

THE ROYAL COMMISSION ON HISTORICAL MANUSCRIPTS

Report on the correspondence and papers

of

FRANCIS WILLIAM ASTON

(1877-1945)

physicist and chemist

in

Department of Manuscripts and University Archives, Cambridge University Library

Reproduced for the National Cataloguing Unit for
the Archives of Contemporary Scientists

(NCUACS 101/6/01)

by

The Royal Commission on Historical Manuscripts

Quality House, Quality Court, Chancery Lane, London WC2A 1HP

2002

All rights reserved

No 7/02
NRA 43881

Catalogue of the papers and correspondence of

Francis William Aston FRS

(1877-1945)

by Peter Harper and Timothy E. Powell

NCUACS catalogue no. 101/6/01

Title: Catalogue of the papers and correspondence of Francis William Aston FRS (1877-1945), chemist

Compiled by: Peter Harper and Timothy E. Powell

Description level: Fonds

Date of material: 1911-1945

Extent of material: 1 box, *ca* 70 items

Deposited in: Department of Manuscripts and University Archives, Cambridge University Library

Reference code: GB 0012 CUL

© 2001 National Cataloguing Unit for the Archives of Contemporary Scientists,
University of Bath.

NCUACS catalogue no. 101/6/01

The work of the National Cataloguing Unit
for the Archives of Contemporary Scientists, and
the production of this catalogue, are made possible
by the support of the following societies
and organisations:

The Biochemical Society

The British Crystallographic Association

The Geological Society

The Institute of Physics

The Royal Society

The Royal Society of Chemistry

Trinity College Cambridge

The Wellcome Trust

NOT ALL THE MATERIAL IN THIS COLLECTION
MAY YET BE AVAILABLE FOR CONSULTATION.
ENQUIRIES SHOULD BE ADDRESSED IN THE
FIRST INSTANCE TO:

THE KEEPER OF MANUSCRIPTS AND UNIVERSITY ARCHIVES
CAMBRIDGE UNIVERSITY LIBRARY
WEST ROAD
CAMBRIDGE

LIST OF CONTENTS

		Items	Page
GENERAL INTRODUCTION			
SECTION A	RESEARCH	A.1-A.5	7
SECTION B	ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH	B.1-B.9	8
SECTION C	PUBLICATIONS	C.1-C.20	10
SECTION D	INTERNATIONAL UNION OF CHEMISTRY	D.1-D.10	12
SECTION E	CORRESPONDENCE	E.1-E.25	14
INDEX OF CORRESPONDENTS			17

GENERAL INTRODUCTION

PROVENANCE

The papers were received for cataloguing from Cambridge University Library in November 2000.

OUTLINE OF THE CAREER OF FRANCIS WILLIAM ASTON

Francis William Aston was born at Harborne, near Birmingham on 1 September 1877. He was educated at Malvern College and Mason College (which later became the University of Birmingham) where he studied chemistry under P.F. Frankland and W.A. Tilden and Physics under J.H. Poynting. Awarded the Forster scholarship he studied optical rotation with Frankland, 1898-1900. Aston then left academic life for three years to work for a firm of brewers. However, he continued to research privately, particularly with discharge tubes. This work attracted the attention of Poynting and in 1903 Aston returned to Birmingham to continue his research in Poynting's department.

At the end of 1909 he accepted an invitation from Sir J.J. Thomson to work as his assistant on positive rays at the Cavendish Laboratory, Cambridge. He took a B.A. degree by research in 1912 and in 1913 the university recognised his distinction in research by electing him as Clerk Maxwell student. It was during this period that he obtained definite evidence for the existence of two isotopes of the inert gas neon. Aston's research was interrupted by the First World War during which he worked at the Royal Aircraft Establishment, Farnborough, principally on aircraft fabrics and dopes (synthetic coatings). In 1919 he returned to the Cavendish Laboratory to research the separation of the isotopes of neon. This was accomplished by his invention of the mass spectrograph, an apparatus which enabled him to utilise the very slight differences in mass of the two isotopes to effect their separation. He extended this principle to other chemical elements, discovering, in a series of measurements, 212 of the naturally occurring isotopes. From this work he formulated the whole number rule which states that, the mass of the oxygen isotope being defined, all the other isotopes have masses that are very nearly whole numbers.

