Catalogue of the papers and correspondence of

# Stanley Keith Runcorn FRS

(1922-1995)

## VOLUME I

General Introduction

Section A: Biographical

Section B: University of Manchester

Section C: University of Newcastle

Section D: Research

Section E: Publications

Section F: Lectures

by Timothy E. Powell and Caroline Thibeaud
NCUACS catalogue no. 104/3/02

| | |
|---|---|
| Title: | Catalogue of the papers and correspondence of Stanley Keith Runcorn FRS (1922-1995), geophysicist |
| Compiled by: | Timothy E. Powell and Peter Harper |
| Description level: | Fonds |
| Date of material: | 1936-1995 |
| Extent of material: | 100 boxes, *ca* 2,800 items |
| Deposited in: | College Archives, Imperial College London |
| Reference code: | GB 0098 B/RUNCORN |



NCUACS catalogue no. 104/3/02

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:

Friends of the Center for History of Physics,
American Institute of Physics

The British Computer Society

The British Crystallographic Association

The Geological Society

The Institute of Physics

The Royal Society

The Royal Astronomical Society

The Royal Society of Chemistry

The Wellcome Trust

**LIST OF CONTENTS**

## GENERAL INTRODUCTION

### PROVENANCE

The papers were received from Mr Neil Molyneux, nephew, in May 1998.

### OUTLINE OF THE CAREER OF STANLEY KEITH RUNCORN

Runcorn was born on 19 November 1922 in Southport, Lancashire. He was educated at King George V School in Southport, before going on to Gonville and Caius College Cambridge in 1941. He studied for the Mechanical Sciences Tripos 1941-1943 (graduated BA in 1944, MA 1948) before war service as an Experimental Officer at the Radar Research and Development Establishment, Great Malvern, Worcestershire 1943-1946.

In 1946 he moved to the University of Manchester where he was Assistant Lecturer in Physics 1946-1948 and Lecturer in Physics 1948-1949. He undertook research under P.M.S. Blackett on the Earth's magnetic field and was awarded his Ph.D. in 1949. Runcorn returned to Cambridge in 1950, where he was made Assistant Director of Research in the Department of Geodesy and Geophysics. Building on his work at Manchester, he established a research team to work on palaeomagnetism. Leaving Cambridge in 1956, he moved to Newcastle to take up the Chair of Physics at King's College (then part of the University of Durham, becoming the University of Newcastle upon Tyne in 1963), a post he held until his retirement in 1988. After retirement Runcorn continued active research. He was appointed Sydney Chapman Professor of Physical Science at the University of Alaska and was also a Senior Research Fellow at Imperial College London.

Runcorn was murdered in a hotel room in San Diego, California in December 1995, at the age of 73.

Runcorn was one of the most distinguished British geophysicists of the twentieth century. He made important contributions in a number of areas, with an active research career spanning six decades. Under Blackett in the late 1940s he studied how the intensity of the magnetic field of the Earth increases with depth. This work, carried out in deep coal mines in England, disproved Blackett's initial predictions from his theory on the generation of magnetism by rotating bodies. Runcorn continued this research at Cambridge, while also beginning to study the polarity reversals of the Earth's magnetic field. From the 1950s, using samples of igneous and sedimentary rocks, many derived from field trips to the American west, he demonstrated that the ancient directions of the Earth's magnetic field at different periods of geological time could be calculated. His demonstration of the westward displacement of the poles from America in relation to Europe was a powerful support

for the theory of continental drift. Runcorn's interest in plate tectonics continued with his participation in projects to study Earth currents using deep ocean cables.

Other contributions made by Runcorn to studies of the Earth were in the area of solid state physics, where he argued that solid state creep below the lithosphere resulting in convection in the mantle of the Earth was the fundamental mechanism of continental drift, and work on the Earth's rotation, in which he used evidence from corals and other fossils to study irregular fluctuations in the length of the day over geological time.

From the mid-1960s Runcorn developed a special interest and expertise in planetary science, studies of the Moon in particular. In 1969 he was appointed by NASA to be a principal investigator in its Apollo lunar program and was able to study samples of rocks returned by the astronauts. He greatly enhanced understanding of the Moon's magnetic field, positing the existence of a small iron core. Following his studies of the ancient lunar magnetic field and polar wandering, he also advanced the idea that the Moon had once had a primeval satellite system of its own.

Apart from his pioneering research work Runcorn made significant contributions to national and international geophysics and lunar science through his wide-ranging involvement with a range of national and international organisations and his active participation in conferences and seminars. In Britain he served on numerous Royal Society committees including the British National Committees for Geodesy and Geophysics, Geodynamics, and Space Research, as well as its Planetary Sciences Study Group, Space Ranging Research Committee and Allocation Committee for Soviet Lunar Samples, among others.

Runcorn was an important figure in European space science efforts. He was prominent in both the European Science Foundation, pressing for it to give a higher priority to space science, and the European Space Agency from 1979 (contributing to three research proposals for mission proposals: the Polar Orbiting Lunar Observatory, the Kepler (Mars) Mission and the Mercury Orbiter Mission). On the international stage he served on COSPAR (the Committee on Space Research of the International Council of Scientific Unions), the International Union of Astronomy (serving as President of its Commission 17 on the Moon), the International Union of Geodesy and Geophysics (playing a particularly important role on the Upper Mantle Committee) and the Inter-Union Commission for Studies of the Moon (serving as President 1975).

Runcorn travelled widely, particularly to the United States, where he was held in high esteem and which he very often visited several times a year. He regularly attended meetings of the American Geophysical Union and was a frequent visitor to the Lunar and Planetary Science Institute, Houston, Texas, attending most of the Lunar Science Conferences held there. Runcorn would generally combine conference attendance with an extensive programme of visits to colleagues at other

research centres throughout the US, and sometimes Canada, usually giving lectures and seminars. He also spent periods as a researcher at the Jet Propulsion Laboratory, Pasadena, California and contributed to the lunar polar orbiter project of the National Aeronautics and Space Administration (NASA).

His extensive travel to the USA notwithstanding, Runcorn made numerous visits to the continent of Europe, particularly in connection with European space projects. He also attended many meetings in the UK, particularly Royal Astronomical Society and Royal Society discussion meetings in London, and NATO Advanced Study Institutes held at Newcastle, which he was instrumental in organising.

Runcorn was elected to the Fellowship of the Royal Society in 1965. He was also an Honorary Member of the Royal Netherlands Academy of Sciences, an Honorary Member of the Royal Norwegian Academy of Science and Letters and a Foreign Fellow of the India National Science Academy. He was also made a Member of the Pontifical Academy of Science in 1981, an honour he valued highly. Runcorn received honorary degrees from the universities of Utrecht, Gent, Paris and Bergen and numerous prizes including the Vetlesen Prize of Columbia University and the Vetlesen Foundation in 1971, the John Adams Fleming Medal of the American Geophysical Union in 1983, the Gold Medal of the Royal Astronomical Society in 1984 and the Wegener Medal of the European Union of Geosciences in 1987.

## DESCRIPTION OF THE COLLECTION

The material is presented in the order given in the List of Contents. It covers the period 1936-1995.

Section A, Biographical, includes some biographical accounts, material relating to a few of the many honours accorded to Runcorn, diaries for the period 1967-1984, and papers relating to his interest in the history of science in general and the history of earth sciences in particular. The principal components of this section, however, are notebooks and loose notes providing good coverage of Runcorn's schoolwork and undergraduate studies.

Section B, University of Manchester, is slight. It is principally teaching material used at the University of Manchester although this includes notes adapted from Runcorn's time at Cambridge and the Radar Research and Development Establishment. Some of this material may have been used for teaching on his return to Cambridge in 1950.

Section C, University of Newcastle, is not voluminous. Although he held a Chair at the University for over thirty years, Runcorn's frequent travelling and numerous outside commitments meant his participation in the life of the university and contribution to the day-to-day running of his department

were limited. There is material relating to establishment of the University in 1963 from a College of the University of Durham, general university policy including issues such as Senate reform, and some School of Physics material, including visitors to the department, lectures and teaching material.

Section D, Research, comprises documentation of Runcorn's research over six decades from the 1940s to the 1990s. There is only one notebook of his wartime research at the Radar Research and Development Establishment, but much fuller coverage of work at Manchester and Cambridge in the late 1940s and early 1950s covering studies of the Earth's magnetic field, including data from bore holes made in coal mines (illustrated by the layer of coal dust still adhering to a number of the notebooks). There is documentation of work collecting and analysing geological samples in the western United States from the later 1950s and early 1960s and further research on the magnetic field and ancient polarity of the Earth. Runcorn's principal research interests of his later career are also well documented. There is extensive material relating to his continued research on continental drift, with data from deep ocean cables, principally in the Pacific Ocean from the 1960s to the 1990s. Runcorn's interest in lunar magnetism and other aspects of planetary science from the mid-1960s onwards is well represented with significant research material relating to Moon samples and research projects for lunar and planetary probes.

Section E, Publications, presents a sequence of drafts of published and unpublished papers by Runcorn, covering the period 1950-1993 with some undated material. A significant number of the drafts listed in the section do not appear to have been published, although apparently prepared with publication in mind. However, it has not been easy in all cases to separate out different drafts; many of Runcorn's articles were very similarly titled, in many cases he repeatedly returned to the same topics over a period of time, and he also would use extracts from earlier drafts to construct later papers. Separately listed in the section are a number of his Letters to the scientific and national press, on subjects ranging from geophysics to university reform, and there is also a sequence of editorial correspondence with requests to review books, referee papers and write articles.

Section F, Lectures, is slight. It presents a few of Runcorn's public and invitation lectures delivered 1972-1993, together with illustrative material in the form of transparencies for overheads projections. The bulk of his lecturing at conferences and seminars is to be found documented in section H, Visits and conferences, retained with material to which it relates. Many of Runcorn's key lectures were also published and some of these are documented in section E.

Section G, Societies and organisations, is very extensive and documents some of Runcorn's most important contributions to science. Represented here is Runcorn's involvement with twenty nine UK, international and overseas organisations, chiefly in the fields of geophysics and space science. The largest body of material relates to Runcorn's service on Royal Society committees, including the British National Committee for Geodesy and Geophysics, the British National Committee for

Geodynamics, the British National Committee for Space Research, the Planetary Sciences Study Group and the Space Ranging Research Committee. There are committee papers, draft reports, correspondence and notes on meetings. There is also material reflecting his concern at inadequate teaching and research facilities for the earth sciences in British universities. Runcorn's international contributions to geophysics and space science are also well represented in the papers. There is significant material relating to his active participation in the work of COSPAR, the International Astronomical Union (Commissions 16, Physical Studies of Planets and Satellites, and 17, the Moon; and the Working Group on Planetary System Nomenclature) and the International Union of Geodesy and Geophysics (in particular the work of the Upper Mantle Committee). There is also important documentation of his contribution to the work of the European Science Foundation and the European Space Agency.

Section H, Visits and conferences, is the largest section in the catalogue. It presents material relating to Runcorn's travel and attendance at conferences from 1956 to 1994. This section shows just how peripatetic was Runcorn's lifestyle. He made a very great number of visits abroad, mainly to the USA but also to the continent of Europe, and a few to Australia and Asia. Although his visits generally were tied in with attendance at specific conferences or meetings, Runcorn very often also took the opportunity to visit colleagues and deliver lectures at other research centres and there may be voluminous correspondence relating to such more informal visits, as well as the material relating to the meetings he was attending, drafts of lectures, programmes and itineraries, travel arrangements etc. UK material includes good documentation of Runcorn's attendance at Royal Astronomical Society and Royal Society discussion meetings, and of his work promoting, organising and contributing to NATO Advanced Study Institutes held at Newcastle. The size of the section notwithstanding, not all of Runcorn's visits are recorded and it is not always clear (especially later in his life) whether planned visits did indeed always take place.

Section J, Correspondence, is not extensive. Runcorn was a conscientious correspondent, despite his very frequent travel and the time consequently spent away from Newcastle. However, the bulk of his correspondence has been retained with the material to which it relates and with which it was found. Thus very many letters are to be found particularly within sections D (Research), G (Societies and organisations) and H (Visits and conferences). This section presents a short sequence of correspondence alphabetically arranged by named individual (principally with W.F. and L.M. Libby of the University of California Los Angeles), a chronological sequence 1948-1995, and alphabetically arranged references and recommendations for former students and colleagues.

There is also an index of correspondents.

T.E. Powell
P. Harper
Bath, 2002

**SECTION A** **BIOGRAPHICAL** **A.1-A.127**

## Biographical

**A.1-A.8** **AUTOBIOGRAPHICAL AND BIOGRAPHICAL**

See also the citations on the occasions of awards to Runcorn at A.88 and A.90.

A.1 Report of Runcorn's death and subsequent obituary from *The Times*, 7 and 18 December 1995.

A.2 Obituary from the *Daily Telegraph*, 11 December 1995.

A.3 Obituary from the *Independent*, 16 December 1995.

A.4 Curriculum vitae, 1994.

A.5 Curriculum vitae (in French), 1980s.

A.6 Bibliography.

A.7 Photocopy of letter and questionnaire from H. Fraenkel, 23 March 1983.

The questionnaire asks Runcorn about his life and work. There are annotations beside some of the questions but no indication the questionnaire was ever completed.

A.8 Newspapers cuttings and photocopies referring to Runcorn's work, 1977-1988.

## Biographical

**A.9-A.18** **SCHOOLWORK** **1936-1941**

Notebooks and exercise books used by Runcorn for school work from Fifth form to Upper Sixth form at King George V School, Southport.

A.9 Exercise book labelled on front cover 'S.K. Runcorn Set H. Autumn 1936 [...] Geography Notes - General Geography & British Isles'.

A.10 Hardback notebook labelled on front cover 'S.K. Runcorn [...] Autumn 1937 German'.

Also includes French grammar.

Some material intercalated loose.

A.11 Exercise book labelled on front cover 'S.K. Runcorn [...] 1937 History notes. Tudor (1422-1603)'.

The notes in fact only cover the initial part of reign of Henry VI. Most pages not used.

A.12 Exercise book labelled on front cover 'S.K. Runcorn [...] Autumn 1937 Practical Chemistry'.

Used from the front and the back. Some material intercalated loose. Most pages not used.

A.13 Hardback notebook labelled on front cover 'S.K. Runcorn [...] Autumn 1937 Practical Chemistry'.

Used from the front and the back. Some material intercalated loose dated 1939.

A.14 Large hardback notebook inscribed on first page 'S.K. Runcorn [...] Magnetism & Electricity'. Also includes notes on 'Elementary Light', 'Elementary Heat' and 'Dynamics'

Used for physics notes from October 1937 to February 1941.

**Biographical**

A.15 Exercise book labelled on front cover 'S.K. Runcorn May [1938] Practical Physics'.

A.16 Unlabelled exercise book used from September 1939 to June 1940 for physics experiments.

At back is list of experiments carried out in dynamics, heat, magnetism and electricity and light.

A.17 Exercise book with damaged label on front cover. Used for chemistry notes *ca* 1938.

A.18 Hardback notebook with damaged label on front cover. Used for mathematics notes, ca 1938.

Some material intercalated loose dated 1939.

**A.19-A.88 UNDERGRADUATE AND POSTGRADUATE STUDIES 1941-1946**

Runcorn entered Gonville and Caius College Cambridge in 1940.

**A.19-A.80 Undergraduate work 1941-1943**

Notebooks, manuscript notes and duplicated typescript worksheets. Much of the material is undated. It is arranged in a broadly alphabetical sequence using Runcorn's titles.

**Dynamics**

A.19 Hardback notebook labelled on front cover 'Dynamics'. Undated.

Most pages not used.

A.20 Exercise book inscribed at top of first page 'Dynamics'. Undated.

Most pages not used.

## Biographical

### Electricity

A.21 Spiral bound notebook labelled on front cover 'Electrical lab. Mich[aelmas Term] 1941 Lent [Term] 1942'.

A.22 Exercise book inscribed on front cover 'Electricity Lab'. Used October 1942 - 1943.

Includes intercalated material and duplicated typescript worksheets pasted to pages of the exercise book.

A.23 Hardback notebook labelled on front cover 'Electricity A'. ?First year notes.

A.24 Hardback notebook labelled on front cover 'Electricity' and on first page 'Electricity 3rd Year'.

Includes duplicated typescript worksheets pasted to pages of the exercise book. Most pages not used.

A.25 Hardback notebook used at front for notes on 'Measuring instruments in Electricity'. Undated but loose at back is examination paper May 1942.

A.26 Exercise book inscribed on front cover 'Electrical signalling lab. B'. Used November 1942 - March 1943.

A.27-A.30 'Electricity'. Duplicated typescript worksheets with manuscript workings, and manuscript notes.

A.27 Second Year examples, 1942.

A.28 Third Year examples, 1942.

A.29 Third Year revision, undated.

A.30 Manuscript notes.

## Biographical

### Electromagnetism

A.31 Hardback notebook inscribed inside front cover 'Electromagnetic Theory by Stratton'. Undated.

Notes on *Electromagnetic theory* by J.A. Stratton (New York and London, 1941).

### Heat

A.32 Exercise book inscribed on front cover 'Heat Engines lab'. Used from October 1941 - January 1943.

A.33 Exercise book inscribed on front cover 'Heat lab'. Used from February - March 1943.

Most pages not used.

A.34 Hardback notebook labelled on front cover 'Heat Engines 2nd Year A'. Undated.

A.35 Hardback notebook labelled on front cover 'Heat Engines A Turbine Design B'. Undated.

