

CONTEMPORARY SCIENTIFIC ARCHIVES CENTRE

under the guidance of the Royal Society's
British National Committee for the History of Science, Medicine and Technology

Catalogue of the papers and correspondence of

EGON BRETSCHER CBE

(1901 - 1973)

Compiled by Jeannine Alton and Peter Harper

Deposited in Churchill College Archives Centre, Cambridge

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INTRODUCTION

PROVENANCE

The material derives from two sources. The major part was received from Mrs. Bretscher at various dates 1984-86. Some of the papers relating to research, committees, lectures and publications during Bretscher's period at the Atomic Energy Research Establishment, Harwell, and not required by the Public Record Office, were received from Harwell in 1984 and are included in Section F of the present catalogue.

OUTLINE OF THE CAREER OF EGON BRETSCHER

Bretscher was born in Zürich and educated at Eidgenössische Technische Hochschule (ETH) for which he retained a lasting affection. He obtained his diploma in chemical engineering at E.T.H. and spent 1925-27 in Edinburgh working for his doctorate in the department of chemistry (Sir James Walker). After a further period at E.T.H. he was awarded a Rockefeller Fellowship, held at the Cavendish Laboratory 1934-35; Rutherford invited him to return to Cambridge in 1936 and he remained there as Clerk Maxwell Scholar (1936-39) and Lecturer (1939-44). His work on nuclear physics led to his involvement in the British atomic bomb research project "Tube Alloys" and his membership of the British Mission to the Manhattan District Scientific Laboratory at Los Alamos from early 1944 where he worked in Fermi's Advanced Development Division. After the war, he returned to Britain and joined the newly-established A.E.R.E. at Harwell, first as head of the Chemistry Division, then from 1948 as head of the Nuclear Physics Division. He was awarded the C.B.E. in 1966, the year of his retirement from Harwell.

DESCRIPTION OF THE COLLECTION

The collection, though not exhaustive, includes some useful material on Bretscher's career and some of the momentous events in which he participated. Of interest in Section A (Biographical and Personal) are A.5 Bretscher's own 'Survey of activities during the war and with the A.E.R.E.', compiled in 1964 and A.6, a

lecture given at Harwell in 1967 on 'Wartime nuclear physics and chemical research at the Cavendish Laboratory 1940-44 associated with atomic weapons'.

Section C (Cambridge) contains a little material on the early stages of Bretscher's atomic research (C.2-C.4) and his collaboration with D.E. Lea (C.5); the notes of a 'Private Colloquium with Fermi' (C.6) are of interest but probably belong to a later period.

Section D documents in considerable detail the work undertaken at the Cavendish Laboratory for the "Tube Alloys" project and includes contemporary research notes and reports by members of the team, reports prepared for the Maud Committee and the Department of Scientific and Industrial Research, and later work relating to post-war publication of the wartime research. Bretscher's regular exchanges of correspondence with Chadwick are also included here.

Section E (Los Alamos) includes some research reports and Bretscher's account of his activities (E.10) as well as various contemporary bulletins and newsletters.

Section F (A.E.R.E. Harwell) is the fullest in the collection and is of interest in documenting Bretscher's involvement in national and international nuclear data committees, and his interest in maintaining collaboration with universities and research institutions.

There is a short Section G (Visits) which includes several visits to Russia and related background reports; the surviving correspondence is to be found in Section H.

SECTION A BIOGRAPHICAL AND PERSONAL A.1-A.62

A.1 -A.6	Biographical and autobiographical
A.7 -A.27	Diaries
A.28-A.61	Career
A.62	Photographs

BIOGRAPHICAL AND AUTOBIOGRAPHICAL

- A.1 Obituary notice, Nature, 244, 3 August 1973 (by M.M. Gowing).
Photocopy.
- A.2 Miscellaneous cvs and autobiographical summaries for various
reference books.
- A.3 Bibliographies prepared 1954, 1964 for Poggendorff-Redaktion,
listing publications by name of journal.
- A.4 Bibliographies 1960, 1964.
- A.5 'Survey of activities during the war and with the A.E.R.E.'
8pp. typescript account prepared by Bretscher (for A.E.R.E.),
October 1964. Miscellaneous typescript and ms. drafts with
variations from final version.
- A.6 Miscellaneous brief notes by Bretscher: on his retirement from Harwell
and return to Cambridge; crucial dates in development of atomic
bomb 1939-41; note on A.E.R.E.; personal data.
- 'Wartime Nuclear Physics and Chemical Research at the Cavendish
Laboratory Cambridge (1940-44) associated with atomic weapons.'
10pp. typescript and ms. draft for slide lecture given at Harwell
January 1967: Bretscher's account of events and personnel up to
his departure for America, including the origin of the name 'Plutonium'
for element 94.

Biographical and autobiographical

DIARIES

- A.7 Small black hardback notebook, paginated 1-141, used as diary. Entries run 10 November 1918-4 April 1919. In German.
- A.8 Black hardback notebook used as diary. Entries run 10 July-29 December 1944, 16 November-27 December 1946. Few pages used.
- A.9 Small spiralback notebook; miscellaneous notes on travel, expenses, addresses, career plans, some scientific notes. 1p. dated 1946.
- A.10 1948 HMSO diary. Begins 'Today I am taking over Nuclear Physics Division'. Not all pages used.
- A.11 Black looseleaf notebook of 'Lefax' pages, various dates 1954-63 and many undated.
Very mixed content, some personal entries but mainly scientific; includes notes on experiments and data on nuclear power, notes for meetings, lectures, committees; travel expenses for self and colleagues, salary scales, etc.
- A.12 1959 pocket diary. Few pages used.
- A.13 1966 HMSO diary.
- A.14-A.27 Tagged sequences of 'Lefax' diary pages
- | | | | |
|------|---------|------|--|
| A.14 | 1953 | A.21 | 1963 |
| A.15 | 1954 | A.22 | 1964 |
| A.16 | 1955 | A.23 | 1965 |
| A.17 | 1957 | A.24 | 1966 |
| A.18 | 1958 | A.25 | 1967 |
| A.19 | 1959 | A.26 | 1972 |
| A.20 | 1959-60 | A.27 | Miscellaneous loose pages, and 11pp. sequence perhaps of notes at conference, n.d. |

The content is similar to A.11 and includes much information on research, meetings, lectures given and attended, conferences and travel by Bretscher and colleagues at Harwell. See also F.6.

Biographical and autobiographical

CAREER

- A.28 School and university.
- Entlassungs und Maturitäts-Zeugnis, Realgymnasium, Zürich, October 1921, and list of former pupils issued for 100th anniversary of school in 1933.
- Two reports, October 1923 and April 1925, from Eidgenössische Technische Hochschule, Zürich.
- Letter from H. Staudinger offering Bretscher a place to work under his direction in analytical chemistry laboratory of E.T.H., May 1925.
- A.29 Correspondence 1927-34 from friends at Edinburgh.
- Bretscher spent 1925-January 1927 in the department of Sir James Walker working for a doctorate on 'Influence of substitution by the methoxy group on the optical rotatory powers of the menthyl naphthoates'.
- Material includes congratulatory note signed by colleagues and later (1966) correspondence re expansion of Edinburgh University.
- A.30 Correspondence and papers 1934 re Bretscher's support from Rockefeller Foundation to work with Rutherford at Cavendish Laboratory, Cambridge, for a year from October 1934.
- Includes application, references, correspondence exchanged with P. Scherrer (Director, Zürich Eidgenössische Technische Hochschule), Rutherford, Debye, Rockefeller Foundation, Bretscher's report on his work.
- A.31 Correspondence 1934 re Bretscher's 'Habilitation'.
- A.32 Correspondence 1936 with M.L. Oliphant on research, career plans, proposed return to Cambridge.
- A.33 Invitation from Rutherford, 1936, to 'spend the next few years mainly at research in the Cavendish Laboratory' as Clerk Maxwell Scholar.
- Included here is 1p. note of 'A few recollections of Lord Rutherford whilst I was at the Cavendish Laboratory'.

Biographical and autobiographical

- A.34 Shorter correspondence re return to Cambridge, registration as research student, membership of Fitzwilliam House, 1936.
- A.35 Leverhulme Fellow and Lecturer in Physics, Liverpool. Application and correspondence 1938.
- A.36 Brief correspondence 1938 re sale of journals.

Letter from E.T.H. Zürich thanking Bretscher for his work as Privatdozent, 1939.

Letter re house in Cambridge, 1939.
- A.37 Contract with J. Springer, for book on nuclear physics by Bretscher and N. Kemmer, 1939.
- A.38 Letter granting Bretscher leave from research 'for the duration of the period of the present emergency', 1940.
- A.39 Invitation from H. Halban to apply for chair of physical chemistry E.T.H. Zürich (declined by Bretscher because of pressure of work and its sensitive nature), 1942.
- A.40 Naturalisation certificate (photocopy) 1944 and related correspondence, 1945-46.

A.41-A.47 Postwar career plans.

Bretscher left Britain in January 1944 to join the Manhattan Project. With the end of hostilities and the conclusion of the project, he explored various career openings in Britain, America and elsewhere. He was attracted by the idea of a return to Cambridge and the Cavendish Laboratory but the terms and conditions of the appointment as eventually put to him were unsatisfactory. He also gave serious consideration to posts at Syracuse (N.Y.) and at Liverpool (with Chadwick) eventually accepting Cockcroft's offer of the direction of the chemistry division at the new A.E.R.E., Harwell. This period of considerable uncertainty is often alluded to in correspondence elsewhere in the collection as well as in the folders below.

A.41 Correspondence July 1945-March 1946 with W.L. Bragg re Lectureship at Cambridge.

Bragg asked Bretscher if he might 'put your name forward' and the appointment was posted in the Cambridge Reporter but not formally notified to Bretscher. Details of his proposed position were sent by Bragg in February 1946, and he declined to accept them.

