967, 1972, 1975, 1976.

G.21                      1978, 1981, 1983, 1987, 1989.

**Societies and organisations**

**UNIVERSITY OF DURHAM**

**1947, 1956**

G.22                      Examining Ph.D. theses.

**UNIVERSITY OF LONDON**

**1954-1972**

G.23                      Examining Ph.D. theses.



**SECTION H**

**VISITS AND CONFERENCES**

**H.1 - H.94**

The presentation of this section is chronological. Included in the main sequence are a few meetings not attended by Hill but for which he prepared contributions in absentia. At H.91-H.94 is a sequence of invitations and conference publicity where there is no evidence of Hill's attendance or of his intention to attend.

**1928**

- H.1                    Congrès international du vin et du pin maritime, Bordeaux, 21-24 June.  
Memorabilia only.

**1932**

- H.2-H.9              Visit to Singapore and Dutch East Indies.

Hill visited the East Indies after an illness on the recommendation of E.B. Worthington. He left for the East Indies on 27 May, arriving in Singapore on 25 June. Hill stayed with a friend from Cambridge, E.J.H. Corner, who was Assistant Director of the Botanic Gardens in Singapore before moving on to the Dutch East Indies. The visit included a trip to Java where Hill was able to gather data and specimens of tropical dye-plants. Hill left for the UK in November arriving back on 14 December.

For Hill's and E.B. Worthington's correspondence with Corner see J.15-J.21.

For photographs from the visit see A.67-A.78.

- H.2, H.3              Softback pocket notebooks used as diaries of the visit. In addition to a record of Hill's movements during the visit - from embarkation to a few days after his arrival back in Cambridge, the diaries contain meteorological observations, notes and sketches of plants seen, notes on dyes and dyeing techniques, addresses of contacts, notes on money spent etc. Loose material intercalated in both books.

- H.2                    May - 30 September. Paginated 1-154.

- H.3                    21 September 1932 - 3 January 1933. Paginated 155-324.

### Visits and conferences

- H.4, H.5 Correspondence from Hill to his family May - December 1932.
- The letters contain quite detailed accounts of Hill's movements, the colleagues he met and the work on which he was engaged, as well as more personal information.
- H.4 May - August.
- H.5 September - December.
- H.6 Correspondence to Hill from his family, June - October 1932.
- Letters to Hill from L.R. Wager, May and November 1932.
- H.7 Miscellaneous material from visit.
- H.8, H.9 Memorabilia. 2 folders.
- 1946**
- H.10 Association of Applied Biologists meeting on the Significance of Trace Elements in Plants and Animals, Imperial College London, 4 October.
- Hill gave a paper on 'Trace elements in relation to enzymes'.
- Notice of meeting; off-print of article by D. Keilin and T. Mann.
- 1947**
- H.11-H.18 Visit to France, 2 June - 1 July.
- Hill visited France as a member of a Cambridge University and East Malling Research Station (EMRS) arboricultural expedition, see J.37. The purpose of the expedition was 'to study wild and cultivated plants belonging to the



### Visits and conferences

genus *prunus* with a view to producing a wider range of rootstocks for stone fruits; especially plums, apricots and peaches'.

The expedition also included A.B. Beakbane of the EMRS, with whom Hill undertook joint research on fruit trees (see J.28-J.50).

For Hill's notebook from this expedition see B.86.

- H.11 Itineraries; notes on expenses. Includes note on purpose of journey.
- H.12 Correspondence and papers *re* arrangements 1947-1948.
- H.13 Manuscript notes; photographs of fruit trees.
- H.14 Correspondence to Hill from his family.
- H.15 7pp manuscript and 12pp typescript drafts of report on the visit to France.  
The typescript ?final draft includes lists of addresses of those working with fruit tree stocks in France and complete itinerary.
- H.16 Memorabilia.
- H.17 Drafts of letters from Hill to Sir John Fryer, Secretary Agricultural Research Council, *re* funding for visit to UK of M. Bernhard of the French fruit research station at Pont de la Maye.
- H.18 Brochure on 'Agen et sa région' prepared for the 2e Congrès National de la Prune et du Pruneau, 1949. Sent to Hill by Beakbane.

### Visits and conferences

#### 1950

- H.19                    80th Conference of Society for Experimental Biology, Sheffield, 3-7 July.  
Hill gave a paper on 'Reduction by chloroplasts'. *Bibliog.* no. 42 (1951).  
Annotated programme only.

#### 1952

- H.20, H.21            Symposium on Photosynthesis, Gatlinburg, Tennessee, October.  
While in the US Hill visited colleagues at a number of research centres.
- H.20                    Brief correspondence *re* arrangements; typescript notes annotated by Hill  
'Nov. 1952 Stanford...'
- H.21                    Hardback pocket notebook inscribed '1st Gatlinburg' on front cover. Used  
for notes on conference proceedings and on visits to colleagues in US  
research centres. Paginated 1-141.

#### 1956

- H.22                    Colloquium on the Aromatic Acids and their Function in Plants, Low  
Temperature Research Station, Cambridge, 11 April.  
Annotated programme only.

#### 1957

- H.23                    Linnean Society symposium on Biochemistry and Taxonomy, London, 18  
July.  
Hill gave a paper on 'Dye-stuff plants'.  
Programme; letter *re* publication of Hill's paper by Linnean Society. There is  
no evidence of publication.



### Visits and conferences

#### 1958

H.24-H.34 Visit to Nyasaland (Malawi), 31 March - 11 April.

Hill visited Nyasaland with F.G. Young as guests of the Nyasaland Tea Association. Their terms of reference were 'to advise on whether or not biochemical research should be undertaken on the problem of tea fermentation...' They visited a number of tea estates and factories before reporting their findings and recommending a programme of research. This research was undertaken by D.S. Bendall.

The bulk of the material is correspondence and papers concerning the research programme into the biochemistry of tea fermentation, dating from Hill's return to the UK.

For photographs taken during the visit see A.81.

H.24 Itinerary; correspondence *re* arrangements; press-cuttings etc..

H.25 'Report of meeting held at Bvumbwe on Friday April 11th' (Hill was present); miscellaneous manuscript and typescript notes.

H.26 Hardback pocket notebook used from the front for notes during visit to Nyasaland and subsequent work on tea fermentation and from the back for botanical notes and sketches.

H.27 Correspondence between Hill and family during visit; memorabilia, chiefly photographs.

H.28-H.33 Correspondence and papers arising, 1958-1964. Chiefly concerning the research programme initiated by Hill and Young.

H.28 1958 April. Includes copy of Hill and Young's report to the Nyasaland Tea Association.

H.29 1958 May.

H.30 1958 June - October. Chiefly *re* funding of research post.

**Visits and conferences**

H.31 1958 November, December. Includes 2pp typescript note by Hill on the fermentation of tea.

H.32 1959-1964 and nd. Includes 4pp manuscript draft of lecture by Hill on black tea

H.33 'Second annual report (1959/60) on research into the biochemistry of tea fermentation' by D.S. Bendall, October 1960; 'Biochemistry of tea fermentation' by Bendall, September 1965.

H.34 Miscellaneous printed background material.

**1959**

H.35 Faraday Society discussion meeting on Energy Transfer with special reference to Biological Systems, Nottingham, 14-16 April 1959.

Information; list of participants.

H.35A Visit to USA.

Manuscript notes for lectures on work on photosynthesis at 'Utah. Salt Lake City for Dec 18 1959' and 'Oregon State College Corvallis Jan 18 1959 [?1960]'.

**1960**

H.36 Visit to USA, March.

Hill gave a lecture at Berkeley, 11 March, and attended the McCollum-Pratt Institute Symposium on Life and Light, Johns Hopkins University, 28-31 March at which Hill and W.D. Bonner gave a paper 'The nature and possible function of chloroplast cytochromes', *Bibliog.* no. 66 (1961). See E.26.

Invitation and correspondence *re* arrangements; manuscript notes for talk at Berkeley; programme for symposium.