A.36 Hardback notebook labelled on front cover 'B. Heat Conduction + Heat Engines'.

A.37-A.41 'Heat'. Duplicated typescript worksheets with manuscript workings, and manuscript notes.

A.37 Second Year examples, 1941-1942.

A.38 Third Year examples, 1942-1943.

A.39 Third Year revision, 1942.

## Biographical

A.40, A.41 Manuscript notes.

2 folders.

### Hydraulics

A.42 Hardback notebook labelled on front cover 'Hydraulics A'. Undated.

A.43 'Hydraulics'. Duplicated typescript Third Year worksheets with manuscript workings, 1942, and manuscript notes.

### Materials

A.44 Hardback notebook labelled on front cover 'Materials'. Undated.

### Mathematics

A.45 Softback notebook inscribed at top of first page 'Mathematics Book 1 [...] 1941-42'.

A.46 Softback notebook inscribed at top of first page 'Mathematics Book 2 1942'.

A.47 Exercise book inscribed on front cover 'Carslaw & Jaeger'. Used at front for mathematics work.

Most pages not used.

A.48-A.51 'Mathematics'. Duplicated typescript worksheets with manuscript workings and notes.

A.48 Second Year examples, 1941.

A.49 Differential equations, 1941.

A.50 Miscellaneous duplicated typescript worksheets, 1941-1942; mathematics examination papers, 1941-1942.

## Biographical

A.51 Manuscript notes.

### Mechanics

A.52 Hardback notebook labelled on front cover 'Mechanics A'. Undated.

A.53 Hardback notebook labelled on spine 'Mechanics [...]'. Used for notes on mechanics B and applied mechanics, with index at back. Undated but includes loose at front duplicated typescript dynamics worksheet, July 1941.

A.54 Hardback notebook labelled on front cover 'Mechanics of Machines A'. Undated.

A.55-A.59 'Mechanics'. Duplicated typescript worksheets with manuscript workings, and manuscript notes.

A.55 Second Year examples, 1942.

A.56 Third Year examples, 1942-1943.

A.57 Third Year revision, 1943.

A.58, A.59 Manuscript notes.

2 folders.

A.60 Mechanics of Machines manuscript notes.

### Power lines

A.61 Softback notebook labelled on front cover 'Power lines'. Undated.

Most pages not used.

## Biographical

### Signals

A.62, A.63 'Signals'. Contents of Runcorn's folder so labelled: manuscript notes.

2 folders.

### Structures

A.64 Spiral bound notebook labelled on front cover '[...] Structures Lab'.

Used in Cambridge Engineering Laboratory for practical work, October 1941 - January 1942.

A.65 Hardback notebook labelled on front cover 'Theory of Structures. A'. Undated.

A.66 Hardback notebook labelled on front cover 'B Structures. Mechanical'. Undated.

A.67 Hardback notebook labelled on front cover 'Civil theory of Structures. B'. Undated.

Includes duplicated typescript worksheets pasted to pages of the notebook.

A.68-A.74 'Structures'. Duplicated typescript worksheets with manuscript workings, and manuscript notes.

A.68 Second Year examples, 1942.

A.69 Third Year examples, 1942.

A.70 Revision, 1943.

A.71 'Statics of Structures' examples, 1941.

## Biographical

A.72, A.73 'Structures Mechan.'. Contents of Runcorn's folder so labelled: manuscript notes.

2 folders.

A.74 'Structures'. Manuscript notes.

### Stress waves

A.75 Softback notebook inscribed 'Stress Waves' at top of first page. Undated.

### Telephony

A.76 Hardback notebook labelled on front cover 'B. Telephony & Telegraphy'. Undated.

Includes duplicated typescript worksheets pasted to pages of the notebook.

### Wireless

A.77 Exercise book inscribed on front cover 'Wireless Lab'. Used November 1941 - May 1942.

### Miscellaneous

A.78 Foolscap notebook used for undergraduate Engineering Laboratory work, October 1942 - March 1943.

A.79, A.80 Contents of Runcorn's folder: miscellaneous duplicated typescript worksheets and manuscript notes.

2 folders.

**A.81-A.87** **Postgraduate work** **1945-1946**

This includes some notes by Runcorn of lectures delivered while he was seconded to the Radar Research and Development Establishment, Great Malvern, where he worked 1943-1946.

## Biographical

A.81, A.82 'The Differential Analyser. Its theory, development and use', John Winbolt Prize Exercise for 1945.

Runcorn won this prize.

A.81 46pp manuscript draft.

A.82 42pp typescript.

A.83 'Nuclear physics'.

Course given by A.C. Kempton, September 1945.

Kempton, like Runcorn, served at the Radar Research and Development Establishment during the war.

5pp duplicated typescript course notes; exercise book with Runcorn's manuscript notes.

A.84 Government issue softback notebook inscribed on front cover 'Bristol Univ. Summer School 1946. Theoretical physics'.

A.85 Hardback notebook 'Nuclear forces'. Undated.

Most pages not used.

A.86 Hardback notebook inscribed inside front cover 'Quantum theory'. Undated.

Includes some intercalated notes on quantum theory. Most pages not used.

A.87 Government issue softback notebook inscribed on front cover 'Circuits'.

Used for notes on nuclei and electron synchrotron, and for notes at Radar Research and Development Establishment on 'Wave form generators' (F.C. Williams).

## Biographical

**A.88-A.94** **HONOURS AND AWARDS** **1971-1987**

The coverage of Runcorn's many honours and awards is disappointing.

A.88 Vetlesen Prize of Columbia University, New York, 1971.

The Vetlesen Prize was presented 'for outstanding achievement in the sciences resulting in a clearer understanding of the earth, its history, or its relations to the universe'. Runcorn received this prize jointly with A.V. Cox and R.R. Doell.

Correspondence, including letters of congratulation, March - September 1971; citations of prize-winners.

A.89 Fellowship of the American Geophysical Union, 1973.

Letter of congratulation and reply, May 1973.

A.90, A.91 John Adams Fleming Medal, 1983.

A.90 3pp typescript citation by N.D. Opdyke; 3pp typescript of Runcorn's response.

A.91 Correspondence, chiefly letters of congratulation, April - September 1983.

A.92, A.93 Gold Medal of the Royal Astronomical Society, 1984.

A.92 Citation.

A.93 Correspondence, chiefly letters of congratulation, January - December 1984.

A.94 Wegener Medal of the European Union of Geosciences, 1987

Correspondence, including letters of congratulation, July 1986 - January 1987.

## Biographical

| | | |
|---|---|---|
| **A.95-A.110A** | **DIARIES** | **1967-1984** |
| | 'Cambridge' pocket diaries, used for recording social engagements, business and health appointments, names of contacts and other jottings. | |
| A.95 | 1967-1968. | |
| A.96 | 1968-1969. | |
| A.97 | 1969-1970. | |
| A.98 | 1970-1971. | |
| A.99 | 1971-1972. | |
| A.100 | 1972-1973. | |
| A.101 | 1973-1974. | |
| A.102 | 1974-1975. | |
| A.103 | 1975-1976. | |
| A.104 | 1976-1977. | |
| A.105 | 1977-1978. | |
| A.106 | 1978-1979. | |

**Biographical**

A.107 1979-1980.

A.108 1980-1981.

A.109 1981-1982.

A.110 1982-1983.

A.110A 1983-1984.

**A.111-A.120 HISTORY AND PHILOSOPHY OF SCIENCE 1990s**

Although Runcorn had a longstanding interest in the subject, this material may have been assembled for two lectures he gave at the University of Sydney in April 1993 on 'The Galileo Affair' and 'Scientific revolutions'.

A.111 Correspondence and papers, including notice for Sydney lectures, 1992-1994.

Also includes 4pp manuscript draft of talk given by Runcorn in France on Sir Winston Churchill, found with the papers.

A.112-A.120 Published articles and typescript papers.

Arranged by subject.

A.112 History of science general.

A.113 History of earth sciences.

A.114 Philosophy of science general.

A.115 Giordano Bruno.

**Biographical**

A.116-A.118 Galileo.

3 folders.

A.118 contains articles by T. Theocharis and colleagues.

A.119 Karl Popper.

A.120 Erwin Schrödinger.

**A.121-A.127 MISCELLANEOUS 1943-1988**

A.121 Softback notebook inscribed on front cover 'Music'. Used for newspaper cuttings of articles by Ernest Newman on classical music, July 1941-1945.

Most of the cuttings have been pasted in the notebook but later ones are loose and interleaved.

A.122-A.124 Newspaper cuttings and other material *re* career of Bruce E. Babbitt.

Babbitt was Governor of Arizona 1978-1987 and a contender for the US Democratic Party nomination for Presidential candidate in 1988. He was former student of Runcorn's who had studied M.Sc. geophysics at the University of Newcastle. Runcorn took an interest in his political fortunes and corresponded with his mother.

A.122 Correspondence, 1987-1988.

A.123, A.124 Newspaper cuttings and photocopies of cuttings. 1985-1988.

2 folders.

A.125 Air Defence Reunions, 1983-1987

As a former member of staff of the Radar Research Establishment, Runcorn was invited to attend the Annual Reunions.

Correspondence and invitations.

## Biographical

A.126 Humorous extracts on the use of language in scientific papers and discussions. 1959-1960.

A.127 Newcastle University Rugby Union Football Club Songbook, 1977.

## `SECTION B UNIVERSITY OF MANCHESTER B.1-B.19

Runcorn was appointed to the staff of the Department of Physics at the University of Manchester, working under P.M.S. Blackett in 1946. He was Assistant Lecturer in Physics 1946-1948 and Lecturer 1948-1949. In 1950 he joined the Department of Geodesy and Geophysics of the University of Cambridge as Assistant Director of Research.

The material includes lecture notes, (much of it adapted by Runcorn from his time as an undergraduate and postgraduate at Cambridge or from work at the Radar Research and Development Establishment), worksheets and examination papers, 1935-1948 and n.d.

B.1 'Physics Tutorial Autumn 1946'. Contents of Runcorn's folder so inscribed: duplicated typescript notes and question sheets and manuscript notes for physics to 1st M.B. students, September - December 1946.

B.2-B.5 'Elementary Physics Laboratory' worksheets, duplicated typescript. 1946.

These are worksheets for physics experiments.

Arranged in alphabetical order by subject.

B.2 C.-H.

B.3 L.-P.

B.4 R.

B.5 S.-V.

B.6 Letter to P.M.S. Blackett *re* Manchester cyclotron from M.-E. Nahmias, 24 January 1947.

Found with preceding.

B.7 'Electromagnetic Theory', manuscript lecture notes.

## University of Manchester

| | |
|---|---|
| B.8, B.9 | 'Geophysics lectures'. Contents of Runcorn's folder so inscribed divided into two for ease of reference: typescript lecture notes. |
| B.10-B.14 | 'Lectures on operational calculus'. Contents of Runcorn's boxfile divided into five for ease of reference. |
| B.10 | 'Lectures on the Operational Calculus', 6pp dated January 1946 |
| B.11, B.12 | 44pp typescript examples, dated August 1946.<br><br>2 folders. |
| B.13, B.14 | Typescript and manuscript notes on Laplace transforms etc.<br><br>2 folders. |
| B.15-B.18 | 'Cavendish Laboratory. Practical Course for Part II Students'. Contents of Runcorn's folder so inscribed divided into four for ease of reference. |
| B.15 | List of practicals headed 'M/C [?Manchester] 3rd yr lab'. |
| B.16 | 35pp duplicated typescript detailed notes on practical work in optics, heat, electricity etc. |
| B.17, B.18 | 'Cavendish Laboratory, Cambridge. Practical Course for Part II Physics'.<br><br>2 folders. |
| B.19 | University of Manchester physics examination papers, 1935-1946.<br><br>Most are for medical and dental students. |

**SECTION C UNIVERSITY OF NEWCASTLE C.1-C.116**

Runcorn was appointed Professor of Physics and Head of Department at King's College, Newcastle upon Tyne in 1956. Then part of the University of Durham, King's College became the new University of Newcastle in 1963. He retired from the Chair in 1988.

## University of Newcastle

**C.1-C.18 ESTABLISHMENT OF THE UNIVERSITY OF NEWCASTLE 1948-1963**

C.1 Papers of the Committee of Academic Board on the Future Constitution of the University, 1948-1950.

This body met primarily to consider the divisional arrangement of the University between Durham and Newcastle.

C.2-C.18 Duplicated typescript papers for meetings of the Academic Board and the Subcommittee for Reconstitution of the Academic Board of the University of Durham, *re* the establishment of the new University.

Runcorn was a member of the Subcommittee.

Includes drafts of the Constitution of the University and comments thereon.

C.2 January - March 1960.

C.3 May - July 1960.

C.4, C.5 August 1960.

2 folders.

At C.4 is a draft of the Constitution.

C.6 September - December 1960.

C.7 January 1961.

Includes draft Constitution.

C.8 February 1961.

Includes draft Constitution.

C.9 March 1961.

## University of Newcastle

C.10 April - May 1961.

C.11 June 1961.

Includes Runcorn's manuscript notes on the Senate of the new University under the Constitution.

C.12-C.14 October 1961.

3 folders.

C.15 November, December 1961.

C.16 January, February 1962.

C.17 October 1962.

C.18 November, December 1962, January 1963.

**C.19-C.54 GENERAL UNIVERSITY 1949-1988**

C.19-C.21 Postgraduate studentships, 1949-1957.

Contents of Runcorn's folder: papers *re* postgraduate studentships at King's College, Newcastle.

C.19 1949-1950.

Includes applications and papers of meetings of the Postgraduate Studentships Committee.

C.20 1951-1956.

**University of Newcastle**

C.21 1957.

C.22 Letter to Assistant Registrar, *re* Research Projects financed by Research Councils, 4 March 1965.

The letter lists former Department of Scientific and Industrial Research grants which were taken over by the newly established Science Research Council, together with Runcorn's proposals concerning the future of the work they supported.

C.23-C.32 'Letters concerning the employment policy. 1'. Contents of Runcorn's folder so inscribed divided into ten for ease of reference: correspondence and papers, 1980-1985.

Most of the material concerns the employment of research workers. Runcorn believed the University administration was insufficiently flexible and this was hampering research work. He took advantage of the establishment in October 1982 of a Working Party on University Research to press his case.

See also C.33-C.36 below.

C.23 Memorandum on University 'Employment Policy', 10pp typescript, December 1980.

C.24, C.25 Correspondence and papers relating to particular cases of employment, 1981 and 1982.

These were kept by Runcorn to illustrate what he felt to be an inflexible attitude on the part of the University administration.

C.24 1981.

C.25 1982.

C.26 Correspondence, October - November 1982.

C.27 Correspondence, January 1983.

**University of Newcastle**

C.28 Correspondence and papers, February 1983.

C.29 Correspondence and papers, March 1983.

C.30 Correspondence, April, May, November 1983.

C.31 Papers, October 1985.

Includes copy of University of Newcastle Association of University Teachers' Report on staff employment, October 1985.

C.32 Correspondence, October - November 1985.

C.33-C.36 'Letters concerning the employment policy. 2'. Contents of Runcorn's folder so inscribed divided into four for ease of reference: correspondence and papers, 1983-1985.

See also C.23-C.32 above.

C.33 Correspondence and papers relating to particular cases of employment of researchers, in various departments, 1983.

These were assembled by Runcorn to illustrate what he and others felt to be an inflexible attitude on the part of the University administration.

C.34 Correspondence, April 1983 - June 1984.

C.35 Correspondence and papers, January - May 1985.

C.36 Draft copy of University of Newcastle Association of University Teachers' Report on staff employment, August 1985.

For final version see C.31.

## University of Newcastle

C.37-C.49 Senate Reform 1984-1988

On the establishment of the University of Newcastle, Runcorn had favoured a larger Senate that included all Professors and Heads of Department. In the event the University established a small Senate of 44 with 27 elected members. It was an issue revisited from time to time from 1963 onwards.

In 1984 the question was reopened by Runcorn who attracted considerable support for his attempt to increase the membership of Senate.

The material was found in Runcorn's folders, most of which were inscribed 'Full Senate'. It is chiefly correspondence with colleagues *re* drafts of letters to the Vice-Chancellor, meetings of the 'Steering Committee' in favour of the enlarged Senate etc. It includes lists of signatories, comments on Runcorn's drafts and correspondence *re* strategy.

C.37 June, July 1984.

C.38 September - December 1984.

Letter to the Vice-Chancellor, 26 September.

C.39 January 1985.

C.40 February 1985

C.41 March, April 1985.

C.42 May, June 1985.

C.43 July, August 1985.

C.44 September - December 1985.

C.45 'Signature sheets'. Contents of Runcorn's folder so inscribed: list of those who signed the proposal for Senate reforms, letters *re* signatories, 1985.

**University of Newcastle**

C.46 January - March 1986.

Includes 'Proposals for Senate Reform' and lists of signatories.

C.47 April - November 1986.

Includes arrangements for the Vice-Chancellor's 'Working Group' to examine the proposal.

C.48 January - May 1987.

C.49 October 1987 - January 1988.

C.50 'Heads of Dept & Profs'. Contents of Runcorn's folder so inscribed: correspondence *re* arrangements for informal lunch meetings for senior university academic staff, 1985-1988.

C.51-C.54 'Academic Strategy'. Contents of Runcorn's folder so inscribed divided into four for ease of reference: papers *re* University strategy, April - August 1987.