Biographical and autobiographical

- A.42 Correspondence with Chadwick February-December 1946. Mainly on posts at Cambridge, Liverpool, Harwell. Bretscher's letter 20 February and Chadwick's reply 26 February give their recollections of early work on plutonium, Maud Committee, etc.
- A.43 Later correspondence with Chadwick, 1948, re conditions at Harwell.
- A.44 Correspondence with Cockcroft, 1944-45. Mainly re Cambridge post, and includes 6pp. draft of postwar development plans for the Cavendish.
- A.45 Correspondence with Cockcroft, 1946. Mainly plans for Harwell, conditions of Bretscher's appointment and responsibilities. Includes letter from R. Spence.
- A.46 Correspondence with Cockcroft, 1947.
Includes letter and memorandum by Bretscher on organisation of Harwell and his taking over responsibility for Nuclear Physics Division.
- A.47 Correspondence with W.E. Burcham re posts and research at Cavendish Laboratory, 1945-46.
Two letters (carbons only) re possible post at Zürich, 1945.
- A.48 Certificate of election as Fellow, American Physical Society, 1946.
Application for Chair of Physics, Reading University, 1946.
- A.49-A.53 Harwell. (See also E.6-E.9, and Section F, especially F.1-F.61.)
- A.49 Miscellaneous shorter correspondence, 1947-48, re arrangements for removal from America, settling in at Harwell.
- A.50 Miscellaneous letters of appointment, 1946, 1948, 1949, 1954.
- A.51 Houses at Harwell.
- A.52 Miscellaneous financial, F.S.S.U., etc.
- A.53 Miscellaneous shorter personal correspondence.

Biographical and autobiographical

- A.54 Correspondence 1948, 1960, 1964 re proposed election to Royal Society.
- A.55 Correspondence and papers re Chair of Physics, Berne, 1951-52.
- A.56 Correspondence 1954 re Swiss atomic energy project and possibility of Bretscher being Director or consultant. See also F.116-F.119.
- A.57 Retirement from Harwell.
Miscellaneous correspondence 1964-67, press-cuttings, Bretscher's letter of thanks for farewell party, etc.
- A.58 Award of C.B.E., 1966.
Letters of congratulation, A.E.R.E. notice of award.
- A.59 Correspondence 1966 re proposed consultancy at National Physical Laboratory.
- A.60 Churchill College, Cambridge.
Dining rights, battels, guest nights, etc., 1967-72.
- A.61 Miscellaneous social invitations, signed menus, etc.

PHOTOGRAPHS

- A.62 Photograph of 'H.T. research team Xmas 1943', with identifications provided by Mrs. Bretscher 1986.
Portrait photograph of Bretscher (photocopy).

SECTION B SWITZERLAND B.1-B.8

Very little remains of Bretscher's early work in Switzerland, despite his long association with the E.T.H. Zürich as undergraduate and later Assistant and Privatdozent for Physics under P. Scherrer.

- B.1 Softback exercise book inscribed '1928 Physik Praktikum'.
Mainly notes on work of Millikan, Zeeman effect. Few pages used.
- B.2 14pp. typescript and ms. copy of Gauss's Discourse on infinite series 1812 (in Latin), and ms. notes by Bretscher on verso of documents of Zürich Kantonalbank.
- B.3 Softbacked exercise book (cover lost).
Miscellaneous notes, results, calculations. Both ends of book used.
All in German except few pages at beginning by Bretscher and another, headed 'Substitution of the phenyl groups by the naphthyl radical' and perhaps related to doctorate work at Edinburgh, 1925-27.
- B.4 Typescript and ms. notes on beta-naphthol (on verso of Zürich Kantonalbank writing-paper).
- B.5 Softback notebook of miscellaneous notes, in English. Few pages used.
- B.6 Meeting of Faraday Society, Oxford, April 1934. The meeting, on 'Determination and Interpretation of Dipole Moments', was introduced by Debye; Bretscher gave a paper on 'The temperature variation of the dielectric constant of ionic crystals'.
Notices of meeting, brief correspondence re arrangements.
- B.7, B.8 Correspondence and papers re work on dielectric constant of crystals, 1934-35.
- B.7 Bretscher's notes and working papers.
- B.8 Correspondence with M. Blackman, P.W. Bridgman, H. Saini.

SECTION C CAMBRIDGE C.1-C.18

C.1-C.7 Research

C.8-C.18 Lectures and teaching.

The surviving research material is unfortunately scanty. For Bretscher's contribution to the UK nuclear physics "Tube Alloys" project during his Cambridge period, see Section D.

RESEARCH

- C.1 'The transmutation of heavy elements'.
Reprint of lecture by Rutherford at Royal Institution, March 1937; Bretscher's contribution is acknowledged on p.5.
- C.2 Small softback notebook, inscribed inside front cover 'Bretscher Cavendish Laboratory Cambridge'.
Notes on various elements, mainly thorium; almost all in German. Few dates; 1p. dated 1938, 1p. ref. 1942 and 1p. ref. to Patent Office 1943. See also D.57-D.62.
- C.3 Softback notebook, inscribed inside front cover 'N. Feather. Chemical Room'.
First entry, in Feather's hand, is on 'Ionium (material from Manchester)' and dated October 1937. Rest of entries are by Bretscher, January-July 1938.
- C.4 33pp. draft for lecture or paper on 'hot expansion chamber' (based on C.T.R. Wilson's cloud chamber).
Typescript with ms. corrections and additions in more than one hand but mainly Bretscher's; n.d.; latest reference 1939.
- C.5 Brief material only, re collaborative work with D.E. Lea.
Includes letter from Lea proposing publication of 'neutrons-on-bacteria experiments' as a joint paper, September 1940 (published J. Hygiene, 41, 1941), and letter, July 1942, re angular distribution of neutron emission by ionisation method (see D.21).

Also included is later correspondence, 1964, re proposed collected works of Lea.

Cambridge

- C.6 Loose-leaf ringback binder, American format. Inscribed inside front cover: 'Private Colloquium with Fermi Quantum electro-dynamics', n.d.
- Includes several sequences of ms. pencil notes, one paginated 1-14, others on 'Relativistic theory', 'Theory of scattering of radiation', 'Quantum electrodynamics', 'Solid State - neutron interaction'.
- See also F.167 which suggests a date of 1946 for this notebook.
- C.7 Black springback binder, paginated 1-73, with additional unnumbered pages and a few pages used at rear.
- Miscellaneous notes in German and English, probably made over several years.

LECTURES AND TEACHING

- C.8 Miscellaneous outlines for lecture courses, none dated, probably late 1930s.
- 'Atomic & Nuclear Physics', 2pp. ms. outline for course of 15 lectures, in the hand of N. Feather.
- 5pp. typescript outline for various courses over an academic year.
- 'Atoms & Nuclei', 1p. note by Bretscher.
- C.9 Miscellaneous ms. notes for lectures, no titles or dates.
- C.10 Notes for course of 13 lectures, October-December 1940.
- C.11 Notes for lectures February-March 1940.
- C.12 Notes for lectures April, May 1940 (not a complete set).
- C.13 Notes for extended course of 21 lectures, November 1940-February 1941.
- C.14 Notes for course of 13 lectures, April-May 1941.

Cambridge

- C.15 Notes for extended course of 22 lectures, January-March 1942.
- C.16 Notes for course of 7 lectures, May 1942.
1p. (only) of '22nd lecture 15 Feb. 1943'.
- C.17 Small notebook 'Supervision 1942', with alphabetical thumb index.
Entries run 1940-43.
- C.18 Miscellaneous examination questions and papers, 1940-43, including suggestions from N. Feather, H. Lipson, D. Shoenberg.

SECTION D "TUBE ALLOYS" D.1-D.105

D.1-D.85 RESEARCH AT CAVENDISH LABORATORY, CAMBRIDGE

D.1 -D.5 Bretscher's notes and drafts

D.6 -D.35 Research reports by co-workers

D.36-D.42 Maud Committee reports

D.43-D.56 D.S.I.R. reports

D.57-D.62 Patents

D.63-D.85 Postwar publication

D.86-D.101 CORRESPONDENCE

D.102-D.105 MISCELLANEOUS REPORTS

For a full historical account of the work done under the code-name "Tube Alloys", given to the British atomic energy project, the origins, membership, work and report of the Maud Committee and its successor organisation, and the contribution to the nuclear energy project of the many teams and individual scientists engaged on it, see Margaret Gowing, Britain and atomic energy 1939-45, 1964.

D.1-D.85 RESEARCH AT THE CAVENDISH LABORATORY

Bretscher's notes and drafts.

D.1

Red exercise-book, inscribed 'U' on cover and name and address (Cavendish Laboratory) inside.

Extensive notes, drafts, calculations on various topics connected with nuclear research, few entries dated and book probably used over several years. Opening sequence 'Uranium experiments Calculations' is paginated 1-10 and p. 10 is dated 1 October 1941; next page is intercalated with notes written on Harwell letter paper. Most entries are in black ink, with additions sometimes added in red. Later pages continue notes and calculations, but have some longer sequences of drafts and narratives on fast neutrons, cooling, 'theory of piles', etc. and include sequence on 'Slowing down combined with diffusion of thermal neutrons' written in biro and perhaps mid 1940s.

D.2

Notebook, covers missing, several pages affected by damp and some loose. Both ends used.

At front of book, entries headed '1st work' (on uranium) various dates, 8 November 1938-28 January 1939.

At rear of book are more extensive notes, calculations, aides-mémoire on a variety of topics including notes for work by co-workers, letters to be written, 1p. notes 'Maud meeting 9.4.41.' (see D.38), drawings of apparatus, 'Jobs to be done in London', 'Points to be settled', 'Problems needing attention', 'Malvern - Runcorn - Liverpool trip', etc. A few pages bear various dates 1 March (1941)-24 October 1943; also included are several lists of 'jobs to be done before leaving' (for USA) perhaps December 1943.