### Visits and conferences

H.37 CIBA Foundation symposium on Quinones in Electron Transport, London, 11-13 May.

Hill participated in the discussion following the final paper.

Programme; manuscript draft and typescript 'rough draft' of Hill's comments.

#### 1962

H.38-H.40 International symposium on Chemical Plant Taxonomy, Paris, 4-6 October.

Hill was sent symposium information but in the event was unable to attend. C.P. Whittingham sent him a set of abstracts.

H.38 Information; programme.

H.39, H.40 Abstracts.

#### 1963

H.41 Charles F. Kettering Foundation symposium on Bacterial Photosynthesis, Yellow Springs, Ohio, 18-20 March. Hill remained at the Foundation for two weeks after the end of the symposium.

For photographs of the occasion see A.82.

Programme; copy of *Yellow Springs News* with photograph of Hill; manuscript notes for talk by Hill given at the Foundation in April (identified by D.S. Bendall).

#### 1964

H.42 Fourth International Photobiology Congress, Oxford, July.

Programme; information including brief historical account of the British Photobiology Group (see G.2-G.9).

### Visits and conferences

- H.43 Tenth International Botanical Congress, Edinburgh, August.
- Spiral bound Congress notebook. Used for notes ?on proceedings and later notes 1965. Most pages not used.
- 1965**
- H.44 American Society of Biological Chemists Federation meetings, Atlantic City, New Jersey, April 1965.
- Hill was not able to attend but prepared a contribution to the discussion.
- Brief correspondence *re* Hill's contribution to discussion; annotated proof of Hill's comments; paper by B. Vennesland *et al* with addendum replying to comments.
- H.45 NATO Advanced Study Institute on the Biochemistry of Chloroplasts, Aberystwyth, 19-28 August.
- Hill gave the opening paper on 'Biochemistry of photosynthetic phosphorylation (II)'.  
Programme and alterations; menu signed by some of those present; letter *re* area to be covered by Hill's lecture.
- 1966**
- H.46 International Minerals & Chemicals Corporation Symposium on Photosynthesis, Growth Sciences Center, Chicago, 5-7 October.
- Invitation; letter enclosing honorarium.
- 1968**
- H.47 International Congress of Photosynthesis Research, ?Freiburg, West Germany, June.
- Annotated invitation to wine-tasting. Not otherwise documented.



### Visits and conferences

H.48, H.49            International Symposium on Photosynthesis in Sugarcane, London, 12-13 June.

H.48                    Letter *re* arrangements; annotated programme.

H.49                    Bound copy of proceedings.

#### 1969

H.50-H.52            Eleventh International Botanical Congress, Seattle, Washington, 24 August - 2 September.

Hill was to chair a symposium on electron transport and phosphorylation but later withdrew from the Congress due to pressure of work.

H.50, H.51            Correspondence *re* arrangements with congress organisers and participants in the symposium, 1967-1969. 2 folders.

H.52                    Information; programme etc.

#### 1970

H.53-H.56            Visit to USA, May.

Hill visited the US to attend the International Conference on the Photosynthetic Unit, Gatlinburg, Tennessee and to take the Penn Lectureship in Biology at the University of Pennsylvania. He also visited Indiana University, where he gave a paper on 'Some reflections on photosynthesis', and the University of Georgia.

H.53, H.54            Conference on the Photosynthetic Unit, 18-21 May.

Hill chaired a session of the conference on 'The oxygen side'.

For photograph taken during conference see A.83.

**Visits and conferences**

- H.53 List of participants; 'The oxygen side' by Hill, 3pp typescript; manuscript notes; etc
- H.54 Conference handbook, extensively annotated by Hill.
- H.55 Penn Lectureship.  
Hill lectured on 'Photosynthesis', 27 May.  
Notice; manuscript notes found therewith; etc.
- H.56 Material *re* visits to Indiana and Georgia universities and invitation to visit State University of New York.
- H.57 British Photobiology Society meeting on Biochemistry of Photosynthesis, King's College London, 10 June.  
Hill gave a paper on 'Photons and oxidation - reduction potentials'.  
Programme; 7pp manuscript draft of Hill's contribution; manuscript notes.
- H.58-H.64 International Biological Programme (IBP)/UNESCO Regional Symposium for Eastern Africa on Bioenergetics in Tropical Ecosystems, Kampala, Uganda, 16-19 September.  
Hill gave a paper on 'Bioenergetics of photosynthesis at the chloroplast and cellular level'.
- H.58 Correspondence *re* arrangements and arising from visit; report of symposium from *Nature*, 3 October 1970.
- H.59 Information; programme.
- H.60 Lists of participants.
- H.61 Summaries of papers.



### Visits and conferences

- H.62                      Drafts of Hill's paper, 22pp manuscript and 15pp typescript + list of slides and references; summary.
- H.63                      Miscellaneous manuscript drafts and notes on bioenergetics of photosynthesis and history of work on photosynthesis.
- H.64                      Information on Bioenergetics meeting, Indiana University, Bloomington, 12-15 October 1970, found with preceding. No evidence of Hill's attendance.
- H.65                      Symposium on From Light to ATP, Bristol, 23 October.  
  
Hill presented the summary and introduced the general discussion.  
  
Programme, letter arising from Hill's contribution.
- 1972**
- H.66-H.68                Sixth International Congress on Photobiology, Bochum, West Germany, 21-25 August.  
  
Hill received a Finsen Medal of the Comité International de Photobiologie on this occasion (see G.10-G.12).  
  
For photographs of the occasion see A.85.
- H.66                      Correspondence *re* arrangements and arising from visit; information.
- H.67                      Annotated programme; annotated list of participants.
- H.68                      Manuscript notes.

### Visits and conferences

- H.69-H.72                      Visit to Ceylon and Australia, November 1972 - February 1973.
- Hill was invited to spend three months in Australia by the CSIRO Divisions of Plant Industry and Food Research, and the Research School of Biological Sciences of the Australian National University. Hill visited colleagues at other research centres in Australia.
- On the outward journey Hill visited colleagues at research centres in Ceylon (Sri Lanka) under the auspices of the British Council.
- For photographs of Hill in Australia see A.85.
- H.69                              Correspondence *re* arrangements to visit Australia 1970-1973.
- H.70                              Programme for seminars in Department of Physical Biochemistry [?ANU], with Hill listed as giving a paper on 'Some historical developments in the study of respiration'; manuscript notes; receipts etc.
- H.71                              Correspondence *re* arrangements to visit Ceylon and brief correspondence arising; itinerary.
- H.72                              Miscellaneous material from visit to Ceylon, chiefly photographs, some identified on verso.
- 1973**
- H.73                              Gordon Research Conference on Regulatory Mechanisms in Photosynthesis, Tilton Academy, New Hampshire, 13-17 August.
- Hill gave a special evening lecture on the history of work on photosynthesis.
- For group photograph of the Conference see A.86.
- Invitation; information; brief correspondence *re* arrangements; manuscript notes.
- H.73A                             British Photobiology Society meeting on Structure and Function of Chloroplasts, London, 19 October.
- Annotated programme.



### Visits and conferences

#### 1974

- H.74 International symposia of the Rank Prize Funds, 5 September.  
Table plan for symposia dinner only.

#### 1975

- H.75 Informal meeting on Photosynthetic Electron Transport and Phosphorylation, Birmingham, 18 April.

Programme.

Joint meeting of British Photobiology Society and International Solar Energy Society (UK section), Imperial College London, June.

Annotated meeting handbook with a few manuscript notes intercalated.

- H.76 Fifth International Biophysics Congress, Copenhagen, Denmark, 4-9 August.

Hill was to attend a symposium on Biophysics and Global Problems to speak on 'Energy conversion in chloroplasts' but later cancelled.

Correspondence *re* arrangements.

- H.77 Royal Institution Photochemistry Discussion Group symposium on Energy Transformation in Photosynthesis, London, 20 November.