In April 1987 the University of Newcastle Academic Board was presented with a University Strategy Document to cut costs by reducing the academic staff by 16% (140 posts) by 1990. Academic Board asked that this be reconsidered but it was approved by Senate. Runcorn was among those who opposed the Strategy Document and advanced alternatives.

The material is papers circulated for Senate and Academic Board meetings and alternative proposals.

**C.55-C.81 SCHOOL OF PHYSICS 1956-1987**

This includes material specifically relating to the School of Physics but there is also some relating to wider Faculty of Science matters.

C.55-C.61 General correspondence and papers

C.62-C.81 Visitors

## University of Newcastle

| | | |
|---|---|---|
| **C.55-C.61** | **General correspondence and papers** | **1956-1979** |
| C.55 | Correspondence *re* postgraduate students, 1956 | |
| C.56 | Papers of meetings of the Rock and Palaeomagnetism Planning Committee, April - December 1966. | |
| C.57-C.59 | Centenary Celebration of the College of Physical Science, Newcastle, 1971.<br><br>The College of Physical Science was founded in 1871. It was renamed Armstrong College in 1904 and then King's College in 1937 on becoming part of the University of Durham. It was awarded a Royal Charter in 1963 when it became the University of Newcastle.<br><br>Although this centenary was celebrated by the whole University, because of the science base of the original College the events had a pronounced focus on the physical sciences and therefore the School of Physics and other science departments were prominent in the centenary events.<br><br>Correspondence *re* centenary events, Appeal, honorary degrees etc. | |
| C.57 | 1970.<br><br>Includes Runcorn's letters to the Vice-Chancellor urging a special Appeal, 2 April and 31 October. | |
| C.58 | January - March 1971. | |
| C.59 | April - June 1971. | |
| C.60 | Correspondence and papers *re* University Development Trust Working Group on Oceanology Studies, 1972. | |
| C.61 | Staffing, 1979. | |

**University of Newcastle**

| | | |
|---|---|---|
| **C.62-C.81** | **Visitors** | **1961-1987** |
| C.62-C.69 | Marchon Visiting Lectureships, 1977-1987.<br><br>These were established in 1963 by Marchon Products Ltd., a chemical company based in Whitehaven, Cumbria to enable the University to invite visiting scientists of distinction. Marchon Products was taken over by Albright & Wilson who maintained the Lectureships.<br><br>The material is principally papers of meetings of the Marchon Visiting Lectureship Sub-Committee and correspondence *re* Visiting Lecturers. | |
| C.62 | 1977. Chiefly *re* invitation to W.F. Libby for 1978. | |
| C.63 | January - April 1978. Chiefly *re* arrangements for lecture by W.F. Libby. | |
| C.64 | May 1978. Includes copy of lecture by Libby, 'The Environment Doctor'. | |
| C.65 | 1979-1981. | |
| C.66 | 1982, 1983. | |
| C.67 | 1984. Includes correspondence *re* invitation to J. Labeyrie. | |
| C.68 | 1985. Chiefly *re* lecture by J.R. Arnold on 'The Frontiers of Space Science'. | |
| C.69 | 1986, 1987. | |
| C.70-C.81 | Other visiting scientists, 1961-1971<br><br>Correspondence with scientists arranging to visit the School of Physics. Some visits involved departmental colloquia or seminars, others were for informal discussions about mutual research interests. | |
| C.70 | 1961. | |

**University of Newcastle**

C.71 1962.

C.72 1963.

C.73 1964, 1965.

C.74 1966-1967.

C.75 1967.

C.76 1968 (1).

C.77 1968 (2).

C.78 1968-1969 (1).

C.79 1968-1969 (2).

C.80 1969.

C.81 1969-1971.

**C.82-C.116 LECTURES AND TEACHING 1950s-1970s, n.d.**

Principally lecture notes, course handouts, syllabus outlines etc.

Little of the material is dated and it may include notes originally used by Runcorn for lectures at Manchester, where he was based 1946-1950 (see section B), or Cambridge, 1950-1956.

## University of Newcastle

C.82-C.90 General material.

C.82 Letter to Runcorn from H.C. Bolton, enclosing copies of examination papers and syllabuses for physics at the University of Durham, December 1955.

C.83 Letter to Runcorn from H.J.J. Braddick enclosing information and syllabuses for teaching of physics at the University of Manchester, 4 December 1962.

C.84 'Level II Laboratory in Practical Physics', 1963-1964.

Contains 'Notes on laboratory procedure, Notes on the estimation of errors and Description of experiments'.

C.85 Manuscript notes for Runcorn on syllabuses for Electromagnetism and Special Relativity for 1972-1973, from 'IDCG'.

C.86 Circular letter to First Year Physics students with details of physics course, n.d.

C.87 Miscellaneous typescript reading lists.

C.88 Duplicated typescript 'Problem sheets'; examples for '3H' physics students.

C.89, C.90 'Transparencies' and 'Geomagnetism'. Contents of Runcorn's folder so inscribed divided into two for ease of reference: transparencies and figures for transparencies.

C.91-C.116 Lecture notes etc.

The bulk of the material is arranged in alphabetic order by lecture topic or course title. Most is undated.

C.91 'Analysis of geomagnetic forms', 6pp duplicated typescript hand-out for 3H Physics by K.M. Creer, 1966.

**University of Newcastle**

C.92 'Applications of physics to astronomy', typescript course outline; 'Level I Astronomy', typescript course outline; and '3H/3JH Astrophysics', typescript course outline.

C.93 'Classical electrodynamics and Special Relativity', syllabus for Part II Hons.

C.94 'Electrodynamics: Pt I Hons', manuscript course summary; 'Questions on Electrodynamics I. Steady & Quasi-Steady States', 5pp duplicated typescript, 1957.

C.95 'Fluctuations & Brownian motion', manuscript notes.

C.96 'Free oscillations of the Earth', photocopy manuscript lecture notes by P.G. Richards, paginated 187-215.

C.97 'Geophysics Lectures. Michaelmas Term', manuscript notes.

These were originally prepared for use at Cambridge.

C.98 'Geophysics', duplicated typescript handouts.

C.99 'Gravitational potential due to a spherical shell', 4pp photocopy typescript and manuscript handout; 'Gravity M.Sc.', typescript course outline.

C.100 'An introduction to the electronic theory of metals', manuscript notes.

C.101 'Light', manuscript notes and associated calculations etc.

C.102 'Magnetohydrodynamics', manuscript notes.

C.103 'N-particle systems', 12pp photocopy manuscript notes.

**University of Newcastle**

C.104 'Nuclear theory I', manuscript notes.

C.105 'Course 22 Observational astronomy and the solar system', course outline by A.J. Meadows; 'Course 21 'Physics with astrophysics I', course outline by K.A. Pounds.

C.106 'Physical basis of anistropy', 2pp manuscript notes.

C.107 'Plasma physics', duplicated typescript course syllabus and supplementary notes, October 1959.

C.108 'Properties of Matter', manuscript notes.

C.109 'Quantum theory', manuscript notes.

C.110 'Rotation about a fixed axis', 6pp photocopy manuscript notes.

C.111 'M.Sc. Seismology syllabus'.

C.112 'Structure of crystals', manuscript notes.

C.113 'Sun and its family', manuscript notes.

C.114 'Tesseral harmonies', manuscript notes.

C.115 'Vector diagram derivations of formulae applying to interferometers', 5pp duplicated typescript.

C.116 Miscellaneous manuscript notes found with lecture material.

## SECTION D RESEARCH D.1-D.360

This section presents documentation of Runcorn's research over six decades from the 1940s to the 1990s. It is presented in a roughly chronological order, although the contents of Runcorn's folders or otherwise related material, which might span a decade or more, have been kept together.

There is one notebook of wartime research at the Radar Research and Development Establishment at Great Malvern, and significant coverage of work at Manchester and Cambridge in the late 1940s and early 1950s covering his studies of the Earth's magnetic field, including data from the UK (chiefly from boreholes made in coal mines and quarries, some material with the coal dust still adhering to it). There is documentation of work collecting geological samples in the western United States from the later 1950s and early 1960s to further research on spin of the Earth.

Runcorn's primary research interests of his later career are well documented. There is extensive material of his research on continental drift with data from deep ocean cables, principally in the Pacific Ocean from the 1960s to the 1990s. Runcorn's interest in lunar magnetism and other aspects of planetary science from the mid-1960s onwards is represented with significant research material.

At D.333-D.360 are folders of correspondence relating specifically to research topics.

## Research

D.1-D.16 Early notebooks

D.1 HMSO Exercise Book inscribed on front cover 'S.K. Runcorn Notes on report'. Used for notes probably while serving at the Radar Research and Development Establishment, 1943-1946. Most pages not used.

D.2 Softback notebook inscribed on front cover 'S.K. Runcorn Plasticity 1947'. Used for notes and calculations on plasticity. Most pages not used.

D.3 Hardback 'Physics' notebook. Used for notes on seminars/lectures attended. Those named include Rosenfeld, [D.R.] Hartree, [L.] Janossy and [J.D.] Cockcroft. Undated but intercalated is programme for Institute of Physics Manchester and District Branch conference on Applications of Radioactive Tracer Elements, 10-12 July 1947. Most pages not used.

D.4 Softback notebook used for work on 'Earth's magnetism investigations', 18 December 1947 - 7 January 1948. Most pages not used.

The notebook was used to record findings from beneath the Earth's surface and is dirty with coal dust.

D.5 Softback notebook used for work on Earth's magnetism, 29 December 1947 - June 1948. Most pages not used.

The notebook was used to record findings from beneath the Earth's surface and is extremely dirty with coal dust.

D.6 Softback notebook used for work on Earth's magnetism, 29 December 1947 - 19 February 1948. Intercalated loose are calculations dated 10 February 1948. Most pages not used.

The notebook was used to record findings from beneath the Earth's surface and is dirty with coal dust.

D.7 Hardback notebook used for work on Earth's magnetism, 24 March - 31 May 1948. Most pages not used.

D.8 Hardback notebook inscribed on first page 'Measurements work with QHM [Quartz Horizontal Magnetometer] 88 & 89 in Parsonage Colliery Leigh [Lancashire] May June 1948'. Most pages not used.

**Research**

D.9 Softback notebook used from the front for measurements in Snowdown area 13 July - 11 September 1948 and at Hickleton Colliery, Yorkshire, January 1949, and from the back for results of 'Surface Surveying' 20 July - 26 August 1948 and January 1949.

D.10 Hardback notebook inscribed on front cover 'Temperature Coefficients'. Used various dates September 1948 - February 1949.

D.11 Hardback 'Physics' notebook used at the front for brief notes, December 1948, and thereafter for notes on lectures or talks by others, May 1958.

Those named include [R.A.] Bagnold, D.C. Tozer, F.J. Lowes, W. Sucksmith, D. Shoenberg and S. Chapman. Most pages not used.

D.12 Hardback notebook inscribed on front cover 'A.C. Benson'. Used for notes and data. Intercalated at back is first page of typescript draft by Runcorn 'The variation of the Earth's magnetic field with depth below the surface'. Undated but *ca* 1948-1950. Most pages not used.

A.C. Benson collaborated in the studies of the Earth's magnetic field, co-authoring with Runcorn and others a number of articles on the subject.

D.13 Hardback notebook used for calculations. A little intercalated material. Undated but similar format to the preceding. Most pages not used.

D.14 Softback Reporters notebook inscribed on front cover 'Log Book To be kept in Gladstone'. Used for rough notes and jottings August 1949 - August 1950. Most pages not used.

D.15 Hardback notebook inscribed inside front cover 'Base book. Vane Tempest [Colliery, Durham] Dept of Geophysics Downing Place Cambridge'. Used from the front to record magnetism measurements 5 February 1950 - 5 October 1951, and at the back, n.d.

D.16 Hardback notebook inscribed inside front cover 'Yorkshire. Geophysics Dept Cambridge University'. Used for magnetism measurements, mostly from Brodsworth Colliery, 31 March - 29 July 1950.

## Research

D.17-D.82 'Data from late 1940s'. Contents of Runcorn's box so inscribed.

The great majority of the material therein was found in folders inscribed by Runcorn with a brief title or description of the contents. The inscriptions have been reproduced in the catalogue entries and folders arranged in alphabetical order.

It relates to work using magnetometers at collieries principally in Lancashire (Astley Green, Nook), Yorkshire (Brodsworth, Cadeby, Hickleton) and Durham (Vane Tempest).

D.17-D.30 'Aerial Surveys Durham Surf[ace] Surveys Cambridge Surveys'.

D.17 Letter to Runcorn from Helge Petersen, Director, Danish Meteorological Institute, with report on the Quartz Horizontal Magnetometer, 20 March 1948.

D.18 Correspondence with C.A. Jarman, Ministry of Supply, *re* use of aerial magnetometer over collieries in Lancashire, Kent and Yorkshire, 31 May 1948 - 26 April 1950.

Includes map of Leigh area, Lancashire with variations in magnetic field, and readings from magnetometer.

D.19 Department of Scientific and Industrial Research summary of report by A.C. Benson for September 1947 - September 1948.

D.20-D.23 Typescript drafts, *ca* 1949-1950.

Most with manuscript corrections.

D.20 'Introduction' beginning 'H.W. Babcock (1947) discovered that the A2p type star, 78 Virginia, possessed a magnetic moment', 5pp.

'6. Surface surveys', 4pp.

'Results of measurements at Nook and Astley Green base', 4pp.

**Research**

D.21 'The effect of local anomalies', 8pp.

'The selection of underground sites', 10pp.

'The experimental determination of the geomagnetic radial variation', 4pp + 2pp tables.

D.22 Incomplete draft paginated 2-18 + figures and graphs, beginning 'Theoretical background: existing theories of the origin of the Earth's main magnetic field fall into two groups'; manuscript note on 'The magnetic field due to a conducting sphere spinning...' (?not in Runcorn's hand).

D.23 'Procedure in QHM [Quartz Horizontal Magnetometer] depth runs', 2pp.

'Procedure in BMZ [Balance Magnetometer Zero] depth runs', 1p.

D.24 Figures, numbered 10-18.

D.25-D.29 Manuscript notes, data and graphs on particular sites, 1949-1950.

D.25 Hickleton Colliery, Yorkshire.

D.26 Lancashire.

D.27 Vane-Tempest Colliery, Durham.

Includes letter on the colliery from the Colliery Manager, March 1950.

D.28 Vicar's Field Colliery.

D.29 Miscellaneous sites in the UK and ?South Africa.

D.30 Miscellaneous figures, data and notes.

**Research**

D.31-D.37 'BMZ calcs'.

Data from surveying work done with Balance Magnetometer Zero. 1949-1950.

Arranged by colliery.

D.31, D.32 Astley Green, Lancashire.

2 folders.

D.33 Brodsworth, Yorkshire.

D.34 Cadeby, Yorkshire.

D.35 Hickleton, Yorkshire.

D.36 Nook, Lancashire.

D.37 Vane Tempest, Durham.

D.38-D.44 'BMZ & QHM Data'.

Data from calibration of equipment, 1949-1950.

7 folders.

At D.39 are plans of Gresford Colliery, Denbighshire, and Yard seam, Bold Colliery.

D.45, D.46 'Lancs SS'.

Data from Lancashire collieries, July 1949 - September 1950.

2 folders.

**Research**

| | |
|---|---|
| D.47, D.48 | 'Lancs SS Calcs'.<br><br>Data and calculations, 1949-1950.<br><br>2 folders. |
| D.49-D.58 | 'QHM calcs'.<br><br>Data from surveying work done with Quartz Horizontal Magnetometer. 1949-1950. |
| D.49 | General notes and calculations. |
| D.50-D.58 | Arranged by colliery. |
| D.50 | Astley Green, Lancashire. |
| D.51, D.52 | Brodsworth, Yorkshire.<br><br>2 folders. |
| D.53, D.54 | Cadeby, Yorkshire.<br><br>2 folders. |
| D.55, D.56 | Hickleton, Yorkshire.<br><br>2 folders. |
| D.57 | Nook, Lancashire. |
| D.58 | Vane Tempest, Durham. |
| D.59 | 'Statistics'.<br><br>Includes plans of Brodsworth and Cadeby Collieries. |

**Research**

| | |
|---|---|
| D.60-D.64 | 'Temp. Coeff Calcs'. |
| D.60 | Letter from 'Alan', Department of Geodesy and Geophysics, Cambridge, to 'Tony' *re* findings from surveys 1949-1950, 4pp, 12 December 1950. |
| D.61 | Plan of Magnetic Survey of Market Drayton area, Shropshire. |
| D.62 | Plan of Hutton seam, Vane Tempest Colliery, Durham, 1950 (see also D.66). |
| D.63, D.64 | Miscellaneous notes, data and calculations. |
| D.65-D.71 | 'Und[er]g[roun]d Surveys Colliery Iron'.<br>Notes, plans etc *re* quantities of iron and steel used underground in pit shafts, 1948-1951. |
| D.65 | Plans of Arley seam, Nook Colliery and Binn seam, Astley Green Colliery, Lancashire. |
| D.66 | Plans of Brodsworth Main Colliery, Yorkshire, Parkgate seam, Hickleton, Yorkshire, and Hutton seam, Vane Tempest Colliery, Durham (see also D.62). |
| D.67-D.71 | Arranged by colliery. |
| D.67 | Astley Green, Lancashire; Bold, Lancashire; Brodsworth, Yorkshire. |
| D.68 | Cadeby, Yorkshire; Gresford, Denbighshire. |
| D.69 | Hickleton, Yorkshire. |
| D.70 | Nook, Lancashire. |
| D.71 | Thorne, Yorkshire; Vane Tempest, Durham. |

**Research**

D.72-D.74 'Yorks S.S.'.