D.3

Extensive sequence of notes on the literature of nuclear physics, on loose pages. All ms., a few with annotations or underscorings in red perhaps added later.

D.4

Ms. notes by Bretscher.

1p. 'Tube Alloy report numbers'.

1p. damp-stained 'Notes concerning Maud report ... Fast neutron affair'.

"Tube Alloys"

D.5 3pp. ms. notes made by Bretscher from the diaries of H. Halban (in UKAEA archives), for 1943 and 1944.

For other notes by Bretscher see Maud Committee reports, especially D.36, D.37

Research notes and reports by co-workers

The material is presented in alphabetical order by name and may include ms. and typescript notes, graphs and diagrams, brief letters on results or progress, or more complete typed-up reports for communication to Directorate of Tube Alloys research at Department of Scientific and Industrial Research. See D.43-D.56 for a set of the reports as submitted.

See also D.63-D.85

D.6-D.9

G.B. Cook

Contents of original folder inscribed 'Cook's reports'.

D.6 Brief ms. 'Monthly Reports', February, March, April, May, September, October, December 1942, December 1943.

D.7 Brief ms. notes by Cook on research in hand, on wax, and 'Extraction of UX ... by adsorbents'.

D.8 Miscellaneous notes, charts, calculations by Cook, Bretscher and another.

D.9 Reports by Cook, none dated.

'The preparation of uranium films by the pyridine method'.

'The preparation of the metallic carbonyls and related compounds'.

'Electrolytic preparation of UO₂ films'.

'The concentration of element 93', 14pp.

"Tube Alloys"

D.10-D.14

N. Feather

Contents of original folder inscribed 'Feather's reports'.

D.10 'Absorption measurements on the radiations from
 $^{239}_{92}\text{U}$ and $^{239}_{93}\text{X}$ '

Report describing work December 1940-June 1941, n.d. 15pp. typescript and Figures 1-13, both in Feather's original labelled envelopes.

D.11 Reports on delayed neutrons, July, August (2) 1941, general report, January 1942.

D.12 Reports on fast neutron scattering, March (2), June 1942.

D.13 'Note on the radiations and isotropic assignment of the 50-year radioelement 94', n.d., mid 1942, with ms. notes and diagrams.

D.14 Report on 'Neutron-produced radioactivity ...', November 1942.

D.15-D.19

A.P. French

Contents of original folder inscribed 'A.P. French'.

D.15 Brief ms. monthly reports, September-December 1942, January, April-December 1943 and 1p. note on work with E.B.M. Martin.

D.16 Letter, 12pp., and 6 figures reporting results of 'H-D method', sent to Bretscher in America, June 1944.

D.17 'Neutron flux measurements', report by Bretscher and French, January 1944 (A.E.R.E. Harwell copy marked 'Declassified').

D.18 'Measurement of a neutron flux in the presence of gamma rays', report by Bretscher and French, September 1944 (A.E.R.E. Harwell copy marked 'Declassified').

D.19 'Electromagnetic radiation and angular correlations', duplicated typescript of lectures given by French at Cavendish, June 1950.

D.20

O.R. Frisch

'Test for short-delay neutron', 2pp., n.d.

D.21

L.H. Gray

'The Ionisation method of measuring neutron energy'.
48pp.+ 4pp. references, typescript with ms. corrections and additions,
for paper published in Proc. Cam. Phil. Soc., 40, 1944.

Gray was then working as radiologist at the Mount Vernon Hospital
and was not directly a member of the Cavendish group. His work
however is referred to by Bretscher in D.2 and in several of the reports
and has therefore been included here.

D.22

H.H. v. Halban

'Discussion of the composition and constitution of uranium-containing
systems in view of producing a divergent nuclear reaction-chain',
with ms. note at end '9 pages and one page concluding remarks
existing in 6 copies'. (This is copy no.5.) Some ms. corrections
in the hand of L. Kowarski with whom Halban left France in 1940;
n.d., prepared for Maud Committee.

D.23, D.24

L. Kowarski

D.23 Letter from Kowarski (in Cambridge) to Halban (at Montreal)
on research progress, 27 September 1943, with a ms. headnote (addressee
unknown, perhaps Bretscher) beginning 'I am not sure whether this letter
was forwarded to Halban. Perrin [Sir Michael Perrin] was of the
opinion that I ought to have a talk with you first'.

D.24 Report 'A critical survey ... absorption of thermal neutrons
by natural uranium', October 1943.

D.25, D.26

E.B.M. Martin (formerly Murrell)

Contents of original folder inscribed 'Mrs. Martin'.

D.25 Brief ms. monthly reports, May-December 1943.

D.26 3pp. note on 'adsorption of UX', various dates in October,
no year.

"Tube Alloys"

- D.27, D.28 G.R. Martin
Contents of original envelope inscribed 'G. Martin's reports (Tube Alloys)'
- D.27 Brief ms. monthly reports, March-December 1943.
- D.28 Undated ms. notes of work in hand or projected.
- D.29-D.31 D.H. Peacock
Contents of original folder inscribed 'Peacock's reports'.
- D.29 Brief ms. reports and letters, March-June 1942.
- D.30 Ms. research notes and calculations by Peacock, annotated by Bretscher and another.
- D.31 'Report on Uranium X' by Peacock, 2pp.
'Uranium X', 7pp. no author. 2 copies.
'The extraction of element 93', 5pp., no author. 2 copies.
- D.32 M.J. Poole
Contents of original folder inscribed 'Poole reports'.
Brief ms. monthly reports, March-December 1943.
- D.33 C.J. Wilkins
Contents of original folder inscribed 'Wilkins reports'.
Brief ms. monthly reports, August, September 1943.
Two ms. research notes, September, October 1943.
- D.34, D.35 D.H. Wilkinson
Contents of original folder inscribed 'Wilkinsons reports'.
- D.34 Brief monthly reports, September-December 1943 (report for October presented in the form of a Shakespearean sonnet).
- D.35 Report 'The radiative capture cross section of U238 for fast neutrons' by Wilkinson and E. Broda, January 1945.

Maud Committee reports and notes

The Maud (more correctly M.A.U.D.) Committee was set up with G.P. Thomson as Chairman in March 1940, at first within the Ministry of Aircraft Production (M.A.P.) and later transferred to the Department of Scientific and Industrial Research (D.S.I.R.) as the Directorate of Tube Alloys.

D.36

Contents of Bretscher's folder inscribed 'Pu-story', containing ms. notes, drafts, calculations and diagrams of various dates, several probably 1940.

Includes 1p. outline points for 'D.S.I.R. report', n.d., on 93, 94, UX, etc.; 2pp. 'Report on our experiments concerning element 93' beginning 'The following considerations (Autumn 1940) have lead [sic] us to embark on experiments to investigate some of the properties of elements 93 and 94'; 8pp. miscellaneous other drafts, notes, calculations.

D.37

'Report on work carried out in Cambridge Sept.-Dec. 1940'.
Presented to Maud Committee December 1940.

There are three reports, all dated 19 December, as follows:

'Report I Interaction of slow neutrons with heavy water ...',
11pp., by Halban and Kowarski.

'Report II Experiments involving element 94', 3pp., by Bretscher and Feather.

'Attempt to determine the fission cross-section of uranium ...',
3pp., by Bretscher.

Also included in folder is 1p. undated ms. note by Bretscher 'Critical energies for fission for various nuclei'.

D.38

'Summary of the report given at the meeting of the MAUD Committee on 9th April' [1941].

4pp., by Bretscher.

D.39

'Extracts from a report to the MAUD Committee in May 1941'.

2pp., by Bretscher, on 'Spontaneous Fission' (sequel to report presented on 9 April, see D.38).

Included here is letter from Cockcroft, April 1941, requesting report on Bretscher's work on '94' (Plutonium).

"Tube Alloys"

- D.40 'Outline report ... Sept. 1940-30 Nov. 1941'.
8pp. on uranium radiation and on delayed neutrons, both by Feather.
- D.41 'Proposition for determination of the contents of heavy water ...'
2pp. copy of note by Halban re heavy water brought to Britain by Kowarski and himself.

Included here is miscellaneous shorter correspondence re work and meetings of Maud Committee, July 1940-July 1941.
- D.42 Copy of report by M.L. Oliphant on his conversations on American research and possible UK collaboration with E.O. Laurence, H.C. Urey and G.B. Pegram, September 1941; sent to N. Feather in advance of visit by Pegram and Urey to Britain to investigate state of uranium research.

D.S.I.R. Reports

This is Bretscher's designation on the original folder. Some of the reports are by named individuals on specific problems, but the majority are monthly reports usually titled 'for the Directorate of Tube Alloys of the D.S.I.R.' (Department of Scientific and Industrial Research). All are typescript carbon copies in fragile condition and damp-stained.

- D.43 'Preliminary short report concerning the experiments with element 93 (Neptunium) carried out during 1941'.
8pp. by Bretscher.
- D.44 'The concentration of element 93 ...'
14pp. by G.B. Cook.
- D.45 'The extraction of element 93 ...'
5pp., not signed.
- D.46 Monthly reports, February, March, April 1942.

"Tube Alloys"

- D.47 Monthly reports, May, June, July 1942.
- D.48 Monthly reports, August, September, October 1942.
- D.49 'Separate measurement of the elastic and inelastic scattering cross-sections of fast neutrons in heavy elements', 13 October 1942. 16pp. marked 'Secret', not signed, ms. additions not in Bretscher's hand.
- D.50 Monthly reports, November, December 1942.
- D.51 Monthly reports, January, February, March 1943.
- D.52 Monthly reports, April, June 1943 (no surviving report for May).
- D.53 Monthly reports, July, August 1943.
- D.54 'A method of measuring ... inelastic scattering of fast neutrons ... and the energy spectrum of the secondary neutrons ...', August 1943. 24pp. +2 Appendixes, by B.B. Kinsey.
- D.55 Monthly reports, September-December 1943.
- D.56 Review of work of Cambridge Slow Neutron Group, February-November 1943. 2pp. by Kowarski.