Annotated programme.

#### 1976

- H.78 Third John Innes symposium, Norwich, 19-22 July.

Hill chaired a session on 'Cytochromes'.

Information; annotated programme.

### Visits and conferences

#### 1977

H.79, H.80 Fourth International Congress on Photosynthesis, Reading, 4-9 September.

Hill served on the scientific committee of the congress.

H.79 Papers *re* organisation of congress 1974-1977. Includes papers of third and fourth meetings of scientific committee.

H.80 Annotated programme.

#### 1978

H.81 Biochemical Society Bioenergetics Group colloquium on Photosystem II, London, 14 July.

The colloquium was dedicated to Hill, who gave the first paper, on 'Oxygen evolution - some historical aspects', *Bibliog.* no. 90 (1978).

Programmes, one annotated.

H.82 From Cyclotrons to Cytochromes: a symposium in Honor of Martin Kamen's 65th Birthday, 27-31 August, La Jolla, California.

Hill was unable to attend but contributed a paper ('Cytochromes and redox systems in photosynthesis', *Bibliog.* no. 92 (1982)) to the symposium volume.

Correspondence and papers *re* arrangements; programme.

#### 1979

H.83 Biochemical Society Bioenergetics Group colloquium on Proton Translation, Cambridge, 29 June.

Annotated programme.



### Visits and conferences

#### 1981

- H.84 Biochemical Society meeting, Manchester, 22-24 July.  
Programme (Hill marked the Bioenergetics Group colloquium on Bioenergetics in Agriculture); manuscript notes.

#### 1982

- H.85 Agricultural Research Council discussion meeting on What limits Photosynthesis?, Sheffield University, 15-16 April. This was preceded by a workshop on fluorescence, 13-14 April, including demonstrations of fluorescence equipment in the Robert Hill Laboratory.  
Hill was invited as a guest. Hill and P.R. Rich reported on the meeting 'A note on the ARC conference "What limits photosynthesis?" ', *Bibliog.* no. 93 (1982), see E.103.  
Information *re* discussion meeting and workshop; programme; etc.

#### 1985

- H.86 Biochemical Society meeting, Oxford, 17-19 July.  
Annotated handbook of abstracts.

#### 1986

- H.87, H.88 Robert-Hill-Symposium, University of Würzburg, West Germany, 2-6 July.  
The symposium was opened with the presentation to Hill of an Honorary Doctorate of the University of Würzburg. See A.30.  
H.87 Correspondence *re* arrangements; programme.  
H.88 Pocket notebook used from the front for notes on visit to Würzburg and at the back for addresses. Most pages not used.

### Visits and conferences

#### 1987

H.89 Fourth International symposium on Oxidases and related Redox Systems, Portland, Oregon, 4-8 October.

The symposium was held to commemorate the birth of D. Keilin. Hill contributed a brief 'Tribute to the memory of David Keilin'.

Invitation; manuscript and typescript drafts of Hill's tribute.

#### 1988

H.90 Royal Society discussion meeting on New Vistas in Measurement of Photosynthesis, London, 25-26 May.

Annotated programme and abstracts.

#### Invitations

H.91 1954, 1955, 1962.

H.92 1963, 1966, 1969.

H.93 1973, 1975, 1978, 1980.

H.94 1981, 1982, 1985-1989.



**SECTION J**

**CORRESPONDENCE**

**J.1- J.156**

Hill rarely kept carbon copies or manuscript drafts of outgoing letters so the correspondence is almost entirely incoming letters. In a few cases Hill made a rough draft of a reply on the letter received. However, there are also a number of Hill's manuscript drafts, particularly those from the late 1970s, that have draft letters to two or more correspondents thereon. These letters are to be found in the Shorter scientific correspondence subsection. The correspondents have been indexed.

J.1-J.120

**GENERAL SCIENTIFIC CORRESPONDENCE**

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

J.121-J.156

**SHORTER SCIENTIFIC CORRESPONDENCE**

In chronological order.

## Correspondence

### GENERAL SCIENTIFIC CORRESPONDENCE

- J.1                    **Anderson, J.M.**                    1974-1982, 1987-1990
- J.2                    **Anderson, M.C.**                    various dates 1964-1982
- Anderson was a research student in the Cambridge biochemistry department studying woodland light climate and growth and CO<sub>2</sub> exchange of grasses, 1960-1963. In 1964 she was appointed to the Scientific Staff of CSIRO, Australia.
- Career and personal news.
- J.3                    **Appleby, C.A.**                    various dates 1975-1989
- Appleby was a member of the Scientific Staff of CSIRO, Australia.
- Progress of research, visits, personal news.
- J.4                    **Arnon, D.I.**                    various dates 1949-1985
- Progress of research, visits, personal news.
- Beakbane, A.B.**
- See East Malling Research Station (J.28-J.50).
- J.5, J.6                **Bendall, D.S.**                    various dates 1953-1977
- Bendall was a research student in the Cambridge biochemistry department studying cytochrome systems and respiration in plant tissue under Hill, 1953-1957. After a short spell in Belgium working with L.N.M. Duysens (q.v.) he returned to Cambridge in 1958 to research on tea fermentation (see H.28-H.32). In 1958 he married F.L. Myers, a colleague in the biochemistry department. Bendall was appointed Demonstrator in Biochemistry 1960, Lecturer in 1965 and subsequently Reader.
- Bendall was Hill's Royal Society memorialist.



### Correspondence

- J.5 1953-1960. Includes correspondence *re* PhD research.
- J.6 1965-1977. Includes correspondence from F.L. Bendall.
- J.7 **Bennett-Clark, T.A.** 1972
- J.8, J.9 **Bertsch, W.F.** 1965, 1973-1978, 1984  
Bertsch was an American colleague who studied at Cambridge in the mid 1960s.
- J.8 1965. *Re* application to spend a year in the Cambridge biochemistry department.
- J.9 1973-1984.
- J.10 **Boardman, N.K.** 1974, 1975  
Chiefly *re* planned visit to Cambridge 1975.
- J.11, J.12 **Bonner, W.D.** various dates 1953-1983
- J.11 1953-1956, 1963. Includes letter to Hill from A.C. Hulme describing Bonner's ideas on phenol oxidase, 1956.
- J.12 1965, 1966, 1971-1976, 1983. Chiefly visits and personal news. Includes photograph of Hill with the Bonners during visit to the USA 1975.
- J.13 **Calvin, M.** 1954, 1955  
Chiefly *re* visit to Cambridge, October 1955.







### Correspondence

J.28-J.50

#### East Malling Research Station

1943-1977, nd

Hill first visited East Malling Research Station (EMRS), Maidstone, Kent in 1943 and corresponded about obtaining rootstocks, seeds etc for his research. On his appointment to the Scientific Staff of the Agricultural Research Council later that year Hill's relationship with the Research Station became more formalised. Hill and A.B. Beakbane of the EMRS carried out joint research on the histology and biochemistry of fruit tree rootstocks, assisted from 1946 by B.G.H. Mosse.

The correspondence is with staff of the Research Station, including the Director R.G. Hatton. In particular there is an extensive sequence of letters from Beakbane regarding progress of research and visits of Beakbane to Cambridge and Hill to East Malling. There are also some typescript and manuscript copies and drafts of Hill's outgoing correspondence.

J.28

1943. Includes Hill's letter to Hatton of 18 September giving 'a rough outline of my plant activities', and manuscript draft of letter to Hatton 23 October setting out the lines of his and Beakbane's proposed collaborative research.

J.29

1944 January - June.

J.30

1944 July - December.

J.31

1945 January - March.

J.32

1945 April - August. Includes letter from Hatton to Hill, 27 April *re* extension of scope of Hill and Beakbane's research.