Data from Yorkshire collieries, 1949 - 1950.

3 folders.

D.75-D.78 'Yorks S.S. Calcs'.

Data and calculations, 1949-1950.

4 folders.

D.79-D.82 Contents of Runcorn's envelope found with the preceding. 1948-1950.

D.79 Correspondence, including letters from Helge Petersen, Director, Danish Meteorological Institute, 1948-1950.

D.80 Plans of Parkgate seam, Brodsworth Colliery, Yorkshire, Parkgate seam, Hickleton Colliery, Yorkshire, Arley seam, Nook Colliery, Lancashire, and unidentified.

D.81, D.82 Notes, data and calculations.

2 folders.

D.83 'Royal Society grant - Earth currents...' Contents of Runcorn's folder so inscribed: correspondence *re* grant expenditure 1950-1958.

D.84 'Gravity contour map of Eastern England corrected for Mesozoic effects' by M.D. Dixon, Report no. K.H.G. 14, November 1950.

Includes report and two maps.

D.85, D.86 Correspondence and papers, chiefly *re* samples of Pre-Cambrian rocks from boreholes in the East Midlands and magnetic observations, May 1951 - January 1952.

Correspondents include staff of the Geological Survey and Museum and oil companies.

2 folders.

## Research

D.87 'Torque in Mantle'. Contents of Runcorn's folder so inscribed: correspondence and papers.

The correspondence is from 1952 (chiefly A.F. Moore) and 1954 (P.H. Roberts). The papers are undated.

D.88 Hardback notebook labelled on cover 'Optical expts at high pressure. S.K. Runcorn, Inst. Of Geophysics Univ. of California [...] and Caius College, Cambridge'. Used for results of experiments, August -September 1952. Most pages not used.

Intercalated material includes correspondence July and September 1952, graphs, data and notes.

D.89 Correspondence from R. Hide, including manuscript draft of 'Electromagnetic damping of longitudinal elastic within the Earth' by Hide and Runcorn, 1954.

D.90-D.97 Data on annual magnetic variations from the USA and Australia.

Principally sheets of data from magnetic observatories, from 1910-1950s.

D.90 Miscellaneous calculations etc. Includes letter to Runcorn *re* magnetic annual variations in South Africa, February 1954.

D.91-D.97 Data from magnetic observatories.

D.91 Cheltenham, Maryland, USA, 1921-1952.

D.92 Honolulu, Hawaii, USA, 1937-1951.

D.93, D.94 Tucson, Arizona, USA, 1910-1954.

2 folders.

D.95 Vieques, Puerto Rico, 1911-1922.

## Research

D.96, D.97 — Watheroo, Australia, 1919-1944.

2 folders.

D.98 — 'Department of Physics, King's College, Newcastle. Proposed research by A.E.M. Nairn on the palaeomagnetism of the Pre-Cambrian rocks of certain African Commonwealth Territories'; duplicated typescript papers on palaeomagnetic collections from Kenya and Bechuanaland. *ca* 1954.

D.99-D.102 — Contents of Runcorn's boxfile: chiefly geological data etc from sites in Arizona and Utah, USA, 1955-1960.

4 folders

At D.102 are three annotated maps of Utah.

D.103-D.105 — Correspondence, data, calculations etc *re* dune effects and geological data, chiefly in USA, 1956-1957.

D.103 — Correspondence, 1956-1957.

D.104, D.105 — Typescript, duplicated typescript and manuscript data etc.

2 folders.

D.106, D.107 — Contents of Runcorn's folder divided into two for ease of reference.

D.106 — Correspondence with the Meteorological Office *re* magnetic observations, 1956-1963.

D.107 — Manuscript calculations, graphs etc.

D.108 — 'Earth currents' by L. Cagniard, 8pp typescript, latest bibliographical reference 1956; manuscript calculations and graphs found therewith.

D.109-D.114 — Typescript papers on aspects of rock magnetism by E. Irving, Australian National University and other colleagues.

## Research

D.109, D.110 'The palaeomagnetism of the Kainozoic basalts' by Irving and R. Green,

D.109 Typescript, with covering letter from Irving, 17 April 1957.

D.110 Figures and captions.

D.111 'The directions of magnetisation in the carboniferous glacial varves of Australia' by A.E.M. Nairn, 23 April 1957.

D.112 'Statistical methods in rock magnetism', by Irving and G.S. Watson, latest bibliographical reference 1956

D.113 'Rock magnetism: a new approach to some palaeogeographic problems' by Irving, latest bibliographical reference 1957.

D.114 'Palaeomagnetic and palaeoclimatological aspects of polar wandering' by Irving, n.d.

D.115 Seismological and meteorological data from Durham University Observatory, 1957.

D.116-D.130 'Basic zero. North American Rocks (S.K.R.) Duchesne Q (tertiary) - Belt Series (Pre E)'. Contents of Runcorn's box file so inscribed: data 1960-1961.

The data is computer print-outs. It was arranged by Runcorn into geological epochs.

D.116-D.120 'Pre-Cambrian Belt series'.

5 folders.

D.121 'Ordovician'.

D.122 'Triassic'.

**Research**

| | |
|---|---|
| D.123 | 'Permian' |
| D.124-D.126 | 'Tertiary'.<br>3 folders. |
| D.127-D.130 | Data sheets.<br>4 folders. |
| D.131 | Letter to Runcorn, 16 March 1961, enclosing rough manuscript drafts 'on permo-carboniferous so-called glacial deposits'. |
| D.132 | 'Development of the Earth topography (lithosphere and hydrosphere) in spherical harmonics up the 32nd order', duplicated typescript calculation and tables, with manuscript found therewith, 'Delft, 1961'. |
| D.133-D.135 | Three softback pocket notebooks, used for field notes on geological work in USA, 1962. |
| D.133 | June - July 1962. |
| D.134 | July - August 1962. |
| D.135 | August 1962. |
| D.136 | 'Mean angles from Japan, N.W. Atlantic, & Gariber Puertos for Secular Variation'. Contents of Runcorn's folder so inscribed: computer print-outs of data, 1962. |
| D.137-D.144 | Work at Supai, Arizona, 1962-1963. |
| D.137 | 'Supai - Field notes. Contents of Runcorn's folder so inscribed: manuscript and duplicated typescript notes; photographs, visitors' leaflet on the Grand Canyon, Arizona. |

**Research**

D.138 'Supai. Aubrey Cliffs'. Contents of Runcorn's folder so inscribed: plots, data sheets etc.

D.139 'Supai. Grand Wash Cliffs'. Contents of Runcorn's folder so inscribed: plot, data sheets etc.

D.140-D.143 'Supai. Kaibab Trail'. Contents of Runcorn's folder so inscribed: visitors' leaflet, plots, computer print-outs, graphs, data sheets etc.

4 folders.

D.144 'Supai Miscellaneous'.

D.145-D.148 'Kaibab Trail Data Sheets'. Contents of Runcorn's folder so inscribed divided into four for ease of reference. 1962-1964.

D.149-D.152 'Secular variation from American sandstones'. Contents of Runcorn's folder so inscribed. 1962-1963.

D.149 Correspondence to Runcorn from colleague in Physics Department, University of Newcastle, with calculations on 'Secular variation', 5 May 1962; and Barbara Gray, Jet Propulsion Laboratory, Pasadena, California, 17 August 1962.

D.150-D.152 Annotated computer print-outs and manuscript and typescript data from sites in USA.

Sites include Carmel, Utah; Chugwater, Wyoming; Spokane, Washington.

3 folders.

D.153, D.154 'Hermit Trail'. Contents of Runcorn's folder so inscribed divided into two for ease of reference: computer print-outs, manuscript data, plots etc. 1963.

D.155-D.159 'Hermit Trail Data Sheets. Not incl D. Mag'. Contents of Runcorn's folder so inscribed. 1963-1964.

**Research**

D.155-D.157 Data sheets, 1963.

3 folders

D.158 Computer print-outs, 1963.

D.159 Data sheets, 1964.

D.160-D.163 'Hermit Trail Thermal demagnetization. Data Sheets'. Contents of Runcorn's folder so inscribed divided into four for ease of reference. 1964.

D.164 'Kaibab. Thermal demag 400° e'. Contents of Runcorn's folder so inscribed. 1964.

D.165, D.166 'Rock magnetism field notes'. Contents of Runcorn's folder so inscribed. 1964-1965.

D.165 Correspondence 1964-1965.

D.166 Annotated printed and manuscript maps, manuscript notes etc.

D.167-D.187 'Pacific Cables. Cable and Wireless Ltd'. Contents of Runcorn's package of papers so labelled.

This material relates to projects to study Earth currents and variations in the Earth's magnetic field by means of abandoned underwater telegraph cables, chiefly in the Pacific Ocean, 1963-1974.

The material is chiefly correspondence from Runcorn and members of his research team with Cable and Wireless Ltd and other telecommunications companies and agencies, researchers in the US, Canada, New Zealand. There are also reports, and graphs, print-outs and tabulated data from the cables.

See also D.262-D.274 for material 1976-1988, D.300-D.303 for material *ca* 1983-1984 and D.316-D.319 for material 1989-1991.

Material relating to the committee of the Upper Mantle Panel set up to study the scientific use of underwater cables is at G.409-G.413.

**Research**

D.167 Cable and Wireless Ltd Report 'Voice Frequency Transmission Measurements on Submarine Telegraph Cables', sent to Runcorn, 1 March 1963.

D.168 Correspondence and papers *re* 'Proposal for measurements of currents of deep internal origin using long ocean telegraph cables' by Runcorn and F.J. Lowes, March - April 1963.

Includes copy of the proposal.

D.169 Correspondence and papers, May 1963.

Includes measurements of Earth currents on Suva-Auckland cable for April-May 1963.

D.170 Print-outs of currents on Suva-Auckland and other cables for April-May 1963.

D.171 Correspondence and papers, June 1963.

Includes magnetograms from New Zealand Magnetic Observatories and copy of grant proposal to purchase recording equipment for the research.

D.172 Correspondence and papers, July - December 1963.

D.173 Correspondence, January - April 1964.

Includes brief description of apparatus for measuring Earth currents.

D.174 Correspondence, May - December 1964.

D.175 Correspondence, 1965.

D.176 Correspondence and papers, 1966-1967.

Includes 'Preliminary results from the Pacific Cables Experiment', 4pp photocopied typescript, and 'Pacific Cables Experiment', 3pp typescript.

**Research**

D.177 'Undersea Cables - the new phase', photocopy typescript + figures, reporting on work on Pacific Ocean cables, March 1968.

D.178 International Union of Telecommunications' *List of Cables forming the World Submarine Network*, 17th edition, March 1968.

D.179 Correspondence and papers, March - November 1968.

Includes list of Pacific cables with notes of breakages, and readings from Pacific and Indian Ocean cables.

D.180 Papers on the Pacific Ocean cables, including 4pp typescript report 'Suva-Auckland Cable - Fourier analysis' and data. *ca* 1968-1969.

D.181 Correspondence, chiefly with telecommunications companies *re* use of ocean cables, January - June 1969.

D.182 Correspondence, August - December 1969.

D.183 Correspondence and papers, 1970.

Includes 2pp typescript description of 'The experiment' to measure redox potential of the sea earths of the Sydney-Auckland and Sydney-Norfolk Island cables, and recordings from Suva-Auckland cable.

D.184 Correspondence, chiefly *re* possible repair of Cottesloe-Cocos Islands cable, January - June 1971.

D.185 Correspondence and papers, August - November 1971.

D.186 Correspondence, chiefly *re* repair of Cottesloe-Cocos Islands and Auckland-Norfolk Islands cables and possible use of South Atlantic cables, 1972.

D.187 Correspondence, chiefly *re* further repair and possible salvage of Cottesloe-Cocos Islands cable, 1973 -1974.

## Research

D.188 'Earth & Moon convection patterns'. Contents of Runcorn's folder so inscribed: computer print-outs, manuscript data and calculations etc., *ca* 1965.

Includes undated manuscript letters to research colleague Barbara [Gray].

D.189, D.190 'The shape of the Moon'. Contents of Runcorn's folder so inscribed divided into two for ease of reference: computer print-outs, manuscript data and calculations, *ca* 1965-1966.

D.191, D.192 Miscellaneous print-outs, manuscript notes and calculations, pages of typescript drafts on the shape of the Moon, 1966.

2 folders.

D.193 Annotated (not in Runcorn's hand) photocopy plans of geological equipment.

The plans are dated April 1966.

D.194 Unidentified graphs, May 1966.

D.195 'Length of Devonian day'. Contents of Runcorn's folder so inscribed: manuscript calculations and notes.

Related to Runcorn's article 'Middle Devonian Day and Month', *Science*, vol 154 (1966).

D.196, D.197 'Sph[erical] harmonic analysis (no connections)'. Contents of Runcorn's folder so inscribed divided into two for ease of reference: description of computer program AHDO2; computer print-out from programme; data etc. 1967.

D.198 Computer print-out 'Mapping geoid with isostatic and glaciation corrections', 1967.

D.199 'Glacial & isostatic correction to geoid.' Contents of folder so inscribed: manuscript letters to 'Alan' and 'Melanie' from Runcorn; manuscript notes, *ca* 1967.

## Research

D.200 Seven photographs, six of corals, 1967.

D.201 'Rock magnetism notes. Penn 1967'. Contents of Runcorn's folder so inscribed: correspondence, 1967-1970; print-outs; photocopied graphs.

D.202-D.206 Contents of Runcorn's folder: chiefly calculations and data, 1967-1972.

5 folders.

D.207 Press Kit for the Apollo Laser Ranging Retro-Reflector Experiment: articles etc. 1968.

D.208-D.213A Viking Project material, 1969, 1971.

NASA's Viking Project was to launch two spacecraft to Mars in 1973, each having an orbiter and a lander. Scientists were invited to submit research projects to be carried out by the mission. In the event the Viking mission landed craft on Mars in July and September 1976.

Runcorn was involved in advising UK colleagues interested in participating.

See also D.223-D.234.

D.208 Duplicated typescript information on opportunities for participation in the mission, July, August 1969.

D.209 Correspondence and papers, chiefly from UK colleagues with outline proposals, June 1969.

D.210 Correspondence and papers *re* research proposals, September, October 1969.

D.211-D.213 NASA literature on the Project.

D.211 Science Management Plan.

D.212 Viking Mission Definition no.2.

## Research

D.213 Viking Lander Science Instrument Teams Report July 30, 1969.

D.213A Correspondence, March - September 1971.

D.214 'M[oment]. of I[nertia]. & Mantle & Core in Jupiter & Saturn'. Contents of Runcorn's folder so inscribed: manuscript calculations and graphs. 1960s.

D.215, D.216 'Coefficients in Electromagnetic Torque on Mantle ie $L_1$-$L_3$'. Contents of Runcorn's folder so inscribed divided into two for ease of reference: manuscript letters from Barbara Gray; annotated computer print-outs; manuscript calculations and graphs. 1960s.

D.217-D.219 'Electromagnetic Torque on Mantle. Complex spherical Bessel functions jn(p) nn(p) for X>1'. Contents of Runcorn's folder so inscribed divided into three for ease of reference: manuscript calculations; computer print-outs etc. 1960s.

D.220-D.222 'Core Growth'. Contents of Runcorn's folder so inscribed divided into three for ease of reference: manuscript calculations and data (not all in Runcorn's hand); computer print-outs etc. 1960s.

D.223-D.234 'Mars - Viking Project'. Runcorn's bundle so labelled: material *re* NASA Viking mission to Mars in 1976. 1971-1978.

See D.208-D.213.

D.223 Leaflet *re* Mariner mission to Mars, 1971.

D.224 Letter from P.J. Coleman to NASA *re* proposed magnetic fields investigation as part of Viking mission, 1 February 1973.

D.225-D.229 Copies of news stories on the Viking expedition filed by E. Driscoll, Science Editor, USIA, May - August 1976.

Sent to Runcorn by Driscoll, 10 August 1976 (letter, with scientific summary, at D.225).

5 folders.

## Research

D.230 Miscellaneous information found with preceding.

D.231 Letters to Runcorn *re* his request for meteorological slides from the Viking mission, January 1977.

D.232 NASA brochure *Mars: The Viking Discoveries*, October 1977.

D.233 'A new phase of planetary exploration: orbiters for the Moon and terrestrial planets', research proposal by P.J. Coleman and Runcorn, *ca* 1977.

D.234 Miscellaneous NASA information, 1978.

D.235 Contents of Runcorn's folder: letter from Susan Hofmann *re* Moon's radius vector calculation, November 1970; two letters to Hofmann, with histograms and data of the Mascon *Maria* and other *Maria*, 1971.

D.236 'Apollo 16, 17 site'. Contents of Runcorn's folder so inscribed: correspondence and papers *re* preferred landing sites for these missions, 1971-1972.

Includes papers of International Astronomical Union Commission 17 (The Moon) meeting at University of Newcastle, March 1971.

D.237 'Moment of Inertia factor of the Moon'. Contents of Runcorn's folder so inscribed: brief correspondence with S. Hofmann, 1972; calculations on inertia factor.

D.238-D.241 'Planetary force'. Contents of Runcorn's folder so inscribed divided into four for ease of reference.

D.238 Correspondence to Runcorn from S. Hofmann, enclosing data, June, July 1972.

D.239 Computer print-outs, manuscript data etc on 'Forces on the continental plates'.

## Research

D.240 Manuscript and typescript pages of drafts by Runcorn.

D.241 Miscellaneous computer print-outs, data etc.