For other reports and material on the "Tube Alloys" project, see D.63-D.85.

Patents

- D.57 Documents on 'Case "L"' (Improved process for the purification of uranium salts) and 'Case "M"' (Process for the production of neptunium and plutonium), April 1942. Includes Draft Specification, correspondence re suggested re-wording. Also included here are miscellaneous typescript drafts and documents, two dated April 1941 and signed by Bretscher, Feather, Halban and Kowarski, and others undated, probably later.

"Tube Alloys"

- D.58 'Agreement' re patenting applications of various inventions, signed by Bretscher, Feather, Appleton and Sir John Anderson, September 1942.

See D.62 for later correspondence on this agreement.
- D.59 Correspondence and papers re U.S. Patents, 1943-44.
- D.60 Copies of patents filed by Bretscher and others, 1941, 1942 and sent to him 1953.
- D.61 List of patents filed by Halban and Bretscher, various dates, 1940-42, sent to him in 1959.
- D.62 Correspondence with R. Makins (Lord Sherfield) re 1942 'agreement' (D.58) and its possible continuing usefulness, 1964.

Postwar Publication

Wartime security regulations did not permit the publication of research reports other than for restricted circulation to official bodies. After the war, some of the papers were revised and published, though in other cases the research was considered to have been superseded (see especially D.74-D.81).

The material below was kept in stiffbacked binders bearing the title and the 'BR' (i.e. the official report) number and is presented in that order. It may include drafts and correspondence from the period of the original research or of later date, and is therefore similar or complementary to the research reports at D.6-D.35.

- D.63 'The total neutron collision areas of some heavy metals', by Bretscher and E.B.M. Murrell (later Martin q.v.), B.R. 136.

1p. typescript (several versions), figures and diagrams. Brief correspondence, 1948.

"Tube Alloys"

- D.64 'Determination of the collision cross-section of hydrogen, deuterium, carbon and oxygen for fast neutrons', by Bretscher and E.B.M. Martin. B.R. 137.
Miscellaneous typescript drafts (some under Mrs. Martin's maiden name of Murrell), diagrams, brief correspondence 1944, reprint of paper as published in Helv.Phys. Acta, 23, 1950.
- D.65 'Determination of the number of neutrons emitted by a radium-beryllium source', by Bretscher, A.P. French, G.R. Martin and M.J. Poole. B.R. 382.
Typescript report, miscellaneous notes, calculations, drafts, some by Bretscher, several by A.P. French, one only dated (May 1943).
- D.66-D.73 'Preparation and properties of a reproducible neutron standard', by Bretscher, G.B. Cook, G.R. Martin and D.H. Wilkinson. B.R. 383, later published in Proc.Roy.Soc., 196, 1949.
- D.66 Miscellaneous ms. notes, graphs, etc., mainly by Bretscher, but includes 'Monthly Report July 1943' by C.J. Wilkins.
- D.67 'A neutron standard'. 9pp. typescript report by Bretscher, Cook and Martin, January 1944. The 1p. attached index has a ms. note by Bretscher 'Where are the sources now', 1966.
- D.68 Miscellaneous drafts for published paper, includes ms. corrections and revisions by collaborators.
- D.69 Correspondence with Chadwick, 1948, re submission of paper for publication in Proc.Roy.Soc.
- D.70 Correspondence and papers from G.B. Cook. Includes 'Monthly reports' January, March-November 1943 and miscellaneous other notes, drafts.
- D.71 Correspondence with G.R. Martin re his section of the paper, 1947, 1948.
- D.72 Correspondence with D.H. Wilkinson, 1944 (early research on neutron standard), 1946-48 (on publication).
- D.73 Bretscher's carbons sending copies of published paper, 1949.

- D.74-D.81 'Isolation and spontaneous fission of U(234)', by Bretscher, G.B. Cook, G.R. Martin, M.J. Poole. B.R. 384.
- D.74 Original B.R. 384 report, February 1944, 14pp. typescript + diagram.
- D.75 Miscellaneous notes, calculations, diagrams, etc. relating to work, not all by Bretscher, few dated but part of early stages of research.
- D.76 Drafts for abstract and paper for later publication, incorporating name of B.G. Harvey as well as original authors, 1952.
- D.77 Correspondence, etc. from G.B. Cook, 1943 (programme of work on U234 and other projects), 1952 (possible publication).
- D.78 Correspondence with B.G. Harvey, 1952, re possible publication. Bretscher's letter 11 August gives reasons for deciding not to publish.
- D.79 Correspondence, etc. with G.R. Martin, 1943 (report on U234 work), 1952 (possible publication).
- D.80 Correspondence and reports from D.H. Peacock, 1942.
- D.81 Correspondence and reports from M.J. Poole, January and July 1943, June 1944, and brief undated note objecting to later publication as research had been superseded.
- D.82, D.83 'Cross sections of U(25) and U(28)'. B.R. 385.
- D.82 Ms. calculations, charts, diagrams and drafts, some by Bretscher but most in the hand of A.P. French, on Angular Distribution, Excitation Function, etc., some with dates in 1943. Perhaps related to paper published in Phys.Rev., 73, 1948.
- D.83 'Determination of the U(235) and U(238) fission cross section ...'. B.R. 385, by Bretscher, A.P. French and E.B.M. Martin. 4pp. typescript +4 figures, January 1944.
- D.84 'Determination of U235 content of enriched uranium samples', by Bretscher and E.B.M. Martin. B.R. 425. 3pp. typescript report, November 1943, and photocopy; photographs of apparatus.

"Tube Alloys"

D.85 Correspondence 1948 with A.P. French re publication of joint paper on D-T reaction and Angular Distribution, published in Phys.Rev. 75, 1949.

See also E.17.

D.86-D.101 CORRESPONDENCE

The correspondence with Chadwick (D.86-D.92) relates to the history and development of the "Tube Alloys" project as it concerned Bretscher and his co-workers from September 1940. D.96-D.100 are letters exchanged between Bretscher and various members of his group after his departure for America in 1944, with scientific, academic and personal news.

D.86-D.92	Chadwick, J.	1940-45
D.86	1940	September-December
D.87	1941	December
D.88	1942	January-June
D.89	1942	July-December
D.90	1943	January-April
D.91	1943	May-September
D.92	1944	(copy of cable only), 1945 (includes correspondence on postwar career plans and research). See also A.41-A.47.

Monthly reports on research at Chadwick's laboratory in Liverpool are at D.102.

D.93 Cook, G.B. March, October 1944
Letter of October is from Montreal.

"Tube Alloys"

- D.94 French, A.P. 1944-46
French joined the Los Alamos group in 1945.
- D.95, D.96 Martin, E.B.M. and Martin, G.R. 1944-46
Letters after August 1944 are from Montreal.
D.95 1944 D.96 1945-46
- D.97 Poole, M.J. 1944-46
- D.98 Wilkins, C.J. 1944
- D.99 Wilkinson, D.H. 1944-45
- D.100 Bretscher's 'round robin' letter to members of the laboratory,
n.d. c. April-May 1944.
- D.101 Miscellaneous shorter correspondence relating to wartime research,
1941-44.
- D.102-D.105 MISCELLANEOUS REPORTS
- D.102 Monthly reports from George Holt Physics Laboratory, Liverpool
(Chadwick's laboratory), August 1942, July, September-December
1943, and 1p. ms. notes by Bretscher.
- D.103 Miscellaneous lists of British reports and manuscripts on "Tube Alloys".
- D.104 3pp. typescript list of 'Reports on work carried out in England',
and 'Reports on work carried out in America', n.d., latest reference
August 1941.
- D.105 'Report on current German Literature', August 1942.
3pp. typescript signed 'K.F.' and 'R.P.' (K. Fuchs and R.E. Peierls).
'Note on positive ion sources', August 1945.
4pp. typescript by A.G. Ward.

SECTION E	LOS ALAMOS	E.1-E.29
	E.1 -E.9	PERSONAL CORRESPONDENCE AND MATERIAL, 1943-47
	E.10-E.19	RESEARCH AND REPORTS
	E.20-E.28	CIRCULARS AND NEWSLETTERS
	E.29	PRESS-CUTTINGS

Bretscher and his family left Britain in January 1944 to join the British Mission to the Manhattan District Scientific Laboratory at Los Alamos where he worked in Fermi's Advanced Development Division on deuterium-tritium reactions. He left to take up his post at Harwell at the end of 1946.

E.1-E.9 PERSONAL CORRESPONDENCE AND MATERIAL, 1943-47

A chronological sequence mainly relating to financial matters, travel claims for consultations with colleagues in Britain and America, etc., and to Bretscher's regular cables of greetings or family news sent via the British Mission to his mother in Switzerland. Bretscher was also able to have small sums of money sent to her.

- E.1 December 1943-March 1944. Arrangements to leave Britain, travel documents.
- E.2 1944, March-June
- E.3 1944, July-December
- E.4 1945
- E.5 1946, January-June. Includes notes and correspondence re biographical article on Bretscher and H. Staub for a Swiss publication.
- E.6 1946, July-August. Arrangements to leave America.
- E.7 1946, September. Visit to Chalk River; cables re appointment and housing at Harwell.
- E.8 1946, October-December. Travel to Britain, housing at Harwell.
- E.9 Miscellaneous travel expenses for consultations with Chadwick, Halban and Oliphant, 1946.