J.33

1945 September - December. Includes data on 'Number of plum trees per 1,000 acres' for England and Wales.

J.34

1946 January - April. Includes material *re* possible botanical visit by Beakbane to Persia.

J.35

1946 May - September.



### Correspondence

- J.36                    1946 October - December. Includes letter from Hill to Hatton, 28 October outlining progress with the work, and 3pp typescript draft 'The application of biochemical methods to a horticultural problem'.
- J.37                    1947. Includes correspondence *re* paper by Hill and Beakbane submitted to the *Journal of Pomology and Horticultural Science* (*Bibliog.* no. 36, 1947), and a little correspondence relating to the arboricultural expedition to France of which Hill and Beakbane were both members, see H.11-H.18.
- J.38                    1948 January - May. Includes 'The root structure of some new clonal apple rootstocks budded with Cox's Orange Pippin' by Beakbane and E.C. Thompson, 7pp typescript + table, sent to Hill for comment.
- J.39                    1948 July - December.
- J.40                    1949 January - June.
- J.41                    1949 July - November.
- J.42                    1950. Includes 'The soluble carbohydrates of fruit plants' by A.E. Bradfield and A.E. Flood, 4pp typescript, sent to Hill for information.
- J.43                    1951.
- J.44                    1952 January - July.
- J.45                    1952 August - September.
- J.46                    1953. Chiefly *re* Mosse's application for research fellowship.

### Correspondence

- J.47 1954-1956. Includes request from Director, EMRS, to advise on preparation of a 'Memorandum on the problems of soft fruit growing' for the Agricultural Research Council, 22 December 1955.
- J.48 1960, 1964, 1969.
- J.49 1972, 1974, 1975. Correspondence 1974, 1975 *re* research on plum rootstock 'E340/4.6'.
- J.50 1976, 1977, nd.
- J.51, J.52 **Elsden, S.R.** various dates 1953-1985
- J.51 1953. Research on cytochromes of photosynthetic bacteria.
- J.52 1954, 1959, 1962, 1985, nd. Most letters are undated.
- J.53-J.56 **Emerson, R.** 1951-1976
- J.53 1951. Research on photosynthesis.
- J.54 1952-1953. Correspondence 1952 *re* Hill's visit to USA.
- J.55 1954-1959. Personal news, progress of research. Includes obituary of Emerson, 1959.
- J.56 1962, 1973, 1975, 1976. Correspondence from Emerson family.
- J.57 **Franck, J.** 1951, 1952, 1955  
Chiefly *re* research on photosynthesis.









**Correspondence**

- J.75-J.78                    **Kamen, M.D.**                    1952-1984
- J.75                    1952-1956. Chiefly correspondence 1954 *re* Kamen's work on photosynthesis.
- J.76                    1957. Draft of 'On the new heme protein of facultative photoheterotrophes' by Kamen and R.G. Bartsch, sent to Hill for comment 24 June.
- J.77                    1962-1966, 1971-1974. Chiefly personal news.
- J.78                    1975-1984.
- J.79, J.80                    **David Keilin Memorial Fund**                    1963-1964
- On Keilin's death a committee of Keilin's colleagues met, under the auspices of the Biochemical Society, to organise an appeal to raise funds for an biannual lecture and medal in memory of Keilin. Hill was a member of the committee.
- Correspondence and papers *re* progress of the appeal. 2 folders.
- J.81                    **Keilin, J.E.**                    various dates 1951-1987
- Joan Keilin, the daughter of D. Keilin, was a research student of Hill's in the Cambridge biochemistry department.
- Chiefly reports on progress of Keilin's research 1951-1955.
- J.82                    **Kirby, J. and Plesters, J.**                    1975, 1978
- Dye-stuffs.
- J.83                    **Knox, R.S.**                    1977, 1978, nd





**Correspondence**

- |             |   |                         |
|-------------|---|-------------------------|
| J.92, J.93  | <b>Mitchell, P.D.</b>   | 1960-1981               |
| J.92        | 1960, 1964  |                         |
| J.93        | 1967-1981. Progress of research.  |                         |
| J.94        | <b>Needham, J. and Needham, D.M.M.</b>  | various dates 1929-1972 |
|             | Chiefly postcards 1929-1934.  |                         |
| J.95        | <i>re</i> <b>Peters, R.A.</b>   | 1982                    |
|             | Hill's recollections of Peters for Royal Society memoir by R.H.S. Thompson.   |                         |
| J.96        | <b>Pirie, N.W.</b>  | 1986                    |
|             | Draft of 'Eclectic biochemistry', Pirie's 5pp typescript reminiscences of F.G. Hopkins and other members of the Cambridge Biochemistry Department in the 1920s. |                         |
| J.97, J.98  | <b>Prince, R.</b>   | various dates 1974-1987 |
| J.97        | 1974, 1978, 1980. Letter 1980 includes list of apple varieties in Adams County, Pennsylvania, and scientific data for Hill's comments.                          |                         |
| J.98        | 1981-1987, nd. Includes 'Quinones as prosthetic groups in membrane electron transfer proteins...' by Prince <i>et al</i> , sent to Hill for comment 1981.       |                         |
| J.99, J.100 | <b>Punnett, T.R.</b>  | various dates 1953-1988 |
|             | Punnett was a post-doctoral research student in the Cambridge biochemistry department working on chloroplasts under Hill, 1954-1956.                            |                         |
| J.99        | 1953-1955. Progress of research.  |                         |





### Correspondence

- |              |  |   |
|--------------|--|---|
| J.105, J.106 | <b>Stoner, E.C.</b>  | 1932-1974   |
|              | <p>Stoner was a contemporary of Hill's as a student at Emmanuel College Cambridge 1918-1921. After research in the Cavendish Laboratory 1921-1924 he was appointed lecturer in physics at Leeds University in 1924 subsequently being Professor of Theoretical Physics 1939-1951 and Cavendish Professor of Physics 1951-1963. He remained a close friend of Hill's and gave advice on thermodynamics problems. On Stoner's death in 1968 Hill remained in contact with his widow.</p> |   |
| J.105        |  | 1932-1946. Includes request for Hill's advice on organising the Leeds University Chemistry Department, 10 October 1943, and correspondence 1946 <i>re</i> application of physics to biology (electron distributions, thermodynamics), with Hill's manuscript notes found therewith. |
| J.106        |  | 1949-1974. Chiefly personal news. Includes posthumous correspondence with Stoner's widow.   |
| J.107        | <b>Tamiya, H.</b>  | 1951, 1952, 1960  |
| J.108        | <b>van Heyningen, R.</b>   | 1947, 1952, 1980  |
| J.109        | <b>Vishniac, W.</b>  | 1953, 1954  |
|              | Progress of research.  |   |
| J.110-J.115  | <b>Walker, D.A.</b>  | 1950s-1989, nd  |
|              | <p>Hill first met Walker when he was a research student in M. Thomas's laboratory at King's College, Newcastle. Hill and Walker became close friends and colleagues and collaborated on a number of papers.</p> <p>Many of Walker's letters are undated, the arrangement of material is therefore tentative. The correspondence includes progress of Walker's research (including data sent to Hill), career matters and personal news.</p>  |   |
| J.110        |  | 1950s, 1960s.   |

### Correspondence

- J.111 1970-1974.
- J.112 1975. Includes 'Stepwise generation of the natural oxidant in a reconstituted chloroplast system' by Walker, 12pp typescript, sent to Hill for comment and possible submission to US National Academy of Sciences for publication, 23 July.
- J.113 1976-1979, various dates 1970s.
- J.114 1980-1985.
- J.115 1986-1989, nd. Includes correspondence *re* honours accorded to Hill.
- J.116 **Whatley, F.R.** various dates 1948-1985  
Whatley was a postgraduate student in the Cambridge biochemistry department working under Hill. He subsequently became Sherardian Professor of Botany at Oxford.  
Includes Hill's manuscript redrafting of 'An oxidising system in green leaves' by Whatley, *ca.*1953.
- J.117, J.118 **Whittingham, C.P.** various dates 1953-1982
- J.117 1953-1954. Extensive correspondence *re* preparation of Hill and Whittingham's book *Photosynthesis*, *Bibliog.* no. 51 (1955).
- J.118 1963, 1974, 1979, 1982.
- J.119 **Winter, L.B.** 1980, 1981  
Winter was a student in the Cambridge biochemistry department in the early 1920s.  
*Re* book of recollections of Cambridge by Winter. Hill wrote a foreword for Winter's book which remained unpublished on the author's death.