D.242, D.243 'Convection & geoid'. Contents of Runcorn's folder so inscribed divided into two for ease of reference: miscellaneous calculations, data and figures, one set of calculations (by S. Hofmann) dated 1972.

D.244-D.246 Contents of Runcorn's box: papers *re* inertia factor of the Moon.

D.244 Correspondence with S. Hofmann and manuscript calculations and notes by her, *ca* 1972.

D.245 Miscellaneous pages of calculations, annotated computer print-outs etc.

D.246 Computer print-outs.

These date from 1968 to 1972.

1 bundle.

D.247-D.254 Runcorn's untitled bundle: correspondence and papers *re* Pioneer Venus project, 1972-1973.

See also D.285.

D.247 Correspondence, April - June 1972.

D.248 *Pioneer Venus. Report of a Study by the Science Steering Group*, NASA, June 1972.

D.249 Correspondence and papers *re* scientific participation in the mission, August - September 1972.

Includes 'Objectives of magnetic field measurements for the Pioneer Venus Eight', 3pp typescript of Runcorn's contribution to NASA Ames Research Center proposal for scientific investigation.

**Research**

D.250 Correspondence with C.P. Sonett, October - November 1972.

D.251, D.252 'A Proposed Magnetic Field Investigation for the Pioneer-Venus Entry Mission', Ames Research Center, December 1972.

Runcorn is named as a co-investigator.

D.251 Management Section.

D.252 Technical Section.

D.253 'Pioneer Venus Orbiter. Report of a Study by the NASA/ESRO Joint Working Group', January 1973.

D.254 Miscellaneous material:

Letter *re* removal of Pioneer Venus programme from the 1974 NASA budget and copy of telegram sent by Runcorn to NASA, January 1973.

Memorandum *re* 1978 Pioneer Venus mission, July 1973.

D.255 'Follow up of work done on the evolution of the Earth's core'. Contents of folder so inscribed: miscellaneous graphs, calculations etc, 1973.

D.256-D.258A Correspondence and papers *re* 1973 Mariner Venus/Mercury project.

Runcorn was at the Jet Propulsion Laboratory, Pasadena, California, to watch pictures from the Mariner 10 flyby of Mercury.

D.256 Correspondence *re* Mercury flyby and magnetic field measurements, April - June 1974.

D.257 Mariner status bulletins, 19, 23 and 25 and Mission Status Summary, 1974.

D.258 Jet Propulsion Laboratory information pack.

Includes brochures and leaflets *re* the JPL's work in space exploration.

**Research**

D.258A 'Radar photos of Venus'. Contents of Runcorn's envelope so inscribed: 17 monochrome photographs, 1972-1974.

D.259-D.261 Runcorn's untitled bundle: papers *re* planetary evolution, *ca* 1974.

D.259 Photocopy letter from Runcorn to 'Ted', 9 August [1974]; photocopy manuscript draft of Fortran computer program.

D.260, D.261 Computer print-outs of data on 'Evolution of a planet from a cold origin'.

D.260 'Mars'.

D.261 'Earth'.

D.262-D.274 'Pacific Cables'. Contents of Runcorn's boxfile so labelled: correspondence and papers *re* work with Pacific Ocean cables, 1976-1988.

See also D.167-D.187 for material 1963-1974, D.300-D.303 (*ca* 1983-1984) and D.316-D.319 (1989-1991).

D.262 1976-1977.

Chiefly *re* research proposal for investigations into potential distribution over the Earth's surface using ocean cables'. Includes Runcorn's manuscript draft outline.

D.263 1978-1980.

Includes photocopy of account of work presented at A.T. Price Memorial meeting, 1980.

D.264 1981. Chiefly *re* Auckland Cable.

D.265 1982. Main correspondent is co-researcher M.L. Richards.

D.266 January-February 1983.

**Research**

D.267 March 1983.

Includes records of differential geomagnetic field from the Pyrenees.

D.268 June - November 1983.

D.269 January - March 1984.

D.270 March 1984.

Voltage records from Suva branch of Auckland-Suva-Hawaii cable, sent to Runcorn by Cable & Wireless Co., 2 March 1984.

D.271 April 1984 - July 1985.

Includes 5pp typescript account of the cables experiments from the 1960s.

D.272 November 1985.

'The relationship between ocean current transports and electric potential differences across the Tasman Sea, measured using an ocean cable' by P.G. Baines and R.C. Bell, typescript draft sent to Runcorn for comment and advice.

D.273 1986-1988.

Includes data from D.E. Winch.

D.274 Plates showing voltages on Pacific Ocean cables from the early 1960s.

D.275-D.277 'Viking 1984 Mars expedn'. Contents of folder so inscribed: correspondence and papers *re* possible magnetism experiments to be carried out by the 1984 Mars mission, 1977.

There was a special meeting during the 8th Lunar Science Conference (H.345, H.346) to discuss the possible magnetics experiments package.

D.275 Correspondence and papers, March - April 1977.

**Research**

D.276 'Magnetics experiments for the 1984 Mission to Mars: an advocacy group report', 8 April 1977.

D.277 Typescript drafts: 'Magnetic surveys from Rover', 3pp and 'Notes on measurement of magnetism of Martian surface samples', 6pp; 2pp manuscript notes by Runcorn.

D.278, D.279 'Jupiter V'. Contents of folder so inscribed.

D.278 Correspondence, chiefly on secular acceleration of Jupiter satellites, February, April 1978; manuscript calculations found therewith.

D.279 Photocopy of 'A chapter of errors in Tidal-Friction theory', 20pp typescript paper by R.A. Lyttleton, latest bibliographical reference 1978.

D.280 'Dr Molyneux'. Contents of folder so inscribed: annotated computer print-outs, data and plots, etc. *re* measurements on the Moon. Some dated July 1978.

D.281, D.282 'Growth ring measurements in fossil brachiopods P.J. Maddigan c/o Physics Dept'. Contents of folder so inscribed divided into two for ease of reference: manuscript data on growth rings, September 1978.

Sent to Runcorn by Maddigan.

D.283 Correspondence and papers *re* support for work on the Magnetisation of Consolidated Sediments, 1979-1980.

Runcorn sought funding for work with D.W. Collinson, D.H. Tarling and S.P.G. Perry.

D.284 Papers *re* support of various research projects to 1979:

'Pre-Cambrian palaeomagnetism and polar wandering', reports on work funded by the Royal Society 1978-1979.

'The Past History of the Earth and Moon's Rotation from Palaeontological Growth Lines', reports on work funded by the Royal Society 1978-1979.

'The Rate of Rotation of the Earth and Moon', final report by F.R. Stephenson on Leverhulme Trust-funded research 1975-1979.

**Research**

D.285 'Pioneer Venus'. Contents of Runcorn's folder so inscribed: 3 colour photograph maps of Venus.

One dated June 1980.

D.286 Jet Propulsion Laboratory photographs.

Captioned on verso.

4 monochrome photographs of Earth features from Space Shuttle Columbia, November and December 1981.

1 colour photograph of *Beta pictoris* ?solar system. Nd.

D.287-D.289 Contents of untitled folder.

D.287 Correspondence with Elizabeth Middleton, Department of Computing, Newcastle Polytechnic, 1982.

D.288, D.289 Plots of the results of Middleton's 'program for the forces on the plates due to the contribution of the effective topography'.

2 folders.

D.290-D.296 'Moon magnetism reprints'. Contents of Runcorn's folder so inscribed, 1980-1984.

D.290 Correspondence, 1982, 1983.

D.291 Computer print-outs, annotated by Runcorn.

D.292 Miscellaneous notes, annotated information etc.

D.293-D.296 Typescript and photocopy papers by others on the Moon and magnetism, 1980-1984.

4 folders.

**Research**

D.297-D.299 Contents of untitled folder divided into three for ease of reference: typescript and photocopy papers by others on the rotation of the Earth, 1982-1984.

D.300-D.303 'Cables'. Contents of folder so inscribed: correspondence and papers *re* work with Pacific Ocean cables, *ca* 1983-1984.

See also D.167-D.185 for material 1963-1974, D.262-D.274 for material 1976-1988, and D.316-D.319 for material 1989-1991.

D.300 Photocopy manuscript and typescript drafts reporting on work by Runcorn *et al* on 'potential differences between distant points on the Earth by submarine cables'.

D.301 Correspondence, 1983-1984.

D.302, D.303 Miscellaneous papers, figures, illustrations.

2 folders.

D.304-D.306 'Discussion with Denis Winch'. Contents of Runcorn's folder so inscribed correspondence and papers *re* work with Pacific Ocean cables, *ca* 1983-1988.

D.304 Correspondence with Winch, University of Sydney, 1983-1988.

Includes data from Pacific Ocean cables.

D.305 Photocopy typescript drafts reporting on work by Runcorn *et al* on Pacific Ocean cables.

D.306 Figures, graphs etc.

D.307-D.312 'Dock reservoir Results Letters'.

Runcorn and colleagues were using tidal gravimeters to measure the value of g (the gravitational constant). 1986-1987.

D.307, D.308 Correspondence *re* design of and arrangements for experiments, February 1986 - 1987.

## Research

D.307 February - May 1986.

D.308 June 1986 - August 1987.

Includes report of meeting at Royal Society on design of experiments, 26 November 1986 and list of 'Ongoing Fifth Force Experiments', August 1987.

D.309 'A space experiment to examine the possibility of a Yukawa-like term in the gravitational potential', 2pp typescript. *ca* 1987.

D.310, D.311 Manuscript and typescript data, graphs etc from gravimeter work, 1986-1987.

2 folders.

D.312 9 photographs of gravimeter equipment.

D.313 Photocopied manuscript calculations, first page titled 'The system', with annotated reference 1989.

D.314, D.315 'Mars'. Contents of Runcorn's folder so inscribed divided into two for ease of reference: letter from R.A. Wells *re* his draft paper on Mars and crustal evolution, 19 October 1989; photocopy extracts of papers on Mars.

D.316-D.319 'S.K. Runcorn. Pacific cables'. Contents of Runcorn's folder so inscribed: correspondence and papers 1989-1991.

The bulk of the correspondence is with D.E. Winch, University of Sydney.

See also D.167-D.185 for material 1963-1974, D.262-D.274 for material 1976-1988, and D.300-D.303 for material *ca* 1983-1984.

D.316 Correspondence with Winch, 1989.

Includes data from Pacific Ocean cables.

D.317 Correspondence with Winch and others, 1990-1991.

Includes data from Pacific Ocean cables.

**Research**

D.318 'Geoelectric potentials measured by ocean cables' by Runcorn, Winch et al., typescript draft + figures, *ca* 1991.

D.319 Miscellaneous typescript and manuscript notes and figures, *ca* 1990.

D.320-D.322 'Ocean currents and geomag.'. Contents of Runcorn's folder so inscribed divided into three for ease of reference: correspondence and figures, 1990-1993.

D.320 Correspondence, 1991-1993.

D.321 Report on the US 'World Ocean Circulation Experiment', December 1990.

D.322 Miscellaneous figures, 1989-1990.

D.323-D.332 Miscellaneous undated material.

D.323 'Palaeomagn results'. Contents of folder so inscribed: typescript data, manuscript plots.

D.324 Typescript data on directions of magnetisation and pole positions for Pre-Cambrian rock formations.

D.325 Manuscript notes and calculations.

Include: 'Mathematical development of electromagnetic induction in a sphere', 'Static versus dynamic model', 'G as a function of position'.

D.326, D.327 Computer print-outs and plot.

2 folders.

D.328 11pp photocopy manuscript calculations entitled 'Fourier transforms'.

## Research

D.329, D.330 Unidentified plots on tracing paper.

2 folders.

D.331 Set of figures titled 'Kepler (observed)'.

D.332 Miscellaneous monochrome photographs.

Some identified on verso.

8 photographs.

**D.333-D.360 Research correspondence 1947-1986**

Runcorn's folders of correspondence related to specific research topics.

D.333-D.340 'Older correspondence about geomagnetism', 1947-1957.

D.333 Letter to P.M.S. Blackett from N. Herlofson, Oxford, enclosing solution to 'problem of magnetic sphere surrounded by a paramagnetic shield', 25 March 1947.

D.334 Letter to Runcorn from D.H. Parnum, Cambridge, enclosing details of scheme for measuring the Earth's magnetic field, 18 October 1947.

D.335 Letter to Runcorn from Ministry of Supply, enclosing copy of Sir Lawrence Bragg's paper 'Magnetic Probe for Detection of Unexploded Bombs' of 5 February 1941. Sent 10 November 1947.

D.336 Correspondence, 1949-1950.

D.337 Letter to Runcorn from A. Herzenberg, enclosing draft on 'Electromagnetic induction in rotating conductors', 24 October 1951.

D.338 Correspondence and papers, 1952-1953.

## Research

D.339 Correspondence to Runcorn from D.I. Gough, writing from Johannesburg, South Africa, *re* age of dykes, 1954-1955.

D.340 Letter to Runcorn from G.E. Backus on the electrical conductivity of the Earth's mantle, 18 January 1957; 4pp manuscript calculation found therewith.

D.341, D.342 Correspondence between F.J. Lowes, Cambridge University Department of Geodesy and Geophysics, and mineral mining companies *re* underground sites for investigations into the magnetic field of the Earth, 1953-1954.

D.341 1953.

D.342 1954.

D.343-D.360 'Corals'. Contents of Runcorn's box file so inscribed: correspondence *re* work on growth rings, 1964-1988.

Growth rings on coral specimens (and other indicators of palaeontological growth increments) were used to assess the history of the rotation of the Earth and the Moon.

The material is chiefly correspondence with colleagues *re* specimens and with research students working under Runcorn.

D.343 1964.

Includes correspondence with W.F. Whittard *re* work on corals.

D.344 1965-1966.

Includes correspondence *re* Belgian expedition to the Great Barrier Reef, Australia.

D.345 January - April 1967.

Chiefly *re* Belgian expedition to the Great Barrier Reef.

## Research

D.346 May - November 1967.

Chiefly correspondence from D.J. Barnes, reporting from the Great Barrier Reef expedition.

D.347 1968.

Includes correspondence *re* research of D.J. Barnes.

D.348 1969.

D.349 1970-1971.

D.350 1972.

Includes material *re* Tidal Culture Tank for University of Newcastle.

D.351 1973.

Includes correspondence *re* study of stromatolites.

D.352 1974 (1).

Includes correspondence *re* collaborative work with Shell Laboratory in Amsterdam. Their laser scanning equipment was used to analyse samples.

D.353 1974 (2).

Correspondence and papers *re* work of G.D. Rosenberg. Rosenberg and Runcorn co-authored a number of papers.

D.354 1975-1977.

D.355 1978.

Includes correspondence *re* work on brachiopods; Runcorn's response to article by P.G.K. Kahn and S.M. Pompea (*Nature* vol 275, 606-611) on growth lines in Nautilus Pompilius shells, including draft of reply by him.

**Research**

D.356 January - February 1979.

Correspondence *re* publication of response to Kahn and Pompea's work.

D.357 March - November 1979.

Chiefly *re* response to Kahn and Pompea's work.

D.358 1980-1981.

Includes correspondence with G.D. Rosenberg *re* digitizer.

D.359 1982-1986.

D.360 Photographs of magnified growth lines found with the material.

**SECTION E** **PUBLICATIONS** **E1-E.362**

The material is arranged as follows:

| | |
|---|---|
| E.1-E.283 | DRAFTS |
| E.284-E.308 | LETTERS TO THE PRESS AND OTHER MINOR PUBLICATIONS |
| E.309-E.362 | EDITORIAL CORRESPONDENCE |

## Publications

**E.1-E.283** **DRAFTS** **1950-1993**

This is based on the bibliography provided by Runcorn at A.6. A very significant number of the drafts listed here do not appear in the bibliography, and this is indicated in the catalogue entries.

**1950**

E.1, E.2 'Magnetic survey of Yorkshire', latest bibliographical reference 1950. No reference in the bibliography.

E.1 Typescript draft.

E.2 Figures.

E.3 'The experimental determination of the geomagnetic radial variation' (with A.C. Benson, A.F Moore and D.H Griffiths), *Phil. Mag.* vol 41 (1950), 783-791.

Typescript drafts with manuscript annotations.

E.4 'The main geomagnetic field', for *Science Progress*, latest bibliographical reference 1950 but no reference in the bibliography.

Typescript draft.

**1951**

E.5, E.6 'Measurements of the variation with depth of the main geomagnetic field' (with A.C Benson, A. F. Moore and D.H Griffiths), *Phil. Trans. Roy. Soc.* A. vol 244, (1951), 113-151.

E.5 Typescript draft.

E.6 Calculations sheets.

## Publications

### 1952

E.7 'On the geomagnetic secular variation in the Pacific', latest bibliographical reference 1952. No reference in the bibliography but may be related to 'On the theory of the geomagnetic secular variation', *Ann. de Geophys.* vol 15, (1959), 87-92.

Manuscript draft

### 1953

E.8 'On the theory of the irregular fluctuations in the length of the day', latest bibliographical reference 1953. No reference in the bibliography.

Typescript draft with manuscript annotations.

### 1954

E.9 'The Earth's core', *Trans. Amer. Geophys. Un.,* vol 35 (1954), 49-63.

Typescript draft with manuscript annotations.

E.10 'The electrical conductivity of olivine at high temperatures and pressures' (by Runcorn, H. Hughes and D.C Tozer), latest bibliographical reference 1954. No reference in the bibliography.

