

THE ROYAL COMMISSION ON HISTORICAL MANUSCRIPTS

Report on the papers of
WILLIAM HUME-ROTHERY OBE, FRS
(1899-1968)
deposited in the Bodleian Library,
Oxford

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CONTEMPORARY SCIENTIFIC ARCHIVES CENTRE

Papers of

WILLIAM HUME-ROTHERY O.B.E., F.R.S.

(1899 - 1968)

Listed by: Jeannine Alton

Harriot Weiskittel

Deposited in the Bodleian Library, Oxford

1973

Description of the collection.

The papers cover the years 1924 - 1968.

There is a considerable number of notebooks, working papers and lectures for the later part of Hume-Rothery's career. Most of the material relating to his early work was destroyed by Hume-Rothery because of pressure of space; the only manuscript references now extant are in the letters to Mr. G. Hedley (Item 153). Some official correspondence relating to the period is in the Department of Metallurgy, Oxford.

Hume-Rothery filed letters from his principal scientific correspondents individually; others are scattered through the collection with the working papers to which they refer.

Hume-Rothery's total deafness required his colleagues to make all their remarks to him in writing. Some of these conversation notes have been separately preserved and identified where possible (Items 21 - 23); others appear as random jottings in the notebooks and correspondence passim.

Unless otherwise stated, all notebooks and lectures are manuscript.

Some biographical material is retained by Mrs. E. Hume-Rothery (widow), Cherry Orchard, Abberbury Road, Oxford, and Mrs. A. D. Moss (daughter), 30, Crediton Hill, London N.W.6. Files (11) of typewritten correspondence chiefly concerning publications are held in the Department of Metallurgy, Oxford, for eventual deposit in the University Archives.

Summary of the career of Professor Hume-Rothery.

- 1912 - 16 Educated at Cheltenham College (Scholar).
- 1916 Entered Royal Military Academy, Woolwich.
- 1917 Suffered attack of cerebrospinal meningitis resulting in total loss of hearing; invalided out of army.
- 1918 Entered Magdalen College, Oxford.
- 1920 Demy of Magdalen College.
- 1922 Honour School of Natural Science (Cl.I.)
- 1922 - 25 Worked on intermetallic compounds, Royal School of Mines.
- 1925 Ph.D. London.
- 1925 - 29 Senior Demy, Magdalen College, Oxford.
- 1929 - 32 Armourers & Braziers Company Research Fellowship in Metallurgy.
- 1931 Married Elizabeth Alice Fea.
- 1932 - 42, Warren Research Fellowship of the Royal Society.
- 1943 - 55
- 1935 D.Sc. Oxon.
- 1937 Fellow of the Royal Society.
- 1938 - 43 Fellow by Special Election, Magdalen College, Oxford.
- 1938 Lecturer in Metallurgical Chemistry, Oxford.
- 1951 O.B.E.
- 1955 George Kelley Reader in Metallurgy, Oxford.
- 1958 - 66 Elected to the Isaac Wolfson Chair of Metallurgy, and to a Professorial Fellowship, St. Edmund Hall, Oxford.

Summary of career (cont.)

- 1960 Opening of Department of Metallurgy, Oxford.
 1960 - 64 Service on Basic Properties of Metals Committee, Ministry of Aviation.
 1965 - 68 Consultant, A.E.R.E., Harwell.

Contents of the Handlist.

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HandlistI. Biographical and printed work

1. Memoir, by G.V. Raynor. (Biographical Memoirs of Fellows of the Royal Society, Vol. 15, November 1969).
- 1A Biographical note and list of publications, supplied by Mrs. E. Hume-Rothery.
2. 'The Freezing Points, Melting Points, and Solid Solubility Limits of the Alloys of Silver and Copper with the Elements of the β Sub-Groups', by W. Hume-Rothery, G.W. Mabbott and K.M. Channel Evans. (Phil. Trans. Roy. Soc., Series A, 233, 1 - 97.) See also Item 103.