**Correspondence**

J.120                      **Wittenberg, J.**                      1973, 1975, nd.

**SHORTER SCIENTIFIC CORRESPONDENCE**

J.121	1924-1928	J.139	1970
J.122	1930-1937	J.140	1971
J.123	1938-1942	J.141	1972
J.124	1943, 1946-1949	J.142	1973
J.125	1950	J.143	1974
J.126	1951	J.144	1975
J.127	1952	J.145	1975, 1976
J.128	1953 January-March	J.146	1976
J.129	1953 April-December	J.147	1977
J.130	1954	J.148	1978
J.131	1955, 1956	J.149	1979
J.132	1957-1959	J.150	1980, 1981
J.133	1960, 1961	J.151	1982
J.134	1962-1964	J.152	1983
J.135	1965	J.153	1984
J.136	1966	J.154	1985, 1986
J.137	1967, 1968	J.155	1987-1989
J.138	1969	J.156	Nd

INDEX OF CORRESPONDENTS

ABBOTT, Frederick F.	C.43
ACCADEMIA NAZIONALE DEI LINCEI	A.24
ACLAND, J. S.	J.156
ADAM, Neil Kensington	E.33, J.122, J.134
ADRIAN, Edgar Douglas, 1st Baron	A.16
AGRICULTURAL RESEARCH COUNCIL	A.14, A.20, A.22, B.99, B.275, D.22-D.27, E.11, H.12, H.17, H.24, H.30, J.32, J.37, J.39
AKABORI, Shiro	J.107
<i>AMATEUR PHOTOGRAPHER</i>	C.43
AMBLER, Richard Penry	J.156
AMERICAN SOCIETY OF BIOLOGICAL CHEMISTS	A.21
AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS	A.21, A.24
AMOROSO, Emmanuel Ciprian	G.21
ANDERSON, Joan Mary (Jan)	A.90, H.69, J.1, J.147
ANDERSON, Margaret C.	A.90, J.2
ANDERSON, Roy Malcolm	G.21
<i>ANNUAL REVIEW OF PLANT PHYSIOLOGY</i>	E.63, E.117
ANSELL, Gordon Brian	A.9, J.148
APPLEBY, Cyril Angus	A.25, A.90, J.3
APPLEMAN, David	J.131
APPLEYARD, Sir Raymond Kenelm	J.140
ARCHER, Mary D.	B.132
<i>ARCHIVES OF BIOCHEMISTRY AND BIOPHYSICS</i>	E.113
ARCOS LIMITED	C.39
ARNON, Daniel Israel	B.221, H.45, J.4
ARONOFF, Sam	J.101
ASHBY, Eric, Baron	B.195
ASSOCIATION INTERNATIONALE DE PHOTOBIOLOGIE	See COMITÉ INTERNATIONAL DE PHOTOBIOLOGIE
ASSOCIATION OF APPLIED BIOLOGISTS	B.221
ASSOCIATION OF SCIENTIFIC WORKERS	G.1
AVRON, M.	H.50



Index of correspondents

BACCARI, Vincenzo	E.70
BACHARACH, Alfred Louis	A.16
BALDWIN, Brian Conrad	J.133
BARBER, James	J.156
BARCROFT, Sir Joseph	A.16, A.49
BARKER, John	J.137, J.139
BARON, William Michael Muir	J.146
BARRETT, Jack	J.148
BASSHAM, James Alan	J.111
BATE-SMITH, Edgar Charles	J.131
BATES, Leslie Fleetwood	J.138
BAUSCH & LOMB OPTICAL COMPANY	B.270, B.271
BAWDEN, Sir Frederick Charles	A.20
BAWDEN, Marjorie E., Lady	J.143
BEAKBANE, Agnes Beryl	B.242, F.46, H.12, H.18, J.18-J.50, J.143 See also A.54
BECK, Horace C.	C.39
R. & J. BECK LIMITED	C.31-C.37
BEDALES SCHOOL	A.56
BEDFORD, Geoffrey R.	B.87, E.46-E.48, E.62
BEECHY, R. Brian	J.136
BENDALL, Derek Stanley	H.28-H.32, J.5, J.6 See also D.15
BENDALL (née MYERS), Fay L.	E.25, J.6 See also D.25
BENNETT-CLARK, Thomas Archibald	J.7, J.137, J.139
BENVENUTI, Feliciano	H.93
BERNAL, Eileen	J.141
BERNHEIM, Frederick	J.144
BERTSCH, Walter Frank	J.8, J.9 See also D.14
BILHAM, E. S.	C.38, C.39
<i>BIOCHEMICAL JOURNAL</i>	E.7
BIOCHEMICAL SOCIETY	A.9, A.17, A.20
BLACK, Clanton	A.51-A.54, H.56, J.144, J.147
BLASCHKO, Hermann Karl Felix (Hugh)	A.20, B.215, E.6

Index of correspondents

BLINKS, Anne	J.129
BLINKS, Lawrence Rogers	J.131
BOARDMAN, Norman Keith	H.69, J.10
BOGORAD, Lawrence	H.50, H.51
BOIS, E.	J.121
BONNER, David M.	J.134
BONNER, Walter Daniel, Jr	B.87, B.169, B.283, E.26, E.58, J.11, J.12
BOWEN, Edmund John	A.20, A.50, B.121, B.272, E.33, J.130, J.134
BOYLAND, Eric	J.124
BRADBEER, Joseph William	J.136, J.137, J.147, J.148
BRADFIELD, A. E.	J.41, J.42
BRADFORD, Henry Francis (Harry)	A.9
BRAGG, Sir (William) Lawrence	B.106
BRAUDE, Ernest Alexander	J.125
BRAUNHOLTZ, J. T.	J.134, J.150
BRIGGS, George Edward	A.16, A.20, J.13
BRIGGS, L. H.	J.124
BRITISH COUNCIL	H.71
BRITISH MOVIE TONEWS LIMITED	C.43
BRITISH PHOTOBIOLOGY GROUP (later SOCIETY)	G.2-G.9
BRITISH THOMSON-HOUSTON COMPANY LIMITED	B.219
BROOKS, Frederick Tom	J.29
BROWN, Allan H.	J.129, J.131
BUCHANAN, Bob Branch	E.109, J.134, J.136, J.154
BUILDING INDUSTRIES SERVICES LIMITED	C.43
BURRIS, Robert Harza	J.131
BUTLER, John Alfred Valentine	G.2, G.3, G.6
BUTLER, Warren Lee	J.144
BUTT, Vernon Spencer	J.134
CADMAN, Colin Houghton	J.130
CALDERBANK, Alan	J.133
CALVIN, Melvin	J.13
CAMBRIDGE MORRIS MEN	D.37