Typescript and manuscript draft

### 1955

E.11 'Core motions and reversals of the geomagnetic field', *Ann. de Geophys.* vol 11 (1955), 73-79.

Typescript draft.

E.12 'On the interpretation of stellar magnetic fields', *Vistas in Astronomy*, vol 1 (1955), 323-330.

Typescript draft with manuscript annotations.

**Publications**

E.13 'The application of solid state physics to the electrical conductivity of the Earth's mantle' (by D.C. Tozer and Runcorn), latest bibliographical reference 1955. No reference in the bibliography.

Typescript draft.

E.14 'The electrical conductivity of the Earth's mantle', *Trans. Amer. Geophys. Un.*, vol 36 (1955), 191-193.

Manuscript draft.

E.15 'The present status of theories of the main geomagnetic field', latest bibliographical reference 1955. No reference in the bibliography.

Typescript draft with manuscript notes.

**1956**

E.16-E.19 'Experiments on the displacement of ultraviolet absorption edge of olivine, *J. Applied Physics*, vol 27 (1956), 598-602.

E.16 Letter *re* the manuscript, October 1955.

E.17 Typescript and annotated drafts.

E.18 Figures, photographs and maps (? of North America).

E.19 Off-print.

E.20 'New evidence for reversal of the geomagnetic field near Pliocene-Pleistocene boundary (by N.D Opdyke and Runcorn), *Science*, vol 123 (1956), 1126.

Typescript drafts

See also E.24 for related article.

**Publications**

E.21 'Palaeomagnetic comparisons between Europe and North America', *Proc. Geol. Assoc. Can.*, 1956, 877-885.

Typescript and manuscript draft with figures.

E.22, E.23 'Palaeomagnetic survey in Arizona and Utah: Preliminary Results', *Bull. Geol. Soc. Amer.,* vol 67 (1956), 301-316.

E.22 Typescript draft with related letter, 1955

E.23 Tables.

E.24 'Remanent magnetization of lava flows in northern Arizona', latest bibliographical reference 1956. No reference in the bibliography.

Typescript and manuscript drafts.

Also includes a typescript of 'New evidence for reversal of the near Pliocene-Pleistocene boundary' (see E.20).

**1957**

E.25 'Convection currents in the mantle and recent developments in geophysics', in *Giedenkboek F.A Vening Meinesz*, 1957, 271-277.

Proofs and manuscript notes.

E.26, E.27 'Palaeomagnetic investigations in Great Britain, I. the measurement of the permanent magnetization of rocks' (with D.W Collinson, K.M. Creer and E. Irving), *Phil. Trans. Roy. Soc.* vol 250 (1957), 73-82.

E.26 Correspondence *re* the article, February 1957.

E.27 Annotated proof.

## Publications

E.28 'Palaeomagnetic investigations in Great Britain II. Analysis of the palaeomagnetism of the Torridonian sandstone series of north-west Scotland' (with E. Irving), *Phil. Trans. Roy. Soc.* vol 250 (1957), 83-99.

Proofs.

E.29 'Palaeomagnetic investigations in Great Britain IV. Geophysical interpretation of palaeomagnetic directions from Great Britain' (with K.M. Creer and E. Irving), *Phil. Trans. Roy. Soc.* vol 250 (1957), 144-156.

Annotated proof.

E.30 'The variation in the length of the day', latest bibliographical reference 1957. No reference in the bibliography.

Typescript draft with annotations.

**1958**

E.31 Entry in the *Encyclopaedic Dictionary of General, Nuclear and Solid-State Physics*. Pergamon Press, *ca* 1958. No reference in the bibliography.

Correspondence and (? final) draft.

E.32 'Palaeomagnetic results from different continents and their relation to the problem of continental drift' (with K.M Creer, E. Irving and A.E.M. Nairn), *Ann. de Geophys.,* vol 14 (1958), 492-501.

Typescript draft and figures.

**1959**

E.33 'On the theory of geomagnetic secular variation', *Ann de Geophys.,* vol 15 (1959), 87-92.

Proof and figures.

## Publications

### 1960

E.34-E.36 'Deeper processes in Earth mantle', latest bibliographical reference 1960. No reference in the bibliography.

E.34 Typescript draft with annotations.

E.35 Typescript draft with annotations, titled 'Some comments on the origins of plate movement' found with the material, n.d.

E.36 Photocopy manuscript draft titled 'Convection in the mantle' found with the material, latest bibliographical reference 1967.

E.37 'Palaeomagnetic evidence for the geomagnetic field reversal and continental drift', latest bibliographical reference 1960. No reference in the bibliography but a head note reads 'Prepared for a Japanese journal of last September conference 1+3 phase.'

Typescript draft and abstract.

E.38-E.41 'Polar wandering and continental drift: evidence from palaeomagnetic observations in the United States' (with D.W Collinson), *Bull. Geol. Soc. Amer.*, vol 71 (1960), 915-958.

E.38 Typescript draft.

E.39 Tables.

E.40, E.41 Figures.

2 folders.

E.42 'Statistical methods in rock magnetism', *Phil. Mag.*, vol 5 (1960), 523-524.

Typescript draft and proof.

**Publications**

E.43, E.44 'Wind direction in the western United States in the late Palaeozoic' (with N.D. Opdyke), *Bull. Geol. Soc. Amer.*, vol 71 (1960), 959-972.

E.43 Typescript draft with annotations.

E.44 Tables.

E.45, E.46 'The palaeomagnetic poles for the lower Jurassic of Europe' (with K.M. Creer and E. Irving), for the *Royal Astronomical Society Geophysical Journal*, *ca* 1960 but no reference in the bibliography.

E.45 Typescript draft and proof.

E.46 Figures.

**1961**

E.47-E.52 'Climatic change through geological time in the light of the palaeomagnetic evidence for polar wandering and continental drift', *Quart. J. Roy. Met. Soc.*, vol 87 (1961), 282-313.

E.47, E.48 Typescript drafts with annotations.

2 folders.

E.49 Figures.

E.50 Plates of black and white photographs.

E.51 Draft, references, legends for figures and plates, appendixes and notes.

E.52 Miscellaneous untitled typescripts, nd.

## Publications

E.53 Planned book on geomagnetism, *ca* 1961. No reference in the bibliography.

Manuscript and typescript draft, with related correspondence.

### 1962

See also E.102 and E.264, 'Convection in the Moon'.

E.54, E.55 'A possible lunar magnetic field', latest bibliographical reference 1962. No reference in the bibliography.

E.54 Typescript draft and related letter, 1962.

E.55 Photographs with inscription in Russian and a separate note with the English translation.

E.56, E.57 'Analysis of the intensities of inhomogeneities of magnetism of the torridonian sandstone series of north-west Scotland' (with Irving, Molyneux and Turnbull), latest bibliographical reference 1962. No reference in the bibliography.

E.56 Manuscript draft.

E.57 Figures and graphs.

E.58-E.60 'Convection currents in the Earth's mantle', *Nature*, vol 195 (1962), 1248-1249.

E.58 Correspondence *re* the article, 1962

E.59 Typescript draft and manuscript notes.

E.60 Figures and notes.

**Publications**

E.61 'On the discrepancy between the optical and dynamical ellipticities of Mars', *ca* 1962. No reference in the bibliography.

Typescript draft with annotations.

E.62, E.63 'Palaeomagnetic evidence for continental drift and its geophysical cause', in *Continental Drift* ed. S.K Runcorn, Academic Press, 1962.

E.62 Typescript draft.

E.63 Figures.

E.64-E.66 'Palaeomagnetism and continental drift', *ca* 1962. No reference in the bibliography but the correspondence suggests it may be related to E.62-E.63.

See also E.69-E.71.

E.64 Correspondence, 1961-1963

E.65, E.66 Draft of chapter 1 'Towards theories of continental drift' and other papers including 'The statistical analysis of palaeomagnetic observations', 'The main geomagnetic field and its secular variation', and 'Methods of measuring the permanent magnetization of rocks'.

2 folders.

E.67 'Some further palaeomagnetic observations in the western United States', latest bibliographical reference 1962. No reference in the bibliography.

Manuscript draft.

E.68 'The origins of the oceanic ridges', latest bibliographical reference 1962. No reference in the bibliography.

Typescript draft.

E.69-E.71 'Towards a theory of continental drift', *Nature*, vol 193 (1962), 311-314.

See also E.64-E.66

**Publications**

E.69 Correspondence *re* the article, 1961-1962.

E.70 Typescript draft with manuscript annotations and off-print.

E.71 Figures.

**1963**

E.72-E.74 'Ancient glaciation and continental drift', *ca* 1963. No reference in the bibliography.

E.72 Correspondence *re* the article, 1963.

E.73 Manuscript and typescript draft with annotations.

E.74 Illustrative material.

E.75, E.76 'Growth of the Earth's core', *Nature*, vol 197 (1963), 992.

E.75 Correspondence *re* the article, 1963.

E.76 Proof.

**1964**

See also E.265.

E.77 'A connection between palaeomagnetism and palaeoclimates', in *Palaeoclimatology,* ed. A.E.M. Nairn, John Wiley, 1964, 181-188.

Typescript proof with annotations.

See also E.78-E.79.

**Publications**

E.78, E.79 'Palaeowind directions and palaeomagnetic latitudes', in *Palaeoclimatology*, ed. A.E.M. Nairn, John Wiley, 1964, 402-420.

See also E.77.

E.78 Typescript and manuscript draft with annotations and manuscript appendix draft.

E.79 Graphs.

E.80 'Changes in the Earth's Moment of Inertia', *Nature*, vol 204 (1964), 823-825.

Correspondence *re* the article.

E.81 'Measurements of Planetary Electric Currents', *Nature*, vol 202 (1964), 10-13.

Correspondence *re* the article; offprint.

E.82 'Satellite gravity measurements and a laminar viscous flow model of the Earth's mantle', *J. Geophys. Res.*, vol 69 (1964), 4389-4394.

Typescript draft

E.83, E.84 'Palaeomagnetic results from Precambrian sedimentary rocks in the western United States', *Bull. Geol. Soc. Amer.* vol 75 (1964), 687-704.

E.83 Typescript draft with annotations and proof.

E.84 Tables and figures.

**1965**

E.85-E.87 'Changes in the convection pattern in the Earth's Mantle and continental drift: evidence for a cold origin of the Earth', *Phil. Trans. Roy. Soc.* vol 258 (1965), 228-251.

**Publications**

E.85, E.86 Typescript drafts with annotations.

2 folders.

E.87 Figures and legends.

E.88 'On changes in radius of the Earth due to core separation', latest bibliographical reference 1965. No reference in bibliography.

Typescript draft.

E.89-E.91 'Palaeomagnetic comparisons between Europe and North America', *Phil. Trans. Roy. Soc.,* vol 258 (1965), 1-11.

E.89 Typescript draft with annotations.

E.90 Reference and legend drafts.

E.91 Manuscript found with the material, entitled 'Report measurement of irregular, inhomogeneous body', dated 27 January 1967.

E.92 'The interior of Mars and Venus', latest bibliographical reference 1965. No reference in the bibliography.

Manuscript draft.

**1966**

E.93-E.96 'Demagnetization studies on some red sediments from the western United States' (with C. Snape), latest bibliographical reference 1966. No reference in the bibliography.

E.93 Correspondence *re* the article.

E.94 Typescript draft with annotations.

**Publications**

E.95 Figures and tables.

E.96 Manuscript comments on the article, not in Runcorn's hand.

E.97, E.98 'The analysis of remanent intensities and susceptibilities of rocks.' (with E. Irving and L. Molyneux), *Geophys. J. Roy. Astr. Soc.* vol 10 (1966), 451-464.

Material found in folder titled: 'Elsevier papers + R.A.S paper. Statistical papers of the North (?) magnetism'.

E.97 Typescript draft and proof with annotations.

E.98 Figures.

**1967**

See also E.266.

E.99 'A palaeontological measurement of the rate of retreat of the Moon from the Earth', in *Mantles of the Earth and Terrestrial Planets*, ed. Runcorn, Interscience Publishers, 1967, 225-228.

Proceedings of NATO ASI at the University of Newcastle upon Tyne, 1966. See also E.107, E.115-E.117 and H.67-H.70.

Typescript draft with manuscript annotations.

An earlier title, crossed out, read: 'N.A.T.O Conference Thursday 31st March 1966'.

E.100 'A review of the palaeomagnetism of North America and Europe in relation to the hypothesis of continental drift'. Latest bibliographical reference 1967. No reference in the bibliography.

Typescript draft.

**Publications**

E.101-E.106 'Convection in the Moon and the existence of a lunar core'. *Proc. Roy. Soc.* A., vol 296 (1967), 270-284.

Material found therewith also includes related drafts of different dates (E.102-E.106).

E.101 'Convection in the Moon and the formation of a lunar core'.

Typescript draft and proofs with annotations.

E.102 'Convection in the Moon', *Nature*, vol 195 (1962), 1150-1151.

Inscription on original folder read: 'M/S for convection in Moon sent to Roy. Astron. for Feb. 12 1962.'

Typescript draft.

E.103-E.106 'On the Moon's ellipticity', latest bibliographical reference 1962. No bibliographical reference.

E.103 Manuscript draft; typescript draft with manuscript annotations.

E.104 Summary and references.

E.105 Figures.

E.106 Photographs.

E.107 'Convection in the planets' in *Mantles of the Earth and Terrestrial Planets*, ed. Runcorn, Interscience Publishers, 1967, 165-173.

See also E.99, E.115-E.117.

Typescript draft with annotations.

E.108 'Flow in the mantle inferred from the low degree harmonics of geopotential', *Geophys. J. Roy. Astr. Soc*, vol 14 (1967), 375-384.

Manuscript draft; photocopy of the off-print.

**Publications**

E.109 'The interpretation of the Geoid', latest bibliographical reference 1967. No reference in the bibliography.

Typescript draft.

E.110, E.111 'On the rotation of Jupiter' in *Magnetism and the Cosmos*, Oliver & Boyd: Edinburgh, 1967, 365-377.

Inscription on original folder read: 'Calculations on time variation of red spot and radio longitudes'.

E.110 Letter *re* the chapter, 1966; typescript draft.

E.111 Figures and tables.

E.112 'Statistical discussions of magnetization of rock samples', in *Methods in Palaeomagnetism*, eds. D.W Collinson, K.M. Creer and Runcorn, Elsevier, Amsterdam, 1967, 329-332.

Typescript draft.

E.113 'The anisotropy of magnetization of rocks', in *Methods in Palaeomagnetism*, eds. D.W Collinson, K.M. Creer and Runcorn, Elsevier, Amsterdam, 1967, 353-359.

Typescript draft with annotations.

E.114 'The magnetization of rock samples' in *Methods in Palaeomagnetism*, eds. D.W Collinson, K.M. Creer and Runcorn, Elsevier, Amsterdam, 1967, 164-171.

Manuscript and typescript drafts.

E.115-E.117 'The problem of the figure of Mars', in *Mantles of the Earth and Terrestrial Planets*, ed. Runcorn, Interscience Publishers, 1967, 425-430.

See also E.99, E.107.

E.115 Correspondence *re* the publication, 1965.

## Publications

E.116 Typescript draft with annotations.

E.117 Manuscript notes.

### 1968

E.118 'Planetary magnetic field as a test of the dynamo theory', *Geophys. J. Roy. Astr. Soc.*, vol 15 (1968), 183-189.

Manuscript and typescript draft with annotations.

E.119-E.124 'The figure of the Moon' (with M.H. Shrubsall), *Physics of the Earth and Planetary Interiors*, vol 1 (1968), 317-325.

E.119 Correspondence *re* the article, 1966.

E.120 Typescript draft with annotations.

E.121 Graphs, maps and figures 1-4.

E.122 Calculations and manuscript notes.

E.123 Miscellaneous sheets titled 'Comments.'

E.124 Miscellaneous drafts on the Moon.

## Publications

### 1969

E.125 'A palaeontological method of testing hypothesis of a varying gravitational constant', in *Application of Modern Physics to the Earth and Planetary Interiors*, ed. Runcorn, John Wiley, 1969, 47-51.

Proceedings of NATO ASI at the University of Newcastle upon Tyne, 1967. See H.77-H.82.

Manuscript draft.

E.126, E.127 'Measurements of potential differences between distant points on the Earth by submarine cables', latest bibliographical reference 1969. No reference in the bibliography.

E.126 Typescript draft.

E.127 Figures.

### 1970

E.128-E.130 Material found together under the title 'Chandler Wobble'.

E.128 'A possible cause of correlation between earthquake and polar motions', latest bibliographical reference 1970. No reference in the bibliography.

Typescript and manuscript draft.

E.129 'Geophysical theories of the excitation of the Chandlerian Nutation', latest bibliographical reference 1970. No reference in the bibliography.

Typescript and manuscript draft.

E.130 'Polar wandering and continental drift', latest bibliographical reference 1967. No reference in the bibliography.

Includes parts of the typescript and manuscript draft, proof and letter, 1967.

## Publications

E.131 'Magnetic properties of Apollo 11 lunar samples (with D.W. Collinson *et al*) in *Proceedings of the Apollo 11 Lunar Science Conference*, vol 3 (1970), 2369-2387.

Off-print.

E.132 'On changes in the radius of the Earth due to core separation', latest bibliographical reference 1970. No reference in the bibliography.

Typescript draft and proof.

E.133 'Palaeontological measurements of the changes in the rotation rates of Earth and Moon and of the rate of retreat of the Moon from the Earth', in *Palaeogeophysics*, ed. Runcorn, Academic Press, 1970, 17-23.