In 1920 Aston was elected to the Fellowship of Trinity College Cambridge. He was elected FRS in 1921 (Hughes Medal 1922; Bakerian Lecture 1927), and in 1922 he was awarded the Nobel Prize for chemistry 'for his discovery, by means of his mass spectrograph, of isotopes, in a large number of non-radioactive elements, and for his enunciation of the whole number rule'.

Aston's interests in astronomy and photography led to his membership of expeditions that studied eclipses in Sumatra (1925), Canada (1932) and Japan (1936). He served as President of the

International Union of Chemistry's Commission on Atoms, 1935-1945. He continued to live and work in Cambridge, where he died on 20 November 1945.

DESCRIPTION OF THE COLLECTION

The material in this small collection covers the period 1911-1945. It is presented in five sections in the order given in the list of contents.

Section A, Research, consists of four notebooks recording work on positive rays, 1911-1913, and a few unidentified manuscript calculations.

Section B, Royal Aircraft Establishment, Farnborough, consists of reports on Aston's work submitted to the Advisory Committee for Aeronautics, 1917-1919 and a humorous account of wartime activities at Farnborough by an unidentified author.

Section C, Publications, consists of manuscript and typescript drafts of a small number of Aston's publications, illustrative material, off-prints by Aston 1919-1939, and a number of typescripts of papers by others including W.H. Bragg, O.J. Lodge and W.J. Pope.

Section D, International Union of Chemistry, consists of correspondence and papers, 1935-1945, relating to Aston's Presidency of the Union's Commission on Atoms.

Section E, Correspondence, consists of a chronological sequence of correspondence relating to Aston's scientific work, 1914, 1922-1945, and n.d. The sequence is predominantly incoming with a few manuscript drafts by Aston, some on the verso of incoming letters. It provides some documentation of Aston's visits and conferences, especially a visit to the USA in 1922 to lecture at the Franklin Institute, Philadelphia, Pennsylvania.

There is also an index of correspondents.

P. Harper
T.E. Powell
Bath, 2001

SECTION A

RESEARCH

A.1-A.5

- A.1 Notebook with label on front cover inscribed 'F.W. Aston Small Negs: 1-72'.

No.26 'Oxygen' is dated 'Jan 12. - 11' and a note that 'Apparatus [was] reconstructed with much finer canal tube and more perfect isolation of the camera' is dated 'Feb 1911'. Almost all the work is undated.

Enclosed at front is a card with typescript note 'Dr. F.W. Aston's Research Note Books on Positive Rays. Dr. Aston was a Fellow of Trinity College [Cambridge] and worked in the Cavendish from 1909-1945.'
- A.2 Notebook with label on front cover inscribed 'F.W. Aston Small negs. 73-101'.

No.80 follows a note that apparatus has been rebuilt dated 'Aug 1911'. Work continues to March 1912 but almost all work is undated.
- A.3 Notebook with label on front cover inscribed 'F.W. Aston 2 ½ x 4 negs 1 - 90'. Inscribed on first page 'Positive Ray photographs 2½" x 4" F.W. Aston'.

Record of work from 'July 1912' to 'April 25th [1913]' with a little later work undated
- A.4 Notebook with label on front cover 'F.W. Aston 2 ½ x 4 Negs 91-158'.

Record of work beginning 'May 16th [1913]'. No.136 follows date 'Nov 1913'.

Many pages unused.
- A.5 Unidentified manuscript calculations, n.d

SECTION B

ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH

B.1-B.9

- B.1 Advisory Committee for Aeronautics 'Report on the Action of Sunlight on Aeroplane Fabric: Its Nature and Prevention' by Aston. Report No. T.1019.
- Presented by the Superintendent, Royal Aircraft Factory, October 1917.
- 16pp duplicated typescript with some manuscript annotation + spectra and figures.
- B.2 Advisory Committee for Aeronautics 'Report on Some Strength Tests of Aeroplane Fabric Exposed to Weather and Their Relation to Sunlight Intensity' by Aston. Report No. T.1112.
- Presented by the Superintendent, Royal Aircraft Factory, March 1918.
- 4pp duplicated typescript with some manuscript annotation + figures.
- B.3 Advisory Committee for Aeronautics 'Report on the Use of Neon Lamps for Stroboscopic Testing of Revolution Indicators' by Aston. Report No. T.1118.
- Presented by the Superintendent, Royal Aircraft Factory, March 1918.
- 10pp duplicated typescript + figures.
- 'Counters' in the title is crossed out and replaced with 'Indicators' in manuscript with the manuscript instruction 'to alter this throughout'.
- B.4 Advisory Committee for Aeronautics 'Report on the Comparative Weathering Qualities of British and German Doped Fabric'. Report No. T.1158.
- Presented by the Director General of Aircraft Production, May 1918.
- 4pp duplicated typescript; proof with manuscript corrections of printed version.
- B.5 Advisory Committee for Aeronautics 'Report on the Measurement of Tautness of Doped Fabric' by Aston. Report No. T.1273.
- Presented by Controller, Technical Department, Aircraft Production, December 1918.
- 12pp duplicated typescript + figures.