Index of correspondents

CAMBRIDGE NATURAL HISTORY SOCIETY	D.36
CAMBRIDGE UNION SOCIETY	D.38
CAMBRIDGE UNIVERSITY NATURAL SCIENCE CLUB	A.16, D.34, D.35
CAMBRIDGE UNIVERSITY PRESS	E.42, F.45
CAMERON, Sir Gordon Roy	A.20, J.123
CASTENHOLTZ, Richard	J.143, J.144
CAVE, Charles John Philip	C.38, C.39
CHALMERS, Ruth V.	J.54, J.130
CHANCE BROTHERS & COMPANY LIMITED	C.42
CHANCE, Britton	A.20, A.24, J.11, J.14, J.148
CHARLES, Arwyn	J.128
CHEESBROUGH, John K.	J.153
CHEESMAN, Ernest Entwistle	J.40
CHIBNALL, Albert Charles	A.29, A.31, A.50, A.51, B.220, D.22 See also A.53
CHILD, Reginald	H.29
CIBA FOUNDATION	H.37
CLAPHAM, Arthur Roy	J.137
CLARKE, G. A.	C.38
CLENDENNING, K. A.	J.124, J.130
CLIFT, L. F.	J.42-J.44, J.46
CLOW, Archibald	J.128
COLLINSON, Edward H.	C.39
COMITÉ (later ASSOCIATION) INTERNATIONAL DE PHOTOBIOLOGIE	A.23, G.10-G.12
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION (CSIRO)	H.69
CONTEMPORARY SCIENTIFIC ARCHIVES CENTRE	A.10
COOK, Arthur Herbert	E.55
COOK, Robert	J.125
COOMBE, David Edwin	A.90, C.45, J.137, J.147, J.150
GEORGE COOPER & SON LIMITED	B.217
CORNER, Edred John Henry	A.90, J.15-J.21
COX, Raymond Pickett	J.22
COXETER, Harold Scott Macdonald	J.127
CRAMMER, John L.	A.16

Index of correspondents

CRANE, Morley Benjamin	A.49
CROFTS, Antony Richard	H.65, J.23, J.63
CUTTING, C. Vernon	H.28, H.30
<i>DAILY EXPRESS</i>	C.43
DALESSANDRO, Giuseppe	J.144
DAUBEN, William Garfield	B.221
DAVENPORT, H. E.	A.25, E.23, J.24
DAWSON, Rex Malcolm Chaplin	J.95
D'COSTA, Mario A.	J.139
DELCAMBRE, E.	C.38
DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH (DSIR)	H.20
DE RAMSEY, Ailwyn Edward Fellowes, 3rd Baron	J.146, J.147
DEVANATHAN, M. A. V.	H.71, J.25
DICKENS, Frank	A.20
<i>DICTIONARY OF NATIONAL BIOGRAPHY</i>	E.78
DRUMMOND, Sir Jack (Cecil)	J.126
DUNN, Colin	J.153
DURHAM UNIVERSITY	G.22
DUYSENS, Louis N. M.	A.20, J.26, J.27
EARL, John W.	J.142
EAST MALLING RESEARCH STATION	J.28-J.50
EDSALL, John Tileston	A.10
EGGLESTON, Leonard Victor	J.124
ELEY, Daniel Douglas	B.221
ELLIOTT, Kenneth Allan Caldwell	B.195, J.150
ELLIS, Reginald John	B.184, J.140
ELSDEN, Sidney Reuben	A.20, J.51, J.52
EMERSON, Robert	J.53-J.56
EMERSON, Stephen E.	J.127
EVANS, Harold J.	J.152, J.153
EVANS, Hilary	J.146
EVANS, Lloyd Thomas	A.25, G.21, H.69, J.143



Index of correspondents

EVANS, William Charles	J.147
FAGER, E. W.	J.128, J.129, J.130
FALK, John E.	J.132
FARADAY SOCIETY	H.35
FELLGETT, Peter Berners	J.154, J.155
FESTER, Gustavo A.	J.124
FICHERA, Pietro	J.139
FINCHAM, John Robert Stanley	J.155
ALEXANDER FINLAY LIMITED	J.121
FISHER, Sir Ronald (Aylmer)	B.221
FLORKIN, Marcel	J.132
FOGG, Gordon Elliott ('Tony')	A.31, G.20
FORSHAW, J. E.	J.48
FORTI, Giorgio	E.54, J.143
FOX, Harold Munro	B.49, J.124
FOYER, Christine H.	J.152
FRANCK, James	J.57
FRENCH, Charles Stacy	E.10, H.51, J.58-J.60, J.143
FRENKEL, Albert W.	J.132, J.138
FRIEDMAN, John B.	J.155
FRIEDMANN, Ernst	J.126
FRIEND, John	A.20, J.134
FRYER, Sir John Claude Fortescue	H.17
FULLERS' EARTH UNION LIMITED	J.122
GAFFRON, Hans	H.91, J.61
GAO Guo-qing	A.10
GARNER, Robert J.	J.40, J.43
GEIGY COMPANY LIMITED	J.133
GENTILE, Benedetto	E.70
GEST, Howard	J.136, J.148, J.155
GIBBS, David	J.146
GIBBS, Martin	A.54, J.132, J.138, J.149, J.156
GODDARD, David Rockwell	J.127

Index of correspondents

GODWIN, Sir Harry	A.16, A.20
GOEDHEER, J. C.	J.134
GOOD, Norman Everett	B.133, H.51, J.62-J.65
GOODING, E. Graham Beaujon	J.126
GOODWAY, Keith M.	J.156
GOODWIN, Jill	A.90, J.144, J.151
GOODWIN, Trevor Walworth	J.111, J.152
GOVINDJEE	H.73, J.66, J.147
GOWING, Margaret Mary	A.10
GREEN, David Ezra	J.131
GREENHAM, David W. P.	B.220, J.154
GREENWOOD, A. Denis	B.327, J.137, J.156
GREGORY, Richard Paul FitzGerald	J.67
GREVILLE, Guy Drummond	J.134
GRIFFITH, John	J.130
GRIMME, L. H.	A.85
HACKMANN, J. Th.	J.133
HALDANE, John Burdon Sanderson	A.20
HALL, David Oakley	H.79, J.68
HANES, Charles Samuel	B.219, D.24, J.69, J.137
HARINGTON, Sir Charles (Robert)	G.20, G.23
HARLEY, John Laker	G.20
HARRIS, Ronald Victor	J.136
HARRISON, Douglas Creese	A.16
HARTREE, E. F.	J.79, J.80
HASSID, William Zev	J.134
HATTON, Sir Ronald (George)	A.16, G.20, H.12, J.28, J.29, J.32, J.36, J.37, J.39, J.40 See also A.51
HEATH, Archie Edward	B.6
HEATH, James E.	J.149
HEBER, Ulrich	A.32, H.87, J.70, J.71, J.113
HELDT, Hans W.	A.32
HERRERO, Joaquin	J.125, J.126
HEWITT, Eric John	J.125, J.141



Index of correspondents

HILL (née WORTHINGTON), Amy Priscilla	H.27
HILL (née JACKSON), Clara Maud	A.45, H.4-H.6
HILL, David J.	A.46
HILL, Joseph Alfred	A.45, H.4-H.6
HILL, Katharine S.	A.47, H.4-H.6
HILL, Susan	A.45, B.176
HIND, Geoffrey	H.51, J.62, J.72, J.147
HIND, H. E.	J.123
HINKLE, Peter	J.63
HOCH, George	J.147
HODGKIN, Dorothy Mary Crowfoot	B.229
HOFFMANN, Brian	J.146
HOFFMANN, N.	J.135
HOLDEN, H. Frank	J.73
HOLMES, Barbara E.	D.16A
HOLT, Stanley J.	J.127, J.130, J.156
HOLTON, Francis A.	J.132
HOLTTUM, Richard Eric	A.79, B.47, J.141
HOPKINS, Sir Frederick Gowland	J.121
HULME, A. C. ('Freddie')	J.11, J.40, J.131
HUXLEY, Sir Andrew (Fielding)	A.20
IBRAHIM, S.	J.127
INDIAN TEA ASSOCIATION (LONDON)	H.24, H.28, H.30
INGALLS, Elizabeth N.	B.221
INMAN, O. L.	J.123
INSTITUTE OF BIOLOGY	G.15
INTERNATIONAL MINERALS & CHEMICAL CORPORATION	H.46
INTERSCIENCE PUBLISHERS INC.	E.8
JACKSON, J. B.	H.75, J.144, J.146
JAGENDORF, André Tridon	J.74
JAMES, William Owen	B.219, J.128, J.130
JEFFREYS, Bertha, Lady	A.51, J.147
JEWITT, Mary	A.16