Proceedings of NATO ASI at the University of Newcastle upon Tyne, 1968. See H.97-H.101.

Typescript draft with annotations.

E.134 'The Rotation of the Planets and their Interiors', Istituto Nazionale di Alta Matematica, vol. 3 (1970), 193-202.

Typescript draft and off-print.

### 1971

E.135 'Comments on the figure of the Moon', *Geological Problems in Lunar and Planetary Research*, vol 25 (1971), 359-363.

Correspondence and typescript draft with annotations.

E.136 'Magnetic characteristics of Luna 10 and 20 samples' (with A. Stephenson, and D.W Collinson), latest bibliographical reference 1971. No reference in the bibliography.

Photocopy typescript.

E.137 'Magnetic properties of Apollo 12 lunar samples' (with D.W. Collinson *et al*), *Proc. Roy. Soc. Lond.* A. vol. 325 (1971), 157-174.

Typescript draft and photocopy of proof.

## Publications

### 1972

E.138, E.139 'Earth as a planet', latest bibliographical reference 1972. No reference in the bibliography.

E.138 Typescript draft with annotations.

E.139 Table and plan of the article.

E.140 'Evidence on the deeper planetary interiors', *Physics of the Earth and Planetary Interiors,* vol. 6 (1972), 100-102.

Typescript draft.

E.141 'Magnetic properties of Apollo 14 rocks and fines' (with D.W. Collinson, A. Stephenson and A.J. Manson), *Proc. 3rd Lunar Sci. Conf. Geochimica et Cosmochimica Acta Supp.* 3, vol 3 (1972), 2343-2361.

See also H.138-H.142.

Off-print.

E.142 'Status report on permanent lunar magnetic fields', June 1972. No reference in the bibliography.

Typescript draft with annotations.

### 1973

E.143 'Continental drift and the search for geophysical mechanism', latest bibliographical reference 1973. No reference in the bibliography.

Typescript draft.

E.144 'On the Implication of the Shape of Mars', *Icarus*, vol 18 (1973), 109-112.

Typescript draft with annotations.

**Publications**

E.145, E.146 'Magnetic properties of Apollo 15 and 16 rocks' (with D.W. Collinson and A. Stephenson), *Proc. 4th Lunar Sci. Conf. Geochimica et Cosmochimica Acta Supp.* 4, vol 3 (1973), 2963-2976.

See also H.138-H.142.

E.145 Typescript draft with correspondence and proof.

E.146 Typescript draft 'Lunar magnetic field palaeointensity determination on Apollo 11, 16 and 17 rocks' (with D.W. Collinson and A. Stephenson).

E.147 'The shape and internal mechanics of the Moon' (with S. Hofmann), in *The Moon*, eds. H.C. Urey and Runcorn, Reidel, 1973, 22-31.

Typescript draft and brief correspondence, 1972, 1973.

E.148 'Theory of the postulated lunar magnetic field', latest bibliographical reference 1973. No reference in the bibliography.

Manuscript draft.

**1974**

See also E.274.

E.149 'Lunar magnetic field palaeointensity determinations on Apollo 11, 16 and 17 Rocks (with A. Stephenson and D.W. Collinson), *Proc. 5th Lunar Sci. Conf. Geochimica et Cosmochimica Acta. Supp.* 5, vol 3 (1974), 2859-2871.

See also H.224-H.227.

Typescript draft.

E.150, E.151 'On forces not moving lithospheric plates', *Tectonophysics,* vol 21 (1974), 197-202.

Drafts with annotations and proofs.

2 folders.

**Publications**

E.152, E.153 'On the origins of mascons and moonquakes', *Proc. 5th Lunar Sci. Conf. Geochimica et Cosmochimica Acta. Supp.* 5, vol 3. (1974), 3115-3126.

See also H.224-H.227.

E.152 Typescript draft and proof.

E.153 Figures.

E.154, E.155 'Some aspects of the physics of the Moon', *Proc. Roy. Soc. Lond.* A., vol 336 (1974), 11-33.

E.154 Typescript draft with annotations.

E.155 Off-print.

**1975**

See also E.275.

E.156, E.157 'An ancient lunar magnetic dipole field', *Nature*, vol 253 (1975), 701-703.

E.156 Typescript draft with annotations.

E.157 Calculations.

E.158 'On changes in the intensity of the ancient lunar magnetic field' (with A. Stephenson and D.W. Collinson), *Proc. 6th Lunar Sci. Conf., Geochimica et Cosmochimica Acta Supp.* 6, vol 3 (1975), 3049-3062.

See also H.247-H.250.

Correspondence, abstract and figure.

**Publications**

E.159 'On the interpretation of lunar magnetism', *Physics of the Earth and Planetary Interiors*, vol 10 (1975), 327-335.

Typescript and manuscript drafts.

E.160-E.162 'Solid state convection and the mechanics of the Moon', *Proc. 6th Lunar Sci. Conf. Geochimica et Coschimica Acta Supp*, 6, vol 3 (1975), 2943-2953.

See also H.247-H.250.

E.160 Correspondence and comments.

E.161 Typescript draft.

E.162 Abstract and proof.

**1976**

E.163 'A physical interpretation of Bullen's compressibility-pressure hypothesis', in *The Physics and Chemistry of Minerals and Rocks,* ed. R.G.J. Strens, John Wiley, 1976.

Correspondence and off-print.

E.164, E.165 'Inferences concerning the early thermal history of the Moon', *Proc. 7th Lunar Sci. Conf. Geochimica et Cosmochimica Acta. Supp.*, 7, vol 3 (1976), 3221-3228.

See also H.294-H.307.

E.164 Correspondence and review, 1976-1989.

E.165 Typescript draft.

**Publications**

E.166 'On the intensity of the ancient lunar magnetic field' (with A.Stephenson and D.W Collinson), *Proc. 7th Lunar Sci. Conf. Geochimica et Cosmochimica Acta. Supp*, 7, vol 3 (1976), 3373-3382.

See also H.294-H.307.

Typescript draft.

**1977**

See also E.276.

E.167, E.168 'Convection within Mercury', *Phys. Earth. Planet. Int.,* vol 15 (1977), 131-134.

E.167 Correspondence and review.

E.168 Typescript draft and manuscript notes.

E.169-E.171 'Early melting of the Moon', *Proc. 8th Lunar Sci. Conf. Geochimica et Cosmochimica Acta Supp.*, 8, vol 3 (1977), 463-469.

See also H.345, H.346.

E.169 Typescript and manuscript draft with annotations.

E.170 Marked proof.

E.171 Review.

E.172-E.175 'Interpretation of lunar potential fields', *Phil. Trans. Roy. Soc.* A, vol 285 (1977), 507-516.

E.172 Typescript draft.

E.173 Proof.

**Publications**

E.174, E.175 Figures and references.

2 folders.

E.176 'Magnetic characteristics of lunar 16 and 20 samples' (with A. Stephenson and D.W. Collinson), *Phil. Trans. Roy. Soc.* A, vol 284 (1977), 151-156.

Typescript draft and photocopy of proof.

E.177, E.178 'Melting of the Moon', latest bibliographical reference 1977. No reference in the bibliography.

E.177 Typescript draft.

E.178 Figures.

E.179 'Palaeointensity estimates from lunar samples 10017 and 10020' (with A. Stephenson and D.W. Collinson), *Proc. 8th Lunar Sci. Conf. Geochimica et Cosmochimica Acta Suppl.* 8, vol 1 (1977), 679-687.

See also H.345, H.346.

Typescript draft with figures.

E.180 'Physical processes involved in recent activity within the Moon', *Physics of the Earth and Planetary Interiors*, vol 14 (1977), 330-332.

Typescript draft.

E.181 'Primeval melting of the Moon' (with L.M. Libby and W.F. Libby), *Nature*, vol 270 (1977), 676-681.

Off-print.

E.182 'Space: a new phase?' (with P.J. Coleman), *Nature*, vol 265 (1977), 197-199.

Typescript draft and off-print.

## Publications

### 1978

E.183, E.184 'Heat sources in the primeval Moon', 1978.

This paper was submitted to the Royal Society for publication in the Proceedings but was not accepted. It is not clear why it appears in Runcorn's bibliography.

E.183 Correspondence and reviews, 1978-1981.

E.184 Typescript and manuscript draft on the Moon found with the material.

E.185, E.186 'On the origins of lunar palaeomagnetism', *Nature*, vol 275 (1978), 430-432.

E.185 Correspondence, 1978-1979 and manuscript notes.

E.186 Typescript draft and off-print.

E.187, E.188 'On the possible existence of superheavy elements in the primeval Moon', *Moon. Earth Planet. Sci. Letts*, vol 39 (1978), 193-198.

E.187 Correspondence, 1978 and review.

E.188 Typescript draft.

E.189-E.192 'Possibility of superheavy elements in iron meteorites' (with W.F. Libby and L.M. Libby), *Nature*, 278 (1978), 613-617.

E.189 Manuscript notes, figures and letter, 1978.

E.190 Typescript draft with figures.

**Publications**

E.191 Typescript draft titled: 'Possibility of superheavy elements in iron meteorites II' with figures.

E.192 Background material including two papers titled: 'Are the siderophile elements found in the lunar highlands of truly meteoritic origin?' and 'Element correlations and their significance for the determination of the bulk composition of planetary objects.'

E.192A 'Rock magnetic and palaeomagnetic studies on Luna 24 samples' (with A. Stephenson and D.W. Collinson), in *Mare Crisium: The Views from Luna 24.* eds. R.B. Merrill and J.J. Papike, Pergamon, 1978, 701-709.

See also H.368, H.369.

Photocopy of draft.

E.193 'The ancient lunar core dynamo', *Science*, vol 199 (1978), 771-773.

Manuscript draft and off-print.

**1979**

E.194 'Europe and planetary exploration', *ca* 1979. No reference in the bibliography.

Correspondence, 1979; typescript and manuscript draft.

E.195 'Palaeontological data on the history of the Earth-Moon system', *Physics of the Earth and Planetary Interiors*, vol 20 (1979), 1-5.

Manuscript draft and calculations; annotated proof.

**1980**

See also E.273.

E.196-E.198 'Lunar polar wandering', *Proc. 11th Lunar and Planetary Institute Conf., Geochimica et Cosmochimica Acta,* vol 3 (1980), 1867-1877.

See also H.463-H.467.

**Publications**

E.196 Correspondence, 1981 and reviews.

E.197 Typescript and manuscript drafts with annotations and figures. Also includes off-print.

E.198 Figures and tables.

E.199 'Superheavy element fission tracks in iron meteorites' (with W.F. Libby and L.M. Libby), *Nature*, vol 287 (1980), 565 (reply to R.K. Bull., *Nature*, vol 282, 1979, 393-394).

Photocopy of the off-print.

**1981**

E.200 'Wegner's theory: the role of geophysics in its eclipse and triumph.' *Geol. Rundschau*, vol. 70 (1981), 784-793.

Typescript draft.

E.201 Two manuscript drafts found together: 'Polar displacement' and 'The interior of the planets - a dynamic view', latest bibliographic reference 1981. No reference in the bibliography.

**1982**

E.202-E.204 'E.M. Probing of the Lunar Interior', *ca* 1982. No reference in the bibliography.

E.202 Letter, 1982.

E.203 Typescript draft by L.J Srnka and Runcorn, with manuscript annotations.

E.204 Manuscript draft by L.J. Srnka.

**Publications**

E.205 'Primeval displacements of the lunar pole.' *Physics of the Earth and Planetary Interiors,* vol 29 (1982), 135-147.

Off-print.

E.206 'The interiors and magnetic fields of the planets. a dynamic view', *ca* 1982. No reference in the bibliography.

Letter and typescript draft.

E.207 'The role of the core in irregular fluctuations of the Earth's rotation and the excitation of the Chandler Wobble', *Phil. Trans. Roy. Soc.* A vol 306 (1982), 261-270.

Off-print.

**1982-1984**

E.208-E.214 Series of drafts found together and written for *The New Scientist* between 1982 and 1984. No reference in the bibliography.

E.208, E.209 Correspondence *re* the publications. 1982-1985.

2 folders.

E.210 Typescript draft with annotations titled 'The time the Moon had moons', *ca* 1982.

E.211 Typescript draft with annotations titled 'The Earth's gravitational field', *ca* 1984.

E.212 Typescript draft titled 'The shape of Earth from space' (with T. Dixon and D. Smith), *ca* 1984.

E.213 Typescript draft with annotations titled 'Lunar magnetism', nd.

**Publications**

E.214 Typescript draft undated, untitled starting with: 'Primitive man was fascinated by and fantasized about the shape and size of the Earth'.

**1983**

E.215 'A review of lunar palaeointensity data and implications for the origin of lunar magnetism (with S.M. Cisowski, D.W. Collinson and A. Stephenson), *Proceedings of the 13th Lunar and Planetary Science Conference, Part 2, JGR*, vol 88 (1983), A691-A704.

See also H.574-H.579.

Typescript draft.

E.216-E.221 'Lunar magnetism, polar displacements and primeval satellites in the Earth-Moon system', *Nature,* vol 304 (1983), 589-596.

E.216 Correspondence 1981-1983.

E.217 Typescript drafts, proof and off-print.

Also includes a second draft on Runcorn's research, untitled and undated.

E.218-E.220 Figures and manuscript notes.

3 folders

E.221 Miscellaneous correspondence, references and figure legends.

E.222 'Lunar palaeomagnetism and its implications' (with D.W. Collinson and A. Stephenson), *Adv. Space Res.*, vol 2 (1983), 21-29.

Typescript draft; offprint.

E.223 'Review: possibility of super heavy elements in the solar system' by L.M Libby and Runcorn, latest bibliographical reference 1983. No reference in the bibliography.

Typescript draft.

## Publications

E. 224 'A new look at lunar palaeomagnetic data: evidence for a well-defined lunar "Magnetic epoch" ' (with S.M. Cisowski, D.W. Collinson and A. Stephenson). Submitted to *Proceedings of the 13th Lunar and Planetary Science conference, Part 2, JGR*, vol 88, 1983.

Abstract only.

E.225, E.226 'Geomagnetism', latest bibliographical reference 1983. No reference in the bibliography,

E.225 Correspondence, 1983.

E.226 Typescript and manuscript draft.

E.227-E.231 'The shape of the Earth', latest bibliographical reference 1983. No reference in the bibliography.

E.227 Correspondence 1978-1984.

Also contains figures and unidentified negatives [?from 'search films'], dated 1954 and 1955, sent to Runcorn by C.W. Tombaugh.

E.228 Typescript draft with annotations.

E.229 Figures.

E.230 Background material including a paper by A.F. Cook entitled 'Planetary rings: 2 2/3 centuries of nearly total ignorance, 4 years of information explosion'.

E.231 Untitled draft found with the material.

## Publications

### 1984

E.232 'Geomagnetic jerks and polar motions', latest bibliographical reference 1984. No reference in the bibliography.

Typescript draft with manuscript annotations.

E.233 'Lunar Magnetism', *Nature,* vol 308 (1984), 661-662 (reply to L.L. Hood and C.P. Sonett, *Nature* vol 307, 1984).

Letter, 1983, with typescript of article by Hood and Sonett; offprint.

E.234 'New consideration of fission track densities at metal silicate interface in meteorites' (with L.M. Libby), latest bibliographical reference 1984. No reference in the bibliography.

Letter, 1984 and photocopy of typescript draft.

E.235, E.236 'System of quasi-stellar object spectra' (with L.M.Libby and L.H. Levine), *Astron. J.*, vol 89 (1984), 311-315.

E.235 Correspondence, 1984.

E.236 Off-print and typescript erratum.

E.237 'The primeval axis of rotation of the Moon', *Phil. Trans. Roy. Soc.*, A. vol 313 (1984), 77-83.

Off-print.

### 1985

E.238 'S.K Runcorn's commentary', *Geophysical Surveys* vol 7, (1984), 55. No reference in the bibliography.

Typescript drafts.

## Publications

### 1987

E.239 'New evidence for the existence of a lunar iron core. Skepticism about a terrestrial origin of the Moon'. *Nature*, *ca.*1987. No reference in the bibliography.

Letter, 1987 and typescript draft.

E.240-E.245 'The Moon's ancient magnetism', *Scientific American*, vol 257 (1987), 60-68.

E.240-E.242 Correspondence, 1984-1988.

3 folders.

Also includes illustrations and captions accompanying Runcorn's article.

E.243, E.244 Typescript and manuscript draft with annotations.

2 folders.

E.245 Copy of R.W. Stevens' Letter to the editor (no journal mentioned) commenting on Runcorn's article 'The Moon's Ancient Magnetism'.

E.246 'Experiments on determining the gravitational field of water in docks and reservoirs' (with M.J. Gross *et al*), latest bibliographical reference 1987. No reference in the bibliography.

3pp typescript + 2pp typescript and manuscript draft; incomplete manuscript draft of 'Tests for an additional term in the grav. pot.'

### 1988

E.247 'Closing remarks' *Phil. Trans. Roy. Soc. Lond.* 1988.

These were made after a discussion on the origin of the solar system, *ca* January 1988.

Photocopy of the off-print.

**Publications**

E.248-E.249 'Lunar palaeomagnetism and the origins of the moon', in *The Physics of the Planets*, ed. Runcorn, John Wiley, 1988, 273-293.

Proceedings of the NATO ASI held at Newcastle upon Tyne, 1985.

Typescript and manuscript drafts with annotations.

2 folders.

**1990**

E.250, E.251 Draft on Sir James Chadwick, possibly for Chadwick centenary, *ca* 1990-1991.