Royal Aircraft Establishment, Farnborough

- B.6 'Fabric & Dope with special reference to deterioration of strength and tautness'.

Abstract and 23pp typescript report by Aston, Royal Aircraft Establishment, Farnborough, January 1919.
- B.7 Advisory Committee for Aeronautics 'Report on Further Experiments upon the Action of Light on Fabric and its Prevention' by Aston. Report No. 1298. Continuation of Report T.1019.

Presented by Controller, Technical Department, Aircraft Production, February 1919.

6pp duplicated typescript + figure; printed version.
- B.8 'The Book of Aeron commonly called the Revelations of Abah the Experimenter'.

Duplicated typescript of humorous account of wartime activities of the Royal Aircraft Establishment, Farnborough, written in a style inspired by the Old Testament with illustrations inspired by various periods of antiquity.
- B.9 Manuscript notes and calculations probably relating to work at Royal Aircraft Establishment, Farnborough.

Many of the notes are on headed notepaper for 'Chudleigh, Farnborough, Hants'.

SECTION C

PUBLICATIONS

C.1-C.20

- C.1 'On the homogeneity of atmospheric Neon'.
14pp typescript with manuscript additions and corrections, n.d.
1913 is the latest date given in the text which may relate, however, to 'The constitution of Atmospheric Neon', *Phil. Mag.*, **xxxix**, April 1920, 449-455. See C.3.
- C.2 'A positive Ray Spectrograph', *Phil. Mag.*, **xxxviii**, December 1919, 707-714.
10pp typescript with manuscript additions and corrections.
- C.3 'The constitution of Atmospheric Neon', *Phil. Mag.*, **xxxix**, April 1920, 449-455.
9pp typescript with manuscript additions and corrections, dated Cavendish Laboratory, [Cambridge], December 1919.
- C.4 'The Mass spectra of the Alkali Metals', *Phil. Mag.*, **xlii**, September 1921, 436-441.
9pp typescript with manuscript additions and corrections, dated Cavendish Laboratory, [Cambridge], May 1921.
- C.5 'The Mass-Spectrum of Uranium Lead and the Atomic Weight of Protactinium', Letter to the Editor, *Nature*, **123**, 2 March 1929, 313.
Printed text only.
- C.6 'Atomic Theory'.
Letter from J. Needham, enclosing 'the stenographer's typescript' of lecture on atomic theory given by Aston in the 'first term's working of the History of Science course', 25 November 1937.
Title page and 21pp typescript of lecture.
The lectures organised by the History of Science Committee for 1936 were published by Cambridge University Press in 1938.

Publications

- C.7 Manuscript and typescript notes and drafts of account of the Cavendish Laboratory, [Cambridge], n.d.
- C.8 Shorter typescript drafts on 'Isotopes and the Periodic Law', 'Atoms and Isotopes (Summary)', etc., n.d.
- C.9 Shorter manuscript notes on isotopes, etc., 1920 and n.d.
- C.10-C.12 Illustrative material.
3 folders.
- C.13 Correspondence *re* Aston's off-prints, 1951-1955.
- C.14 Off-prints, 1919-1939. 1 bundle.
Not a complete set.
- C.15-C.20 Typescripts of papers by others
- C.15 K.T. Bainbridge.
- C.16, C.17 Sir William H. Bragg.
2 folders.
- C.18 Sir Oliver Lodge.
- C.19 Sir William J. Pope.
- C.20 Unidentified.

SECTION D

INTERNATIONAL UNION OF CHEMISTRY

D.1-D.10

Aston was invited to assume the Presidency of the International Union of Chemistry's International Commission on Atoms in March 1935. The other members of the Commission were Niels Bohr, University of Copenhagen, Otto Hahn, Friedrich Wilhelms Universität, Berlin, W.D. Harkins, University of Chicago, and Georges Urbain, Laboratoire de Chemie Minérale, Sorbonne, Paris. The first task of the Commission under Aston's Presidency was to undertake the publication of a table of isotopes. In 1937 M.L.E. Oliphant and R.S. Mulliken joined the Commission and in 1939 F. Joliot became a member in place of Urbain who had recently died.