Index of correspondents

JOHNSON, E. Paul	J.130
JONES, Arthur W.	B.270
JONES, Reginald Victor	J.142
<i>JOURNAL OF POMOLOGY AND HORTICULTURAL SCIENCE</i>	J.37
JUVET, J.	C.33
KAGEN, Lawrence J.	J.142, J.147
KAMEN, Martin David	A.31, J.75-J.78, J.144, J.148
KAPLAN, Nathan Oram	H.82, J.147
KATOH, Sakae	J.133
KE, Bacon	J.130
KEILIN, David	J.121 See also J.79-J.80
KEILIN, Joan E.	A.90, D.14, J.81
KENDREW, Sir John (Cowdery)	J.124
KENNEDY, Gilbert Young	J.125
KERR, Michael W.	J.135
CHARLES F. KETTERING FOUNDATION	B.270, B.271, D.28, H.20
KETTLEWELL, R. W.	H.28-H.32
KEYS, Alfred John	J.118
KIDD, Franklin	A.16
KINDERSLEY, David	B.234
KING, Tsoo E.	H.56, J.132, J.136, J.138, J.149, J.153
KIRBY, Jo	J.82
KLEIN, Roger Anthony	B.148
KLEINZELLER, Arnost	A.54, J.149
KLUYVER, A. J.	J.125
KNOX, Robert S.	B.288, J.83
KORNBERG, Sir Hans (Leo)	A.24, A.29, J.111, J.151
KRASNOVSKY, Alexander Abramovich	A.90
KREBS, Sir Hans (Adolf)	A.50, B.221, J.126
KROGMANN, David	A.84
KUMAR, Ashwani	J.142
KVET, Jan	J.135



Index of correspondents

LANDSBERG, Peter Theodore	A.90, B.273, H.93, J.84
LANG, Anton	A.24, J.64
LARGE, E. C.	J.132
LARKUM, A. W.	J.153
LATIES, George G.	J.152
LEACH, Bernard (Howell)	J.85
LEAF, Charles S.	C.38, C.39
LEAVER, Christopher John	B.184
E. LEITZ (LONDON)	C.42
LEMBERG, (Max) Rudolf	J.127 See also J.148
LESK, Arthur M.	B.135, E.87, J.86, J.87, J.148, J.150
LEVY, G. A.	J.127, J.129
LEWIN, Ralph A.	J.123
LIÉBECQ, Claude	J.130
LIEBERMAN, Morris	J.141
LINNEAN SOCIETY	H.23
LINSENMAIR, K. E.	H.87
LINSCHITZ,	J.130
LINSTEAD, Sir (Reginald) Patrick	J.125
LIPMANN, Fritz Albert	J.129
LIPSET, David	J.146
LIVINGSTON, Robert	J.129
LOEWUS, Frank	E.117, H.44, H.92
LONDON UNIVERSITY	G.23
LONGUET-HIGGINS, Hugh Christopher	A.50
LOOMIS, W. David	J.150
LOSADA, Manuel	J.88
LUCK, J. Murray	J.89
LUIS RODÉS, S. J.	C.38
LUMRY, Rufus W.	J.90, J.152
LUNDEGÅRDH, Henrik	J.130
LYTHGOE, Basil	A.50

Index of correspondents

McCARTHY, E. F.	B.49
McCLENDON, John H.	J.130
McELROY, William David	H.36
McLACHLAN, Rev. H. John	J.140, J.141
MACHLIS, Leonard	J.136
MADDOX, John Royden	E.97, E.105
MAGGS, Donald Hugh	J.47
MANN, Thaddeus Robert Rudolph	J.81
MAPSON, Leslie William	J.91, J.137 See also E.60, E.78
MARCHLEWSKI, L.	J.121
MARGOLIASH, Emanuel	H.78
MARSH, Ralph Warren	B.221, J.124
MASEFIELD, Geoffrey B.	J.50
MASKELL, Ernest John	A.16, E.15, J.124
MASON, Howard S.	H.89
MATILE-FERRERO, Danielle	J.22
MAUZERALL, David	J.143
MAYER, A. M.	J.91
MEDICAL RESEARCH COUNCIL	D.18
MEHLER, Alan H.	J.132, J.149
MERNE, John G.	B.212
MERRILL, E. D.	J.17
METHUEN & COMPANY LIMITED	E.15
METZNER, Helmut	E.117, H.79, J.139, J.144
MILBURN, T. Robert	H.58
MILK MARKETING BOARD	A.55
MILLER, Elmer S.	J.123
MINISTRY OF SUPPLY	E.7
MITCHELL, H. H.	B.226
MITCHELL, Joseph Stanley	G.2
MITCHELL, Peter Dennis	H.50, J.92, J.93, J.150
MITCHISON, Graeme	J.149
MIYACHI, Shigetoh	A.54, E.75, J.146



Index of correspondents

MOMMAERTS, Wilfried F. H. M.	J.148
'MONDIALE'	C.40
MONTEITH, John Lennox	J.25
MORTON, Richard Alan	G.3
MORUZZI, Giuseppe	E.41
MOSSE, Barbara Gertrud Hedwig	J.31, J.33, J.35, J.40, J.41, J.46
MOTT, Sir Nevill (Francis)	B.272, B.285, E.33, J.27, J.156
MOULE, Charlie	J.147
MOYSE, A.	H.91
MÜHLETHALER, K.	J.136
MUÑOZ, Cruz Rodríguez	J.125
MURTHY, C.S.H.N.	J.152
MYERS, Jack Edgar	J.56, J.134, J.144, J.147
NAKATANI, Herb	A.25, J.149
NATIONAL ACADEMY OF SCIENCES	A.10, A.24, B.185, B.188, D.28
<i>NATURE</i>	E.11, E.97, E.114, E.115, J.107
NEALES, Tom Finnis	J.127, J.131
NEEDHAM, Dorothy Mary Moyle	H.69, J.94
NEEDHAM, Joseph	B.106, F.45, J.94, J.152
NEILSON, Alasdair Hewitt	B.283, E.47, E.48, J.138, J.139
NEVILLE-JONES, David	J.128
NEWMAN, Margaret	A.88
NEWMAN, Maxwell Herman Alexander	A.16
NEWTON, Bruce Anthony	A.10
NICHOLAS, David James Donald	A.20
NICHOLLS, Peter	A.90, H.89, J.138, J.139
NISHIMURA, Mitsuo	A.54, J.134, J.149, J.152
NORDAL, Arnold	J.124
NORRISH, Ronald George Wreyford	A.20, G.2
NYASALAND TEA ASSOCIATION LIMITED	H.31, H.32
OCHOA, Severo	E.14, J.61
OMER-COPER, Joseph	J.121, J.134, J.140
OSBORNE, Daphne Joan	J.156

Index of correspondents

OSTER, Gerald	J.132
OXFORD, A. E.	J.123
PANTIN, Carl Frederick Abel	A.16
PARKER, C. A.	J.133
PATON, James	C.44
PATON HAWKSLEY	B.271
PEACOCKE, Rev. Arthur Robert	J.147, J.148
PEARCE, Stanley Clifford	J.31
PERHAM, Richard Nelson	D.7
PETERS, Gerald A.	J.153
PETERS, Sir Rudolph (Albert)	A.16, A.24, E.15, J.95
<i>PHOTOSYNTHESIS RESEARCH</i>	E.116
<i>PHYTOCHEMISTRY</i>	E.116, J.150
PIRENNE, Maurice Henri Leonard	G.3, J.131
PIRIE, Norman Wingate	A.90, G.20, J.96
PLESTERS, Joyce	J.82
PORTER, George, Baron	B.299, E.97, G.21, J.66, J.111, J.131, J.150
PORTER, Helen Kemp	A.20, G.20, J.125, J.129
POWELL, Oliver	J.146, J.147
PRICE, Peter J.	J.14
PRIESTLEY, Mary	J.154
PRINCE, Roger C.	J.97, J.98, J.148
PRINSLEY, Roslyn	J.153
PRYCE, John M.	E.47
PUNNETT, Thomas R.	J.99, J.100
QUASTEL, Juda Hirsch	A.20
RABINOWITCH, E. I.	J.122
RACKER, Efraim	H.50
RANDALL, Sir John (Turton)	J.123
RANK PRECISION INDUSTRIES LIMITED	C.44
RANSON, S.L.	A.20