E.250 Correspondence and papers, 1990-1991.

Includes a typescript draft by D. Edwards entitled 'Life and Work of Sir James Chadwick'.

E.251 Manuscript draft.

**1991**

E.252 'Origins of the annual geomagnetic variation' (with D.E. Winch), *Proc. Roy. Astr. Soc.* (1992), 69-70.

Typescript draft with annotations.

**1993**

E.253-E.257 'Geoelectric potentials in the ocean and their relation to the annual variation in the geomagnetic field' (with L. Molyneux, *et al*), *ca* 1993. No reference in the bibliography.

E.253 Correspondence, 1992-1993.

E.254, E.255 Figures.

2 folders.

## Publications

E.256, E.257 Typescript drafts and background material.

2 folders.

### Various and undated

E.258-E.283 Miscellaneous drafts 1949-1977 and nd.

E.258-E.263 Collection of drafts found together in a folder labelled: 'Early unpublished papers'. 1949-1962.

E.258 Manuscript draft 'Electromagnetic torques acting on a spherical shell', latest bibliographical reference 1949.

E.259 Typescript draft of a chapter titled 'Electronic torques acting upon the mantle', latest bibliographical reference 1950.

E.260 Typescript draft 'A theory of the main geomagnetic field' with manuscript annotations, latest bibliographical reference 1952.

E.261 Typescript chapter draft with annotations titled 'The assumed coincidence of the mean geomagnetic axis with the axis of the Earth's rotation', latest bibliographical reference 1958.

E.262 Typescript and manuscript drafts with annotations 'The geomagnetic field in the Pacific and the formation of the Earth's core', latest bibliographical reference 1962.

E.263 Manuscript draft 'The electrical conductivity of the upper mantle', nd.

E.264-E.272 Collection of drafts on continental drift, 1962-1967.

E.264 Manuscript draft 'Convection in the Moon's interior'. Possibly a version of 'Convection in the Moon', *Nature*, vol 195 (1962), 1150-1151.

**Publications**

E.265 Manuscript draft 'A growing core and a convecting mantle' in *Isotope and Cosmic Chemistry* eds. H. Craig, S.K. Miller & G.J. Wasserburg, North Holland, Amsterdam, 1964, 321-340.

E.266 1p of manuscript draft of 'Wandering Continent', in *The Earth's Mantle,* ed. T.F. Gaskell, Academic Press, London, 1967, 475-492.

E.267 Manuscript and typescript drafts 'Continental drift in the Mediterranean', undated

E.268 2pp of manuscript draft 'Convection in the Earth's mantle and continental drift', undated.

E.269 1p of manuscript draft 'Convection and thermal history of Earth and Moon', undated.

E.270 1p of notes 'Geological survey in Rabat', undated.

E.271 2pp manuscript 'Thermal history of the Earth', undated.

E.272 7pp of manuscript draft, unidentified, undated.

E.273, E.274 Two drafts found together.

E.273 'Continental drift and the search for a geophysical mechanism', latest bibliographical reference 1973. No reference in the bibliography.

Possibly related to 'Some comments on the mechanism of continental drift', in *Mechanisms of Continental Drift and Plate Tectonics*, eds. P.A. Davies and Runcorn, Academic Press, 1980, 193-198.

Typescript draft with annotations, figures and letter.

E.274 'Plate Tectonics' (chapter heading), latest bibliographical reference 1974.

Typescript and manuscript draft with annotations.

## Publications

E.275 Untitled typescript draft on the Moon, latest bibliographical reference 1975.

E.276 Untitled typescript draft on the Moon, latest bibliographical reference 1977.

E.277 'Electromagnetic effects on the rotation and orbits of the innermost satellites of the major planets', undated.

Typescript draft.

E.278 'On the existence of a 2nd layer in the Moon', 1p of typescript draft with annotations, undated.

E.279 'Some comments on the potential field of terrestrial planets', undated.

Typescript draft with annotations.

E.280 'The gravitational fields of the planets and the evolution of their interiors', undated.

Typescript and manuscript drafts.

E.280A Untitled 'Article for EOS', on geology in UK universities.

3pp typescript with manuscript annotations.

E.281, E.282 Miscellaneous untitled and undated typescript and manuscript drafts.

2 folders.

E.283 Miscellaneous figures, some with manuscript legends; photographs found in an envelope titled 'Prof. Feditig' and representing exhibition displays on geological maps of the Moon.

## Publications

| | | |
|---|---|---|
| **E.284-E.308** | **LETTERS TO THE PRESS AND OTHER MINOR PUBLICATIONS** | **1950-1987** |
| **E.284-E.289** | ***The Guardian*** | **1962-1983** |
| E.284, E.285 | 'The Expanding University' (with W.F.K. Wynne-Jones), 1 May 1962. | |
| E.284 | Correspondence with colleagues *re* academic salaries in the UK, Europe and the USA; reply to the article. 1959-1962. | |
| E.285 | Background information, typescript and manuscript drafts and photocopy of the published article. | |
| E.286-E.288 | 'How Academics can break the grip of British Inertia' (with James Baddiley), 9 February 1979. | |
| E.286 | Correspondence with colleagues in the UK and overseas *re* academic tenure; replies from colleagues. 1979. | |
| E.287 | Collection of newspaper cuttings including the Letter as published and replies. | |
| E.288 | Background material: typescript papers and article. | |
| E.289 | A comment on Anthony Tucker's account of Professor Lyttleton's 'theory about the formation of mountains', 3 February 1983<br><br>Typescript draft of the letter. | |
| **E.290-E.300** | ***Nature*** | ***ca* 1964-1985** |
| E.290 | On B.J. Levin's new hypothesis on the Moon, *ca* 1964.<br><br>Typescript draft. | |

**Publications**

E.291 Reply to L. Egyed's article published in *Nature* vol 203 (1964), *ca* 1964

Correspondence and typescript draft.

E.292-E.294 'The Geophysical Consequences of Professor Lyttleton', *Nature* vol 241, (1973), 521-523.

See also E.322.

E.292 Typescript draft with annotations and off-print.

E.293, E.294 Previous exchanges between Runcorn and Lyttleton.

E.293 'A Reply to Lyttleton', Runcorn, 31 October 1971.

Typescript draft and off-print.

E.294 'The Solution to Professor Runcorn's Problem' by R.A. Lyttleton, 15 September 1972.

Off-print.

E.295, E.296 Reply to M.L. Goldstein 'Lunar Magnetism', 13 November 1975.

This originated following Goldstein's response to Runcorn's 'An Ancient Lunar Magnetic Dipole Field, *Nature*, vol 253 (1975), 701-703.

E.295 Correspondence with the editors and Goldstein *re* the article (1975).

Also includes Goldstein's typescript draft 'Magnetostatic potential theory and the lunar magnetic dipole field'.

E.296 Manuscript and typescript drafts of Runcorn's reply; off-print with Runcorn and Goldstein's letters.

E.297 Reply to article 'Lunar Magnetism' by L.L. Hood, C.P. Sonett, and L.J. Srnka, *ca* 1980.

Letter and typescript draft of 'Lunar Magnetism' and Runcorn's reply.

## Publications

E.298 Comment 'on Sir Harold Jeffrey's recent paper and Professor Lyttleton's book', 13 January 1983

Letter and typescript draft.

E.299, E.300 'NERC Scheme Criticized', 19 September 1985

Comments on allocation of studentships and the Berry report.

E.299 Correspondence with editors and colleagues, 1985.

E.300 Manuscript and typescript draft with annotations; photocopy of the article.

**E.301** ***New Scientist*** **1986**

'Earth Moves', 25 September 1986

Photocopy of the letter.

See also E.321, E.322

**E.302** ***The Observatory*** **1950**

'Stellar Magnetic Fields and Rotations', February 1950

Typescript draft with manuscript annotations.

**E.303, E.304** ***Science*** **1982**

'Investigating Solar Activity' (with H.E. Suess), *Science,* vol 218 (1982), 842.

E.303 Correspondence with colleagues and publishers, 1982-1983.

E.304 Typescript drafts with annotations.

## Publications

**E.305-E.308** ***The Times*** **1985-1987**

E.305 'Ancient Climates of the Earth', *ca* 1963.

Newspaper clipping of the article.

E.306 'Department of Education and Science university staff redundancy scheme', 7 November 1985,

Typescript draft with manuscript annotations.

E.307, E.308 On university research and teaching, 19 June 1986.

E.307 Correspondence, 1986; typescript draft of the letter with manuscript annotations.

E.308 Runcorn's collection of newspaper cuttings on the topic of university research and teaching, 1986-1987.

**E.309-E.362** **EDITORIAL CORRESPONDENCE** **1961-1988**

Arranged in alphabetical order by publisher or journal.

At E.355-E.362 is a sequence of shorter exchanges arranged chronologically.

E.309 *Earth and Planetary Science Letters* 1985

Refereeing.

E.310 *Geological Magazine* 1981

Correspondence and review of Kurt Lambeck 'The Earth's Variable Rotation'.

**Publications**

| | | |
|---|---|---|
| E.311 | *GFF* (a quarterly journal of the Geological Society of Sweden)<br>Correspondence *re* refereeing. | 1980 |
| E.312 | *Icarus*<br>Invitations to review. | 1980-1987 |
| E.313 | *Journal of Geodynamics*<br>Correspondence *re* review of 'Earth Tides and Polar Motions'. | 1983 |
| E.314 | *Journal of Geophysical Research*<br>Correspondence *re* reviewing and refereeing. | 1986 |
| E.315 | *Journal of Geophysics*<br>Review. | 1980 |
| E.316-E.320 | *Nature* | 1962-1986 |
| E.316-E.319 | Reviewing and refereeing.<br>4 folders. | |
| E.320 | Miscellaneous typescript reviews, untitled and undated. | |
| E.321, E.322 | *New Scientist*<br>Invitations to review and contribute.<br>2 folders. | 1961-1986 |

## Publications

E.323-E.333 *Pergamon Press* 1963-1986

Runcorn contributed to a number of Pergamon Press publications.

E.323 Encyclopaedia of Geophysics.

Invitations to contribute, 1982-1985.

E.324, E.325 International Dictionary of Geophysics.

Possible contribution to new edition, 1982-1984.

2 folders.

E.326-E.330 Physics and Chemistry of the Earth.

Runcorn acted as scientific editor for volumes 7 and 9 of *Physics and Chemistry of the Earth.*

E.326-E.329 Correspondence *re* to the publication of *Physics and Chemistry of the Earth.* 1963-1981.

4 folders.

E.330 Folder containing questionnaire, a list of potential authors, advertising poster for the book and large size figures.

E.331 Correspondence *re* the publication of a book on internal geophysics by P. Melchior, 1984.

E.332 Correspondence *re* the publication of results of international geophysical research projects, 1985-1986.

E.333 Correspondence *re* miscellaneous reviewing and refereeing, 1973-1984.

## Publications

E.334 *Physics Bulletin* 1971

Proof of Runcorn's review of 'Collected Papers of Sir Harold Jeffreys on Geophysics and other Sciences'.

E.335-E.346 *Physics of the Earth and Planetary Interiors* 1975-1988

Runcorn was the editor of the journal.

E.335-E.343 Correspondence *re* the publication of issues, 1975-1988.

9 folders.

E.344 Typescript reviews by Runcorn, 1977-1986.

E.345 Editorial board of *Physics of the Earth and Planetary Interiors*, undated.

E.346 List of letters and papers received for publication.

E.347 Reidel Publishing Co. 1980-1985

Reviewing and refereeing.

E.348 Royal Astronomical Society 1979-1986

Reviewing and refereeing.

E.349-E.351 *Tectonophysics* 1963-1986

Runcorn was a member of the editorial board. He was also invited to contribute and review.

E.349, E.350 Correspondence *re* reviews and refereeing, 1963-1986.

2 folders.

E.351 Typescript note on the establishment and continuation of the journal, nd.

**Publications**

| | | |
|---|---|---|
| E.352-E.354 | Miscellaneous unidentified reviews. | |
| E.352 | Proof of Runcorn's review of S.R. Taylor's, 'Lunar Science Eclipsed by Technology' with manuscript annotations, *ca* 1975. | |
| E.353 | Annotated typescript draft of a review of 'The Earth, its Origin, History and Physical Constitution', *ca* 1976. | |
| E.354 | Correspondence *re* review of 'The Earth's Rotation' by Stig Flodmark, 1981. | |
| E.355-E.362 | Shorter correspondence with various publishers | 1960-1988 |
| | Correspondence is arranged in chronological order. | |
| E.355 | 1960-1970. | |
| E.356 | 1974-1976. | |
| E.357 | 1976-1977. | |
| E.358 | 1977-1978 | |
| E.359 | 1979-1985. | |
| E.360 | 1980-1983. | |
| E.361 | 1983-1985. | |
| E.362 | 1985-1988 | |

**SECTION F LECTURES F.1-F.33**

Documented here are Runcorn's public and invitation lectures. This represents a comparatively small proportion of Runcorn's lecturing. Many of his lectures were delivered at conferences or while visiting abroad and many of these are documented in section E (Publications) and, especially, in section H (Visits and conferences), where they have been retained as found.

F.1, F.2 'Continental drift and our wandering continents: controversy and vindication over sixty years', Alex L. du Toit Memorial Lecture, Geological Society of South Africa, October 1972.

Runcorn had planned to go to South Africa in the autumn 1971 to deliver the 13th du Toit Memorial Lecture but had to postpone the visit to the following year.

See H.176-H.180 for Runcorn's Visit to South Africa and Rhodesia, October 1972.

F.1 Typescript early draft with extensive manuscript corrections and additions; copy of anniversary address by du Toit to the Geological Society of South Africa, 1927.

F.2 18pp typescript draft, with some manuscript corrections and additions.

F.3, F.4 'Lunar and planetary magnetism', Halley Lecture, University of Oxford, 8 May 1973.

F.3 Photocopy of manuscript transcript, with Runcorn's annotations.

F.4 17pp typescript.

F.5 Kelvin Lecture, Institution of Electrical Engineers, 1974.

Letter *re* publication of lecture, with 19pp typescript transcript. June 1974

## Lectures

F.6 'Contribution to Lord Blackett Memorial Meeting', 31 October 1974.

4pp typescript recollections by Runcorn of Blackett's contributions to geophysics.

F.7 'The physicist's Moon', Samuel Tolansky Memorial Lecture, University of Newcastle, 30 October 1975.

31pp typescript.

F.8 'Mechanism of plate tectonics', April 1977.

The title page is annotated 'From Australia Feb 1977 For China April 1977', referring to visit to China made by Runcorn that month, see H.351-H.355.

11pp typescript.

F.9 'Palaeontological evidence concerning the Earth expansion hypothesis', lecture at Expanding Earth Symposium in honour of S. Warren Carey, Sydney, Australia, 11-13 February 1981.

This was to have been delivered by Runcorn but he was unable to attend and his lecture was given by 'Sandy' Stewart of the University of Reading.

Brief correspondence, February-March 1981; 6pp typescript of Runcorn's lecture, with manuscript corrections and additions; account of the meeting by A.R. Crawford.

F.10-F.13 'The solar system in modern astronomy', Invited Lecture at Conference in honour of 80th Birthday of George McVittie, Canterbury, 2 June 1984.

Subsequently published in the *Quarterly Journal of the Royal Astronomical Society*, vol 26 (1985).

F.10 9pp typescript + 3pp references, with extensive manuscript corrections and additions.

F.11 10pp typescript + 2pp references for publication.

F.12 Figures + captions; 4pp manuscript note by Runcorn 'For Inst of Maths'

## Lectures

F.13 'Magnetism in the Solar System', Rochester Lecture, University of Durham, 5 May 1987.

Brief correspondence *re* arrangements, November 1986 - January 1987.

F.14 Notices for lectures delivered by Runcorn in Australia, March 1993:

'Lunar palaeomagnetism and the early evolution of the Moon', University of Sydney, 15 March.

'Planetary magnetism: testing the dynamo theory', University of Newcastle, New South Wales, 18 March.

F.15 'Upper Mantle', nd.

1p manuscript.

F.16 'Lunar palaeomagnetism', nd.

8pp typescript.

F.17 'Epilogue', beginning 'In expressing my gratitude to all those who contributed [to] a happy occasion for the School of Physics'. Nd.

4pp manuscript (incomplete).

F.18 'Magnetic musings', lecture in honour of Raymond Hide, nd.

5pp manuscript.

F.19, F.20 Two transcripts of lectures in series on the Earth's magnetic field, nd.

F.19 Slow variations in the magnetic field, 23pp typescript.

F.20 Short variations in the magnetic field, 21pp typescript.

## Lectures

F.21 Untitled lecture beginning 'Unlike those who are concerned with the evolution of the surface of Mars', nd.

9pp typescript.

F.22 Untitled lecture beginning 'I think that the problem of the nature of the forces which move the plates is really the most fundamental problem which presents itself to those who are interested in solid earth geophysics', nd.

16pp typescript.

F.23 Contents of Runcorn's folder inscribed 'Public lectures': manuscript notes, lecture outlines.

F.24-F.33 Illustrative material.

Transparencies used to illustrate or for giving lectures, mostly found in Runcorn's folders.

F.24 'Climate 1994'.

F.25 'Ewing lecture Planetary Magnetism'.

F.26, F.27 'Le Mouel. Lectures. Changes in length of day'.

2 folders.

F.28 'Le Mouel. Lectures on fluid flow in core'.

F.29 'Lectures'.

F.30 'Electromagnetic induction in oceans'.

F.31-F.33 Miscellaneous transparencies.

3 folders.