Los Alamos

E.10-E.19 RESEARCH AND REPORTS

The exceptionally tight security at Los Alamos meant that virtually no personal research material remains. E.11-E.17 are final reports contributed to the sequence of 'L.A.' reports. Rather like the 'B.R.' reports at D.63-D.85, most were kept by Bretscher in stiff-backed binders with the L.A. number and are preserved in that order.

- E.10 Miscellaneous documents on research.
Includes 3pp. typescript on 'Activity since my arrival at Site Y' [Los Alamos]; p.3 gives an account of previous work at Cambridge and lists papers by Bretscher and collaborators.
1p. note pasted on card, on 'Extraction of 94'.
1p. calculations on 'Dragon theory', by O.R. Frisch.
- E.11 'Fission cross section of 28 and 49 for 14 Mev neutrons'. No report no.
6pp. typescript 'Draft of fission cross section report', no author but probably by Bretscher.
- E.12, E.13 'Slow-neutron disintegration of boron-10; search for the formation of Be(10), and estimate of the mean life of Be(10)'. LADC 338.
E.12 Three typescript copies of paper, one dated 13 September 1947, all with different deletions, ms. revisions and additions, intercalated calculations.
- E.13 Miscellaneous charts, drafts, notes, calculations.
- E.14 'Energy loss of deuterons in D₂O at very low energy', LAMS 392.
14pp. typescript draft with some ms. corrections.
14pp. typescript corrected version.
- E.15 'Low-energy yield of D(D,p)H³ and the angular distribution of the emitted protons', by Bretscher, A.P. French and F.G.P. Seidl. LADC 439.
Two copies of report dated September 1947; later published in Phys. Rev., 73, 1948.
- E.16 'Low-energy cross section of the D-D reaction and angular distribution of the protons emitted', LA-581.
21pp. typescript draft with appendix and figures, no author or date.

Los Alamos

- E.17 'Low-energy cross section of the T-D reaction and angular distribution of the alpha particles emitted'. LA-595.
14pp. typescript draft, work related to report 581 at E.16. Includes brief forwarding letter to E. Konopinski, June 1946. Later published with A.P. French in Phys.Rev., 75, 1949. See also D.85.
- E.18 'The effects of Atomic Bombs on Hiroshima and Nagasaki'. Report of United States Strategic Bombing Survey, June 1946.
- E.19 Official reports to U.S. Atomic Energy Commission on Nuclear Power Reactor Technology. Five items, with a ms. note by Bretscher '1-4 Historical of Manhattan Project'.
- E.20-E.28 CIRCULARS AND NEWSLETTERS
- E.20 Circulars and information bulletins for British personnel, 1944.
- E.21 Similar, 1945.
- E.22 Circulars and information bulletins from U.S. sources to Los Alamos personnel, November 1943, 1945.
- E.23 Similar, 1946.
- E.24 Miscellaneous copies of The Bulletin (published thrice weekly for workers on Los Alamos site).
- E.25, E.26 Material relating to Association of Los Alamos Scientists, formed 30 August 1945 'to promote the attainment and use of scientific and technological advances in the best interests of humanity'.
Includes press release 'Motion for formation' of association, copies of articles by N. Bohr, J.R. Oppenheimer, Sen. McMahon and others, account of Senate debate, and other documents re control of atomic energy. 2 folders.
- E.27 Los Alamos Newsletter (published by Association of Los Alamos Scientists, at first weekly, later fortnightly). No.1 includes statement of aims and membership of committees.
Nos. 1-10, 12-22, 25-31.

Los Alamos

E.28

Miscellaneous official announcements on development and dropping of atomic bomb, telegrams of congratulation, conferment of 'Army-Navy Production Award for high achievement in the production of war equipment' on Los Alamos Laboratory:

E.29

PRESS-CUTTINGS

Newspapers and cuttings (Los Alamos Times, Santa Fe New Mexican, Denver Post) mainly 1945, 1946; includes photocopy of a retrospective article 1972.

1 box.

SECTION F ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL, F.1 - F.180

F.1-F.61 BRETSCHER'S CAREER & RESEARCH

F.62-F.123 COLLABORATIVE RESEARCH & PROJECTS

U.K. Universities F.62-F.78

U.K. Institutions, laboratories & firms F.79-F.88

U.S.A. Universities and institutions F.89-F.108

Europe F.109-F.119

U.S.S.R. F.120-F.123

F.124-F.139 COMMITTEES

F.140-F.180 LECTURES AND PUBLICATIONS

The material in this Section comes from two different sources.

Bretscher's own material includes the notebooks at F.1-F.6 and some of the research and committee folders. The remaining research and committee folders, the material on collaborative research and on publications was received from A.E.R.E. Harwell as not required for the Public Record Office. It should be noted that they are not necessarily the complete original file. The content of all the folders, whatever their source, is similar and may include notes and calculations, minutes and notes of meetings or discussions, research reports, correspondence and related background material.

The 'collaborative research', especially that with universities in Britain (F.62-F.78), is of interest in documenting Bretscher's strong wish to maintain high research standards at Harwell.

The committee material (F.124-F.139) though incomplete, reflects the importance he attached to the measurement and evaluation of nuclear data and his success in achieving international co-operation.

Atomic Energy Research Establishment, Harwell

BRETSCHER'S CAREER AND RESEARCH

- F.1 Stationery Office notebook dated on cover 'June 1947' and inscribed 'Seanuts'. Few pages used. Entries run June-November.

'Seanuts' was the codename for the experiment to establish the conditions governing dilution and dispersion of effluents discharged into the sea off the Cumberland coast.
- F.2 Stationery Office notebook inscribed 'Italian'. Miscellaneous contents, few dated. Both ends of book used.
- F.3 Stationery Office notebook inscribed on cover 'for History'. Miscellaneous contents, few dated.
- F.4 Stationery Office notebook inscribed 'Timing Unit'. Notes and experimental results, not in Bretscher's hand. Notes at rear of book are in his hand.
- F.5 Linen-bound notebook, probably originally a diary, with many pages torn out. Now contains notes possibly of contributions to a conference.
- F.6 Lefax loose leaf diary, with index. Research notes and information. Similar to A.11, A.14-A.27.
- F.7 Minutes and Appendix of second meeting of Harwell Power Committee, July 1946.
- F.8 'R.A.E.'

Brief correspondence 1947 re temporary accommodation for Chemistry Division at R.A.E. Farnborough while buildings were completed.
- F.9 Shorter correspondence re visits and lectures (Bretscher's carbons only), 1947.
- F.10 'Formulae, graphs, tables'.

Bretscher's folder so inscribed. Includes ms. notes mainly on constants, undated but some early; miscellaneous printed tables and related material, some dated 1945, 1953.

Atomic Energy Research Establishment, Harwell

- F.11 'The pile as a measuring instrument'.
Folder of notes, drafts (including paper of that title, by Bretscher) and publications 'by Harwell staff and others, on measurement of fast and slow neutron sources.
- F.12, F.13 Drafts and papers by P.A. Egelstaff, kept with above, 1948 and later.
2 folders.
- F.14 Shorter correspondence on research and visits (Bretscher's carbons only), 1948, 1949.
- F.15 'Radiothorium'
Correspondence and memoranda, January-February 1949, February-March 1954.
- F.16 'Ion sources'
Diagrams, ms. notes, correspondence, notes of conference on ion sources, Amsterdam, November 1949.
- F.17 'Chemistry'
Miscellaneous correspondence mainly with manufacturers re supplies and specimens. Various dates, 1949-62.
- F.18 'Crystals'
Correspondence, notes of meetings, research notes and memoranda, supplies, etc. on scintillation crystals, April 1949-November 1964.
- F.19-F.21 'Pile theory'
Contents of a folder so inscribed.
- F.19 37pp. ms. draft by Bretscher.
- F.20 Miscellaneous typescript drafts and research reports, by Bretscher and others, 'Age-velocity theory', 'Multiplying media', 'Pile kinetics', etc.
- F.21 Research reports by others, 1950.

Atomic Energy Research Establishment, Harwell

- F.22, F.23 'Pile Neutron Research Group'
Correspondence, notes of meetings and visits, equipment and supplies, recruitment, finance, research notes and reports. Several of the reports are by P.A. Egelstaff who led the Group, which transferred from the Nuclear Physics Division to the Solid State Physics Division from 1 April 1965.
- F.22 July 1951-December 1956
- F.23 January 1957-March 1965
- F.24 Letter (copy) from R.H. Dalitz on various aspects of neutron scattering, 1952.
- Report by B.T. Price on collaboration on μ -Mesons at Aiguille du Midi, 1952.
- F.25 Shorter correspondence on Harwell organisation, visits, etc., 1953-55.
- F.26 'Fission Products'
Correspondence, memoranda, supplies, discussion meetings (meeting of May 1955 has a ms. note by Bretscher '8 men 3 years'), January 1955-July 1959.
- F.27 Comments by various members of Nuclear Physics Division on work on spectra measurements at Argonne Laboratory and similar work at Harwell. Includes programme for research on spectra. (Perhaps related to F.31.) 1956.
- Also included here is miscellaneous shorter correspondence on Harwell affairs, 1957.
- F.28 'Xenon Production'
Correspondence, supplies, research report, January 1958-June 1960.
- F.29 ' ^3He Neutron Spectrometer'
Correspondence, research notes and memoranda, March 1958-January 1960.