The International Union of Chemistry was based in Paris where its Secretary General, Jean Gérard, was one of Aston's principal correspondents. Despite the location of the Union in Paris and the international membership of the Commission, the Commission sought to continue work into the first years of the Second World War through the agency of E. Briner of the Conseil de la Chemie Suisse, Geneva, Switzerland.

Correspondence and papers, 1935-1945.

- D.1 1935 March - December.
- Includes invitation to Aston to serve as President of the Commission on Atoms and 'a provisional Table of Stable Isotopes' sent by Aston to members of the Commission for their consideration.
- D.2 1936 January - December.
- Includes 'First Report of the Committee on Atoms of the International Union of Chemistry'.
- Aston preferred the term 'Committee' to 'Commission' for the body of which he was President.
- D.3 1937 March - July.
- Includes proofs of second report of the Committee on Atoms of the International Union of Chemistry.
- D.4 1938 March - December.
- Includes papers *re* 'Report 1938'.

International Union of Chemistry

- D.5, D.6 1939 March - October.

2 folders.

D.6 includes printed versions of fourth report of the Committee in English, French and German.
- D.7 1940 January - April.

Includes printed version of fourth report of the Committee with annotation ? for fifth report.
- D.8 1941 April - December.

Includes typescript draft of sixth report for 1941. Not published.
- D.9 1942 January - October.

Includes manuscript and typescript drafts of 'Sixth Report of the Committee on Atoms. 1941, 1942'.
- D.10 1944, 1945.

SECTION E

CORRESPONDENCE

E.1-E.25

A chronological sequence of correspondence relating to Aston's scientific work, 1914, 1922-1942, n.d.

Predominantly incoming letters with a few manuscript drafts by Aston, some on verso of incoming letters.

- | | |
|---------|---|
| E.1 | 1914.

1 letter only. |
| E.2 | 1921.

Includes invitation from Franklin Institute, Philadelphia, Pennsylvania for Aston to deliver a course of five lectures in 1922 on his recent work. |
| E.3-E.7 | 1922 February - July and n.d. [1922].

Correspondence predominantly relates to Aston's visit to the USA to lecture at the Franklin Institute, Philadelphia. Aston gave a series of five lectures on 'Atomic Weights and Isotopes' at the Institute, 6-10 March. During his visit to the USA he also lectured at Cornell University, Ithaca, New York, Harvard University, Cambridge, Massachusetts and Johns Hopkins University, Baltimore, Maryland. |
| E.3 | February 1922. |
| E.4 | March 1922. |
| E.5 | April 1922. |
| E.6 | June, July 1922. |
| E.7 | N.d. [1922]. |

Correspondence

- E.8 1923.

Includes letter informing Aston of the award to him of the John Scott Medal of the City of Philadelphia.
- E.9 1924.

Includes invitation in the form of a printed circular to the 105th annual meeting of the Swiss Natural Sciences Society, Lucerne, 1-4 October 1924. Aston gave a lecture on atoms and isotopes at the meeting.
- E.10 1925.

Includes programme for the 'Twintigste Nederlandsch Natuur- en Geneeskundig Congres', Groningen, 14-16 April 1925. Aston gave a lecture on 'Isotopes and the Periodic Law'.
- E.11 1926-1927.
- E.12 1928-1929.

Includes correspondence 1929 *re* visit to the Indian Institute of Science, Bangalore and to Malaya.
- E.13 1930-1931.

Includes correspondence *re* physics meeting promoted by the Volta Foundation and held in Rome, 11-18 October 1931.
- E.14 1932.
- E.15-E.17 1932-1933 and n.d.

Correspondence, drafts and spectra from K.T. Bainbridge of the Bartol Research Foundation of the Franklin Institute, Philadelphia, Pennsylvania. See also C.15.

3 folders.

/...