Index of correspondents

RAPKINE, Louis	J.124
REID, Robert D.	J.130
RICH, Peter R.	A.90, B.296, E.101, E.109
RICHERS, Richard	B.226
RICHTER, Derek	A.25, A.90, J.123, J.126, J.147
RIMINGTON, Claude	A.16, A.20, A.90, J.101
ROACH, William A.	A.20, B.226, J.29, J.30, J.37, J.42, J.47, J.125
ROBERTS, E. A. H.	H.24, H.28, H.30
ROBERTSON, Noel Farnie	J.134, J.135
ROBERTSON, Robert Hugh Stannus	J.122
ROBERTSON, Sir Rutherford (Ness)	A.24, A.31, G.20, H.69, J.155
ROE, Edna Margaret Frances	A.23, A.51, G.3-G.7, J.137
ROGERS, William Percy	J.134
ROGERS, William Stephen	J.29, J.43
ROOK, Sir Alan	A.50
ROSENBERG, Marie	J.122
ROTHSCHILD, Nathaniel Mayer Victor, Baron	J.125, J.133
ROYAL COMMISSION FOR THE EXHIBITION OF 1851	D.19
ROYAL METEOROLOGICAL SOCIETY	C.39
ROYAL SOCIETY	A.10, A.15, A.20, A.31, B.106, B.130, B.218, E.33, E.55, E.60, G.18-G.21, H.69, H.73, J.46, J.110, J.111, J.149
RUSSELL, E.	J.132
SALISBURY, Frank B.	J.155
SALT, George	A.24
SAN PIETRO, Anthony	H.51, H.64, H.73, J.102, J.148
SATO, Ryo	J.129
SCARISBRICK, R.	A.16, A.25, J.131
SCHAPIRA, G.	J.124
SCHMITZ, Brigitte	B.148
SCHOUTE, C.	C.41
SCIENCE RESEARCH COUNCIL	J.138, J.141
SCOTNEY, Tom M.	B.217, B.218

Index of correspondents

SCOTT-MONCRIEFF, Rose (Mrs O. M. Meares)	J.103A
SEARLE, G. F. W.	J.138
SETLÍK, Ivan	J.135, J.139
SHAW, H.	B.221
SHAW, Sir (William) Napier	C.38
SHELDRAKE, A. Rupert	J.103
SHEPPARD, Norman	B.121, E.29, E.33, J.133
SHI Ding Ji	J.153
SHIBATA, Kazuo	E.75, J.3, J.140, J.146, J.149, J.151, J.156 See also A.53
SIEGENTHALER, P. A.	E.55
SIMPSON, George Clarke	C.38, C.41
SIRONVAL, C.	H.53
SIVAK, Mirta Moemi	J.150, J.151
SLATER, Edward Charles ('Bill')	A.20, A.31, G.21, J.132, J.137
SLATER, Sir William (Kershaw)	H.30
SMILLIE, Robert M.	H.69
SMITH, Dorothy R.	C.38
SMITH, James H. C.	E.10, J.104, J.128
SNELLING, Margaret	D.24
SOCIETY FOR THE PROTECTION OF SCIENCE AND LEARNING	A.56
SOFROVÁ, Dana	A.90
SOLOMON, Maurice E.	B.226, J.124
SPRINGER-VERLAG	E.53
STANHILL, Gerald	J.146
STEPHENSON, Marjory	A.13
STERN, Kurt G.	B.221, B.226, J.125
STILES, Walter Stanley	E.15, J.132
STODDART, R. W.	A.90
STONER, Edmund Clifton	A.16, B.229, J.105, J.106
STONER (née CRAWFORD), Jean Heather	J.106
STREET, Herbert Edward	J.137
STURGESS, Violet	B.218
SYNGE, Richard Laurence Millington	A.90



Index of correspondents

TAINSH, A. Ramsay	J.151
TAKAMIYA, Atsui	J.140, J.144
TAMIYA, Hiroshi	E.115, J.107 See also A.54
TAYLOR, Joyce	J.156
THOMAS, J. B.	J.129, J.130
THOMAS, Meirion	G.20, G.22, J.142, J.143
THOMPSON, Keith	H.58
THOMPSON, Robert Henry Stewart	J.151
THOMPSON, Sally	J.42, J.44
THORPE, William Homan	A.20
THRUSH, Brian Arthur	J.151
TOBIAS, Cornelius A.	H.76, J.143
TODD, Alexander Robertus, Baron	B.106
TRACEY, Michael V.	E.22, E.117, J.130
TREBST, Achim	J.143, J.144
TREYVE, Léon	B.218
TRIM, Arthur Reginald Henry	A.90, B.215, J.140, J.142, J.146, J.153, J.155 See also D.14
TUBBS, Francis Ralph	J.45-J.47
TUNG, T. P.	J.124
URI, Norbert	G.2, J.129, J.130
UYEMURA, Rokuro	J.122
van HEYNINGEN, Ruth	A.25, A.54, A.90, J.108
van NIEL, Cornelius Bernardus ('Kees')	J.129, J.131
VENNESLAND, Birgit	H.44
VERNON, Leo P.	H.50, J.140
VESTLING, Carl S.	J.131
VIDAL, Ramón Dios	J.125
VISHNIAC, Wolf	J.109
VLITOS, August John	H.48
VOLCANI, E. Ben	J.143, J.144

Index of correspondents

WADDINGTON, Conrad Hal	A.49
WADE, H. E.	J.124
WAGER, Lawrence Rickard	A.48, H.6
WAIN, Ralph Louis	A.20
WAINWRIGHT, Stanley D.	J.126
WALKER, David Alan	A.29, A.32, A.90, B.272, H.87, J.66, J.110-J.115
WALLACE, T.	J.33
WASSINK, E. C.	J.140
WATSON, Rodger	J.122
WEAVER, Ellen P.	J.134
WEBBER, Bryan Ronald	B.136, B.155, J.144, J.147, J.155
WEBER, Gregorio	B.123, E.30, E.33, J.131
WEBSTER, Brian R.	E.47, E.48
WESTWOOD, Brian	B.293
WHATLEY, Frederick Robert	J.50, J.116 See also D.14
WHIPPLE MUSEUM OF THE HISTORY OF SCIENCE	C.45
WHITEHOUSE, Harold Leslie Keer	B.283
WHITTINGHAM, Charles P.	E.15, H.38, J.117, J.118
WHYLE, Lance C.	J.156
WICKSTEED VILLAGE TRUST	B.218
WILLIAMS, John E. M.	J.143
WILLIAMS, R. D.	B.218
WINTER, Lewis B.	J.119
WINTERMANS, J. F. G. M.	J.140
WITTENBERG, Jonathan	J.120
WOLFE, Harold E.	J.48
WOLSTENHOLME, Sir Gordon (Ethelbert Ward)	H.92
WOLVEKAMP, Hendrik Pieter	A.50, J.122, J.124, J.131, J.137, J.142, J.144
E. J. WOODMAN & SONS	B.233
WORTHINGTON, Edgar Barton	A.16, A.90, H.58, J.16
WRAY (OPTICAL WORKS) LIMITED	J.131
WYLES, H. J.	J.124
WYNNE, Charles Gorrie	C.44



**Index of correspondents**

YEO, Peter Frederick

J.138

YOUNG, Sir Frank (George)

D.1-D.3, D.6, D.8, D.9, H.28,  
H.30-H.32, J.13, J.99, J.133, J.137,  
J.140

ZENK, Meinhart

J.136, J.137, J.141, J.153

ZUCKERMAN, Solly, Baron

G.13