Atomic Energy Research Establishment, Harwell

- F.30 'Ionium (Th²³⁰)'
Correspondence, memoranda, analyses, printed matter, etc., May-August 1957, 1960, January 1962-December 1963. Not a complete file. Narrative summary of project May 1958-December 1962 tagged inside front cover.
- F.31 'Spectrum Measurements. LIDO Two Block Experiment'
Correspondence, memoranda, proposals, estimates and reports on project (in the charge of M.J. Poole), May 1959-January 1962.
- F.32 'Lead - 208'
Correspondence, memoranda, etc., mainly on sources of supply and extraction costs.
- F.33, F.34 'Pu - Be Sources'
Correspondence with colleagues and suppliers, memoranda, printed material.
F.33 July 1959-September 1961.
F.34 October 1961-December 1962, October 1964. Includes 3pp. 'Summary of events concerning the availability of Pu/Be sources' for the period July 1959-November 1961.
- F.35-F.37 'Mössbauer experiments and relevant literature'
F.35 Ms. notes by Bretscher. Ms. notes by W. Marshall with 13pp. typescript draft for lectures on 'The Mössbauer effect and experiments in relativity'.
F.36 Press release on papers by members of Nuclear Physics Division, on Mössbauer effect, January 1960, and papers on subject.
F.37 Reprints and background material.
- F.38 'Tandem Generator'
Correspondence, research proposals and reports, notes of meetings, equipment, etc., September 1961-February 1966. Not a complete file 'Pt.1B' only.

Atomic Energy Research Establishment, Harwell

- F.39 'Nuclear data for Prototype Fast Reactor (PFR)'
Correspondence, memoranda, research reports, September 1962-
July 1964.
- F.40 Shorter correspondence on Harwell affairs, 1960-62.
- F.41 Miscellaneous ms. notes by Bretscher on DNA, RNA, Genetic code,
c.1962.
- F.42 'Nuclear data for resonance reactors'
Ms. notes, correspondence, research reports, related printed matter
and references, few only dated 1963.
- F.43 'Isospin analogue states'
Research notes (not by Bretscher), related printed matter, n.d. 1960s.
- F.44, F.45 'Polarisation and nuclear orientation'
Correspondence, ms. notes, notes of meetings, research reports and
related printed matter, 1963-66. 2 folders.
- F.46 Correspondence and papers on Baron 10 (part file only). Various
dates, 1947-64.
- F.47 ' K_2^0 Experiment'
Correspondence, notes, mainly on work of High Energy Physics Group
at CERN, 1965.
- F.48 'Weak interaction, parity violation'
Correspondence, printed matter, 1965.
- F.49 Correspondence, reports and research ideas from members of Nuclear
Physics Division, 1965-66.
- F.50-F.53 Miscellaneous shorter notes by Bretscher. Few dated. F.50 includes
miscellaneous photographs of reactors and experiments. 4 folders.

Atomic Energy Research Establishment, Harwell

- F.54-F.56 Miscellaneous drafts for Nuclear Physics Division Progress Reports, some heavily-corrected by Bretscher. Mainly 1965, but also 1963. 3 folders.
- F.57 Miscellaneous shorter correspondence (almost entirely Bretscher's carbons) on staff, visits, promotions, research, appointments, 1966.
- F.58 Miscellaneous information re Harwell and outstations, lists of projects, personnel, committee structure, age-groups, etc., c.1966-68.
- F.59 Miscellaneous correspondence 1966-68 mainly re Bretscher's post-retirement consultancy, expense claims, attendance at conferences, arrangements for historical lecture on early Cambridge atomic research (see A.6).
- F.60 Correspondence 1968, re organisation and re boron pile.
- F.61 Continuing shorter correspondence, mainly re consultancy, 1969-72.

Atomic Energy Research Establishment, Harwell

COLLABORATIVE RESEARCH AND PROJECTS

Most, though not all, of this material was received from the A.E.R.E. It reflects the wide-ranging nature of the collaboration which Harwell tried to foster in its capacity as a research establishment.

The folders may contain, in varying proportions, any or all of the following:

Advice on equipment, apparatus and supplies.

Suggestions for research projects, arrangements or contracts for collaborative work, progress reports and results.

Recruitment, appointments and funding, submission and examination of higher degrees.

Exchanges of information, equipment, published reports.

Visits and exchanges of personnel.

Lectures, colloquia, conferences.

U.K. universities

F.62, F.63 Birmingham University 1948-60

F.62 1948-54 F.63 1957-60

F.64 Bristol University 1958-63

F.65-F.67 Cambridge University 1947-65

Mainly the Cavendish Laboratory but includes some correspondence with other departments, and with overseas colleagues.

F.65 1947-52

F.66 1953-58. Includes original typescript draft of O.R. Frisch's famous joke paper 'On the feasibility of coal-driven power stations'.

F.67 1959-65 (part file only).

Atomic Energy Research Establishment, Harwell

- F.68, F.69 Durham University 1942-56
Correspondence mainly with F.A. Paneth and G.R. Martin.
F.68 1942, 1947-52. Includes correspondence re publication of wartime research.
F.69 1953-56. Mainly on proposed method for absolute calibration of neutron sources, and progress reports.
- F.70 Edinburgh University 1948-56, 1963-64
Research projects, physics teaching.
- F.71 Glasgow University 1956-59
- F.72 Liverpool University 1955, 1964-65
Hire and loan of equipment; fast neutron detector.
- F.73 London University - Imperial College 1947, 1954, 1956-59
Accelerators; deuterium.
- F.74 London University - Queen Mary College,
University College 1950-55, 1963
Brief exchanges only.
- F.75 Manchester University 1951-55
Shower experiments; neutron counters.
- F.76-F.78 Oxford University 1948-65
Correspondence on a wide variety of research projects, mainly with colleagues at the Clarendon Laboratory, but also at the Physical Chemistry Laboratory, the Department of Metallurgy and the Department of Nuclear Physics.
F.76 1948-52
F.77 1953-56. Not a complete file.

Continued

Atomic Energy Research Establishment, Harwell

F.78 1958-65 Includes research agreements and reports on collaborative work on 'Applications of nuclear orientation to solid state physics', 'Scattering of protons by deuterons'.

U.K. Institutions, laboratories and firms

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|------------|---|--|
| F.79 | Admiralty Research Laboratory | 1952-54 |
| F.80 | Associated Electrical Industries (A.E.I.) Research Laboratory | 1951-52, 1963 |
| F.81 | Department of Scientific and Industrial Research (D.S.I.R.)
Various research projects proposed or sponsored. | 1955, 1961, 1964, 1965 |
| F.82 | Imperial Chemical Industries (I.C.I.) | 1949-52 |
| F.83 | Medical Research Council Radiotherapeutic Research Unit | 1949-52 |
| F.84, F.85 | National Physical Laboratory (N.P.L.)
Mainly on collaborative work on calibration of neutron sources. | 1952-64 |
| | F.84 | 1952, 1957-59 |
| | F.85 | 1959-64 |
| F.86, F.87 | United Kingdom Atomic Energy Establishment (UKAEA)
Atomic Weapons Research Establishment (A.W.R.E.) | 1955-63 |
| | F.86 | 1955-60. Actinide Isotopes in the U.K. |
| | F.87 | 1958-63 |
| F.88 | UKAEA Radiochemical Centre (R.C.C.) | 1952-64 |

Atomic Energy Research Establishment, Harwell

U.S.A. Universities, institutions and firms

F.89	Aeronautical Research Laboratories Beryllium targets.	1960
F.90	American Institute of Physics Proposed 'Compilation Journal'.	1957, 1962
F.91, F.92	Brookhaven National Laboratory F.91 1949-52, 1965-66. Velocity selector, scintillation counters, fast neutron detector. F.92 1953-58. Mainly neutron cross section compilation.	1949-66
F.93	California Institute of Technology	1950-56
F.94, F.95	University of California, Los Alamos Scientific Laboratory F.94 1946-52 F.95 1953-56. Includes work on detection of free neutrino.	1946-56
F.96	Carnegie Institute of Technology	1949-50
F.97	Chicago University Institute for Nuclear Studies	1948-57
F.98	Columbia University Pulse height analyser, velocity selector.	1955-57
F.99	Cornell University	1949-55
F.100	General Dynamics Corporation	1956-57

Atomic Energy Research Establishment, Harwell

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|-------|--|----------|--|
| F.101 | High Voltage Engineering Corporation | 1956 | Brief correspondence only, on tandem generator. |
| F.102 | Iowa State College | 1952 | Boron crystals. |
| F.103 | Massachusetts Institute of Technology | 1950-52 | |
| F.104 | National Bureau of Standards | 1949-58 | |
| F.105 | Office of Naval Research | 1951-65 | Correspondence conducted with successive Scientific Liaison Officers at the Branch Office at American Embassy, London, on research, visits, lectures, etc. |
| F.106 | Stanford University | 1952-57 | Plastic scintillators; klystrons. |
| F.107 | United States Atomic Energy Commission
(U.S.A.E.C.) | 1951-63 | |
| F.108 | Miscellaneous shorter correspondence with colleagues in USA, requests for information, thanks for reports and publications, etc. | 1952-61. | |

Europe

- | | | | |
|-------|---|---------|--|
| F.109 | Italy. University of Rome | 1956-57 | Mainly on linear accelerator. |
| F.110 | Spain. Junta de Energia Nuclear, Madrid | 1952-57 | Visits, lectures, training, equipment. |

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- F.111 Sweden. Aktiebolaget Atomenergi (Atomic Energy Co.), Stockholm 1952-64
Equipment, visits, lectures, results.
- F.112-F.119 Switzerland
- F.112 Brown Boveri Company, Baden. 1947-52, 1957
Drawings, patents, visits.
- F.113-F.115 Eidgenössische Technische Hochschule (E.T.H.), Zürich, Physikalisches Institut 1948-62
- F.113 1948-55. Visits, lectures, research, apparatus. Includes drawings.
- F.114 Material re Centenary celebration of E.T.H. which Bretscher (an old student) attended as representative of A.E.R.E., 1955
- F.115 1958-62
- F.116-F.119 Swiss nuclear reactor programme 1955-56, 1963-65. Bretscher was asked to advise. See also A.56.
- F.116 Miscellaneous background material re setting-up of Swiss nuclear energy programme.
- F.117 Correspondence 1955-56 on initial project.
- F.118 1963-65 Mainly on meson factories.
- F.119 Copy of conference paper by A.F. Fritzsche on 'Nuclear Energy Programmes of the Smaller Countries' taking the Swiss nuclear energy programme as an example, 1961.