Correspondence

- /...
- E.17 includes 15pp typescript with manuscript additions and corrections entitled 'Description of a New Mass-Spectrograph including summary of scope and importance of work in relation to other fields'. The typescript has a manuscript inscription at the head of the first page 'Submitted to National Research Council as part of an application for a grant-in-aid'. It is signed by Bainbridge (p.15) but not dated (latest bibliographical reference 1933).
- E.18 1934.
- E.19 1935.
- E.20 1936.
Includes correspondence *re* visit to Japan.
- E.21 1937-1938.
- E.22 1940.
Includes correspondence and printed papers *re* the use of the mass spectrometer in the analysis of petroleum products.
- E.23 1941.
- E.24 1942.
- E.25 N.d.

INDEX OF CORRESPONDENTS

ABRAHAM, Henri	E.18, E.20
AMES, J.S	E.4
ANDREI, Ion	E.14
ANGLO-IRANIAN OIL CO. LTD	E.22
ASTON, Helen M.	C.13
BAINBRIDGE, Kenneth T	C.15, E.15-E.17
BAXTER, Gregory Paul	E.11, E.23
BIRGE, Raymond T.	D.2
BLEAKNEY, Walker	E.19
BOARD OF DIRECTORS OF CITY TRUSTS, Philadelphia	E.8
BOGERT, Marston Taylor	D.7
BOHR, Niels	D.5
BOUSQUET, J.	D.4, D.5
BRAGG, Sir William Henry	See C.16, C.17
BRAGG, Sir (William) Lawrence	See C.13
BRINER, E.	D.8, D.9
BRYDEN, Samuel D., Jr	E.13
CHAMPETIER, G.	D.4
COSTA, Joseph L.	E.11
DAVIS, Bergen	E.18
DEMPSTER, Arthur J.	E.2, E.8, E.19, E.20, E.23
DOCKSEY, Patrick	E.22
DOUY, O.	E.6
DUNN, F.P.	E.6

Index of correspondents

EAGLE, Albert	E.24
EDWARD ARNOLD & CO.	E.6
EGUCHI,	E.20
FERMI, Enrico	E.13
FLÜGGE, S.	D.5
FORBES, Alexander	E.4
GERARD, Jean	D.1-D.5, D.7, D.10
GEYELIN, Henry L.	E.7
GLAISHER, James Whitbread Lee	E.9
GLAZEBROOK, Sir Richard Tetley	E.19 See also E.18
GOLDHABER,	E.24
GRAY, Robert WHYTLAW -	E.23
GREAT BRITAIN AND NORTHERN IRELAND	
FOREIGN OFFICE	E.8
HAAS, [?W.J.] de	E.10
HAHN, Otto	D.1, D.2, D.4, D.5
HARDY, Godfrey Harold	E.25
HARKINS, William D.	D.1, D.3, D.4, D.7
HEILAND, Louis	E.8
HEVESY, George de	E.14
INTERNATIONAL UNION OF CHEMISTRY	D.1-D.7, D.10
INTERNATIONAL UNION OF PURE AND APPLIED PHYSICS	E.18, E.20

Index of correspondents

JAEGER, F.M.	E.10
JOLIOT, Frédéric	D.7
KNIPP, C.T.	E.3
KOHLWEILER, Emil	E.2
LANGMUIR, Irving	E.3
LODGE, Sir Oliver Joseph	C.18
LYMAN, Theodore	E.4
MARCONI, Guglielmo	E.13
MATTAUCH, Josef	D.5, E.21
MERRITT, E.	E.4
MICHELSON, Albert Abraham	E.3
MORISON, Sir Theodore	E.9
MULLIKEN, Robert Sanderson	D.3-D.5, D.7
<i>NATURE</i>	See D.9
NEEDHAM, Joseph	C.6
OLIPHANT, Sir Mark (Marcus Laurence Elwin)	D.5, D.7, E.21
OWENS, R.B.	E.2
PEGRAM, George B.	E.5
PIGGOT, Charles S.	E.11, E.12
POPE, Sir William Jackson	See C.19

Index of correspondents

SCHWYZER, Fritz	E.8, E.9
SCOTT, Arthur F.	E.12
SMITH, Sir Frank Edward	E.22
STONE, Edith A.	E.9
TAYLOR, D.D.	E.22
<i>THE TIMES</i>	E.12
UNION INTERNATIONALE DE CHIMIE	See International Union of Chemistry
UNION INTERNATIONALE DE PHYSIQUE PURE ET APPLIQUÉE	See International Union of Pure and Applied Physics
UNITED GEOPHYSICAL COMPANY	E.22
URBAIN, Georges	D.1, D.2
WARD, R.M. BARRINGTON -	E.12
WATSON, H.E.	E.12
WILSON, W.	E.3, E.5