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U.S.S.R.

- F.120-F.123 Miscellaneous correspondence, visits, exchanges of information, etc.; includes some copies of reports on nuclear research in U.S.S.R.
- F.120 1955-56
- F.121 Report on nuclear physics in U.S.S.R., n.d. c.1955-56, by E. Ajzenberg.
- F.122 Reports and correspondence, 1957-62
- F.123 Similar, 1963-64

COMMITTEES

Harwell and U.K. Data Committees

- F.124 Nuclear Electronics Committee
Bretscher's folder, inscribed 'Data handling computers', mainly reports and background papers for meetings of committee, 1963 and 1965.
- F.125 Harwell Nuclear Data Committee
Bretscher's folder, inscribed 'Nuclear data requirements', mainly reports and background material for meeting of committee in September 1966.
- F.126 Minutes and papers for committee meetings and for 'Nuclear Data Forums', 1968.
- F.127 Similar (few only), 1969, 1970, 1971. 1971 material is re U.K. Nuclear Data Committee meetings.

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International Data Committees

- F.128-F.131 Tripartite Nuclear Cross Sections Committee (T.N.C.C.), 1960-64
This was formed in 1955 to foster collaboration between UK, USA and Canada.
The material consists of general correspondence and papers on research and meetings of the T.N.C.C. Plutonium Subcommittee.
- F.128 April 1960-December 1961
- F.129 1962
- F.130 1963, January-June. Includes correspondence relating to dissolution of T.N.C.C. and transfer of functions to E.A.N.D.C. (q.v.) from 1 May 1963.
- F.131 July 1963-February 1964. Includes continuing correspondence on dissolution of T.N.C.C. and ownership of materials.
- F.132-F.135 European-American Nuclear Data Committee (EANDC), 1958-66.
Bretscher was Chairman.
- F.132 July 1958-January 1959. Correspondence and arrangements for Planning Meeting for formation of committee, held at Harwell December 1958. Includes list of participants, summary of discussions.
- F.133 March 1959-December 1961. Heavy water lattice spectra.
- F.134 May 1961-February 1963. Neutron beam production.
- F.135 1966. Includes 'Third Biennial Report of the Activities of the EANDC' by Bretscher and R. Batchelor.
- F.136 Euratom (European Atomic Energy Committee), 1956-65
Correspondence, notes of discussions, suggestions for collaborative projects, press releases, printed matter.

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F.137-F.139 International Nuclear Data Scientific Working Group (INDSWG),
1961-66

INDSWG was set up by the International Atomic Energy Agency (IAEA) in 1962 and Bretscher was nominated as UK representative.

F.137 1961-63. Nominations, arrangements for first meeting (May 1963), discussion notes and reports.

F.138 1963-64. Second meeting (January 1964).

F.139 1966. Includes correspondence re change of name to International Data Committee and future representation.

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LECTURES AND PUBLICATIONS

- F.140-F.169 Lectures and publications by Bretscher
F.170-F.180 Lectures and publications by others at Harwell

Lectures by Bretscher

- F.140 Correspondence (only) inviting Bretscher to give course of seven 'causeries' on peaceful use of atomic energy for L'Université Radio-phonique Internationale, 1951.
- F.141 'Station Lecture' (on work in progress at Harwell).
3pp. ms. notes, n.d., c.1950.
- F.142 'Use of atomic piles for nuclear measurements'
7pp. typescript, latest reference 1952.
Included in folder are three further lectures on reactor design, piles and neutron energies at Harwell, unsigned but with ms. corrections by Bretscher, and miscellaneous other accounts of research in progress by other members of Nuclear Physics Division, none dated, some probably later, see F.152.
- F.143-F.145 Lectures at University of California, Los Angeles, March 1956.
All accompanied by a clearance note from AERE.
- F.143 'Mesonic X-rays: Showers'. Ms. notes, background material.
- F.144 'Extensive Air Showers'. Ms. and typescript notes and drafts, diagrams, not all by Bretscher. Includes draft for lecture on subject given in Dublin, March 1954, by 'Dr. Galbraith'.
- F.145 'Nuclear constants basic to reactor design'. 11pp. typescript with ms. annotations.
- F.146 Miscellaneous material relating to conference on 'Neutron Physics by Time-of-Flight', Gatlinburg, Tennessee, November 1956. Bretscher chaired a session.
Miscellaneous ms. and typescript drafts, diagrams, not all by Bretscher, programme of conference.

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- F.147 Lecture on 'Nuclear Reactors' to Physical Society, University of Glasgow, February 1957.
9pp. typescript and ms., with clearance note from A.E.R.E.
- F.148, F.149 Lectures at Yale, September 1957.
With clearance note from A.E.R.E.
- F.148 'Reactor Neutron Spectra', 10pp.
- F.149 'Survey of Low Energy neutron physics', 7pp.
- F.150 'Lectures (Durham and Cambridge)'
Correspondence, June 1957-January 1958, re lecture at Durham (F.151) and arrangements for Bretscher to give course of lectures on 'Interactions of Neutrons with Nuclei' at Cavendish Laboratory, Michaelmas Term 1957. Includes summaries of lectures 2-5.
- F.151 'Synopsis of lecture to the Physical Society at Durham'. On nuclear reactors.
5pp. typescript and ms. n.d., perhaps 1958, see F.150.
- F.152 'Lecture to Physical Society, Cambridge'. On work in hand at Harwell.
9pp. typescript and ms. n.d. but probably mid 1950s; includes work on Time of Flight, and cosmic ray research also featured in F.142.
- F.153-F.160 'Australian Lectures', given on visit to Australia in 1961.
- F.153 'The Mössbauer Effect: nuclear resonance fluorescence'
With clearance note from A.E.R.E.
Ms. and typescript notes, drafts, calculations; a little background material.
- F.154 'The British nuclear power programme and some of the factors which determine the economics of the U.K. nuclear energy production'.
6pp. typescript and ms. draft, with diagrams attached and some ms. comments by M.J. Poole.

Continued

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- F.155 'Neutron physics in the intermediate energy region'.
With clearance note from A.E.R.E.
Several typescript and ms. notes and drafts, some probably from previous lectures; a little printed matter.
- F.156 'Survey of the ideas on neutron nuclear interaction'.
7pp. typescript and ms. draft.
- F.157 'Basic data for reactor physics calculations. Part A: Moderator scattering'.
With clearance note from A.E.R.E.
9pp. typescript and ms. draft, with diagrams attached.
- F.158 'Basic data for reactor physics calculations. Part B: nuclear data'.
With clearance note from A.E.R.E.
6pp. typescript and ms. draft, with diagrams attached.
- F.159 'Slides'.
Slide lists, diagrams and other background information.
- F.160 Itinerary and schedule of lectures. Included here are clearance notes for two additional lectures given on the tour, on 'An experimental test of the statistical theory of nuclear reactions' and 'Quasi-elastic scattering of protons ...'.
- F.161 'Nuclear physics in its relation to the National Atomic Energy Program'.
Lecture at Institute of Physics conference on 'Low Energy Nuclear Physics', Harwell, September 1962.
10pp. typescript and ms. draft with intercalated notes and diagrams; conference programme.
- F.162 'The relation of neutron physics to the development of atomic energy'.
Variously paginated typescript and ms. draft for lecture at Los Alamos, February 1963.
Also included are notes for talk on Time of Flight by M.S. Coates, November 1962.
- F.163 10pp. typescript and ms. draft +3pp. tables, for lecture of same title, given at Bonner Memorial Conference, Houston, February 1963.

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- F.164 'Introductory talk' at International Conference on the Study of Nuclear Structure with Neutrons', Antwerp, July 1965.
- F.165 Undated:

1p. only, on work of Nuclear Physics Division, A.E.R.E.

3pp. 'Draft Programme Review'.

Book reviews by Bretscher

1948-61

Drafts; may include a little correspondence with colleagues and editors.

- F.166 1948-52
- F.167 1954-55. Includes miscellaneous recollections of E. Fermi (d.1954), one of which refers to 'small private course' on radiation theory and quantum electrodynamics given by Fermi to Bretscher and a few others at Los Alamos during Bretscher's last summer there (1946). Perhaps related to notes in C.6. Work probably intended for Royal Society Memoir of Fermi, on which Bretscher and Cockcroft collaborated.
- F.168 1956, 1958, 1959
- F.169 1960, 1961.

Lectures by others at Harwell

- F.170 Course of twenty lectures by O.R. Frisch, given December 1946-June 1947. Duplicated typescript.
- F.171 Two papers by J.V. Dunworth. n.d., latest reference 1947.
- F.172 'Atomic piles and their use in nuclear physics'
17pp. +1p. references. Latest reference 1949.

Lectures and notes by T.M. Fry (1950), E.R. Rae (1958).
- F.173 Lecture given in Dublin 1954. No author.

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- F.174 Shorter correspondence, memos. etc. re lectures given by members of Harwell staff, 1950s.
- F.175 Similar material, 1962-64.

Publications by others at Harwell

Correspondence, drafts, etc. relating to submission or refereeing of papers, reviews, etc.

- F.176 1948-51
- F.177 1952-53
- F.178 1954-55
- F.179 1956-57
- F.180 1958-60. Includes draft of article by American visitor on 'Living and Working at Harwell' and photograph, July 1960.

SECTION G VISITS G.1 - G.14

It is clear from correspondence and references elsewhere that the surviving material does not adequately represent Bretscher's visits to lectures, conferences or laboratories.

- G.1 Invitation to attend 200th Anniversary of Naturforschende Gesellschaft, Zürich. Correspondence only. 1946
- G.2 Correspondence re visit to Switzerland and Italy. Bretscher's carbons only. 1948
- G.3 Visit to U.S.A. and Canada, September-November 1951
This was an official visit, and included attendance at International Conference on Nuclear Physics at Chicago, lectures and visits at several laboratories and institutions and renewal of personal contacts. Bretscher visited Washington, Oak Ridge, Houston, Los Angeles, Los Alamos and Brookhaven in U.S.A. and Chalk River, Montreal and Ottawa in Canada.
Material includes invitations, travel arrangements and funding, programme and participants at conference, correspondence with colleagues, etc. There is a little scientific correspondence arising. Tagged inside front cover of folder is Bretscher's 3pp. ms. list of research workers and projects at various centres.
- G.4 Visit to Italy. 1953
Brief correspondence only.
- G.5 Visit to Philips, Eindhoven (declined). 1958
- G.6-G.13 Anglo-Russian visits. 1963-66
G.6 Visit to certain laboratories for low and high energy physics in the U.S.S.R., June 1963.
This was under the auspices of the UK/USSR agreement; five physicists from A.E.R.E. and three from Rutherford Laboratory visited Moscow, Dubna, Leningrad, Kharkov and Yerevan.
Material is mainly reports on the visit; brief notes only by Bretscher.

Continued

Visits

G.7 Visit of Russian physicists to U.K. laboratories and universities, December 1965.

Programme of visits, list of participants, photographs.

G.8-G.12. Visit to laboratories for low and high energy physics in the U.S.S.R. June 1966

A similar visit to that of June 1963. Bretscher was one of the five members of the A.E.R.E. delegation and visits were made to Moscow, Obninsk, Serpukhov, Novosibirsk, Leningrad, Kharkov and Dubna.

G.8 Travel arrangements and itineraries.

G.9 Notebooks and loose pages of notes by Bretscher.

G.10 Photographs and memorabilia, greetings from Russian colleagues.

G.11 Russian reports on work at Dubna, Novosibirsk, Obninsk.

G.12 U.K. reports on visit.

G.13 Miscellaneous reports on Russian atomic energy, exchange visits scheme, etc, kept with material for 1966 visit. various dates 1959-66.

G.14 Seminar on Intense Neutron Sources (SINS), Santa Fe, September 1966.
Draft report, ms. and typescript comments by Bretscher, final version.
Brief personal correspondence also included.

SECTION H CORRESPONDENCE H.1 - H.80

The surviving correspondence is unfortunately scanty and there are few substantial sequences. It is presented alphabetically, dated and indexed, with a brief indication of content or other information where appropriate.

- H.1 Aharoni, J. 1930
Two letters, from Freiburg.
- H.2 Alvarez, L. 1948
Colleague at Los Alamos. Bretscher's carbons only.
- H.3 Arnold, L. 1972
M.M. Gowing's history of atomic energy.
- H.4 Balmer, J.J. 1896
Letter to family with (on verso) table of helium spectrum lines; diagram of colours; diagrams of polyhedra.
Balmer, a distinguished Swiss scientist, is best known for his work on hydrogen spectrum lines; this letter indicates his interest also in helium spectra.
The material was passed on via Lydia Knapp-Balmer, wife of Balmer and a friend of Hanni Bretscher's mother.
- H.5 Bloch, F. 1930, various dates
1937-53
Felix Bloch was a lifelong friend from early days in Switzerland. He later moved to America and settled at Stanford. He was awarded the Nobel Prize in 1952.
The letters are mainly personal, Bloch's letters addressing Bretscher as 'Gon'; letters of 1930 are from Bloch in hospital, and from Bloch's mother, both referring to the mountaineering accident in August when Bloch broke a leg and Bretscher contributed largely to saving his life when they had to spend two nights in the open.
- H.6 Blok, A. 1950, 1971
- H.7 Breit, G. 1952, 1958
Visits and research.
- H.8 Bretscher, A.A. (cousin) 1946

Correspondence

H.9	Burcham, W.E.	1969
H.10	Cartwright, M.L.	1949
H.11	Casimir, H.B.G. Exchange of wartime news.	1945
H.12-H.14	Chadwick, J.	1948, 1960, 1961, 1967
	H.12 1948 (isotopes), 1960 (publication of A.E.R.E. research).	
	H.13 1961, 1966. Celebrations for Chadwick's 70th and 75th birthdays.	
	H.14 1971. One letter only, from Chadwick, on 80th birthday.	
H.15	Cockburn, R. Brief correspondence only.	1958, 1966
H.16	Cockcroft, J.D.	various dates 1964-67
H.17	Cook, L.G. Former Cambridge colleague, later working at various research stations in Canada.	1939-41, 1944, 1947
H.18	Debye, P. Two letters only.	1931, 1937
H.19	Dee, P.I. Bretscher's carbon only, on T.R.E. and radar.	1948
H.20	de Hoffmann, F. Colleague at Los Alamos; mainly on publications.	1947, 1950
H.21	Dunworth, J.V. Bretscher's carbon only.	1965

Correspondence

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|------|--|---------------|
| H.22 | Eckart, C.
Reports on dispersal experiments in the Irish sea. | 1951-52 |
| H.23 | Eucken, A.
Work on dielectric constants of crystals. | 1934 |
| H.24 | Feather, N.
Postwar appointments; possible monograph by Bretscher. | 1945-46 |
| H.25 | Fisch, I.
Uranium waste; use of isotopes. | 1955 |
| H.26 | Foster, R.C. (formerly Fleischner)
Foster and his wife were old friends, originally of Hanni Bretscher's family. They had been seed merchants in Czechoslovakia and after various migrations settled in America before returning later in life to Switzerland (information from Mrs. Bretscher, 1986). All the correspondence in the folder is from and to America. Earlier letters include news of family in Czechoslovakia. | 1943-50, 1963 |
| H.27 | French, A.P. | 1949-54, 1958 |
| H.28 | Frisch, O.R.
Correspondence 1946 is <u>re</u> Harwell and Frisch's and Bretscher's appointments there. | 1946-48 |
| H.29 | Fuchs, K.
One letter only, on 'Sea Nuts' research report. The letter is accompanied by a note on Fuchs contributed by Mrs. Bretscher, 1986. | 1948 |
| H.30 | Garside, L. | 1971 |
| H.31 | Goldhaber, M.
Neutron measurements. | 1949, 1950 |

Correspondence

H.32	Gowing, M.M. Bretscher's comments on history of atomic energy.	1971
H.33	Halban, H.H. v Brief correspondence only.	1950, 1959
H.34	Hampelman, L. Colleague at Los Alamos. One letter only.	1948
H.35	Hughes, D.J.	1948
H.36	Kapitza, P. Rutherford centenary colloquium in Moscow. Includes draft reply from Bretscher on his contacts with Rutherford.	1971
H.37	King, P.	1955, 1965
H.38	King, R.	1964
H.39	Konopinski, E.	1948, 1950
H.40	Kowarski, L. Research, postwar plans, etc.	1944-46, 1951-52, 1955
H.41	Lane, A.M.	1960
H.42	Lauritsen, C.C. Bretscher's carbons only.	1948, 1949
H.43	Logue, J.T. Atomic bomb.	1945
H.44	London, L.	1971

Correspondence

H.45	MacKenzie, K.R.	1962-63
H.46	Mark, C. Brief correspondence only, <u>re</u> photographs of J. von Neumann.	1965
H.47	Marshall, W.	1971
H.48	Martin, E.B.M.	1971
H.49	Mullett, L.B.	1966
H.50	Neddermayer, S. Career plans after Los Alamos.	1946
H.51-H.53	Oliphant, M.L. Oliphant was one of Bretscher's oldest friends in Britain; the correspondence is on careers and research.	1939-53
	H.51 1939-43	
	H.52 1945-46. Mainly postwar career plans.	
	H.53 1947-53	
H.54	Paneth, F.A. One letter only, on death of Bretscher's mother.	1949
H.55	Paul, E.	1966
H.56	Pölya, G. Bretscher's carbon only.	1944
H.57	Poole, M.J.	1946, 1951

Correspondence

H.58	Rothschild, N.M.V. Bretscher's carbon only, on leading physicists.	1966
H.59	Scherrer, P.	n.d.
H.60	Seligman, H. Mainly post-retirement plans.	1966, 1968, n.d.
H.61	Sellschop, J.P.F. Possible visit to South Africa.	1966
H.62	Sigg, E. Schoolfellow at Zürich Gymnasium.	1945-46
H.63	Sinelnikova, E.A. Widow of Russian colleague.	1967
H.64	Staub, H. Research and appointments; includes a little correspondence from Erika Staub.	1945-51
H.65	Strang, G. Two letters only.	1965
H.66	Taschek, R.F.	n.d.
H.67	Teller, E. Publications, visits, etc. Correspondence 1948 includes humorous verses by Teller 'Exceedingly small' (on mesons) on the Solvay Conference in June of that year.	1945, 1947-51
H.68	Titterton, E.W.	1966
H.69	Vick, F.A.	1966, 1967

Correspondence

H.70	Waller, I.	1971
H.71	Weber, E. Exchange of postwar news with old friend from Zürich.	1946
H.72	Weisskopf, V.F. Bretscher's carbon only.	1950
H.73	Wilkinson, D.H.	1946, 1954
H.74	Wilson, C.T.R. One letter only. See also F.70.	1948
H.75, H.76	Shorter personal and scientific correspondence. Not indexed. H.75 1944-55 H.76 1960-71 and n.d.	

REFERENCES AND ASSESSMENTS

H.77	1944
H.78	1966
H.79	1967. Grant applications (1)
H.80	1967. Grant applications (2)

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