II. Laboratory Notebooks

3. 'Apparatus Book', with Hume-Rothery's name and address, The Old Chemistry Department, The University Museum, Oxford.
Notes made on cost and source of apparatus bought 1926 onwards. 1947
4. Notebook, with name and address. Notes on articles read. n.d.
5. Notebook, 'Work on Lattice spacings of Alkalis and Alkaline Earths. June, July, August 1944'. Includes conversation notes. 1944
6. Notebook, labelled in another hand 'Notes on other people's books etc. on Iron and Steel'. 1949

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| 7. | Notebook,with name and address,'Notes on odd pieces of work'. | 1948 - 54 |
| 8. | Notebook. April 1950 - May 1962. | 1950 - 62 |
| 9. | Notebook,'W.H-R,M.O.S. Work',and 'Mg Alloy Freezing Point Calculations'. | 1951 - 66 |
| 10. | Notebook,with name and address. (Index at back of book by W.L.Hodge,I.C.L.). | 1954 |
| 11. | Notebook. | 1955 |
| 12. | Notebook,'Calcns. of Fe diagrams'. | 1955 |
| 13. | Notebook,with name,address and index. Labelled in another hand 'Mainly notes on papers'. | n.d. |
| 14. | Notebook,labelled in another hand 'Thinking aloud'. | 1958 - 60 |
| 15. | Notebook with loose pages inserted,'Ferrous Alloys' and 'Calculations'. Feb.1960 - August 1963. | 1960 - 63 |
| 16. | Notebook,'Theory of Alloys'. | 1960 |
| 17. | Notebook,'Notes on what we think needs adding to the Iron book'. | 1963 |
| 18. | Notebook,with name,address and index,labelled in another hand 'Notes on other papers'. | 1960 - 66 |
| 19. | Notebook with related correspondence and offprints,labelled in another hand 'Thinking and calculating'. | 1966 - 68 |
| 20. | Notebook,'Miscellaneous Freezing Point Research'. | n.d. |
| 21. | Diary for 1966 containing notes of conversations. | 1966 |
| 22. | Notebook of conversation notes. | n.d. |
| 23. | File,various conversations,mostly unidentified. | n.d. |

III. Working papers

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| 24. | Article 'Rule for Temperature Dependence of Solubility of Metals in Iron',by I.I.Kornilov,1950, annotated by Hume-Rothery. | 1950 |
| 25. | 'Thermodynamics and Metallic Solid Solutions',pages numbered T.1 - 32. | n.d. |
| 26. | Miscellaneous working papers,earliest dated 17 August 1955. | 1955 |
| 27. | Miscellaneous working papers,dated Oct. - Nov. 1961. | 1961 |
| 28. | 'Corrections to Curves',dated 2.2.61. | 1961 |

29. Correspondence with Dr. Askill, and calculation re diffusion date in Iron. 1964
30. 'Recalc.' of Fe diagram. n.d.
31. 'Models of Wave Mechanics and Boundary Conditions'. n.d.
32. Paper on 'The Binding Energies of Metals and Alloys,' by N.F. Mott, with Ms annotations by Hume-Rothery and Ms comments by Dr. S. Altmann. n.d.
33. File labelled 'Molybdenum Alloy Theory I'. 1963 - 64
34. File with note on cover, 'Misc. notes on Molybdenum Alloy'. 1965
35. Work on Compound Molecules in Mg-Sn System, 21 December 1965 - 4 March 1968. 1965 - 68
36. Work on the Engel-Brewer theory of metallic structures. Correspondence with Professor Leo Brewer, Professor Bryan Coles, Professor G.E. Bacon, Professor Carl Koch, Dr. Borge Lunn, Dr. Richard Waterstrat. Notes, calculations, and drafts. 1966 - 68
37. Ms. and proofs with corrections of article 'The Engel-Brewer theories of metals and alloys,' Progress Materials Science, 13, 229. 1967
38. Annotated papers and articles on Engel-Brewer theories. 1964
39. Correspondence and Ms articles on Engel-Brewer theories for Encyclopaedic Dictionary of Physics. 1966 - 68
40. Ms. translation (perhaps by Hume-Rothery) of article by Haffe and Wagner, 'Thermodynamic Analysis of Liquidus Curves of Inter-metallic Compounds.' n.d.
41. Notebook, labelled 'A Note on the Constitution of Manganese-Nickel Alloys,' by D.N. Tyler, C.G. Smith, and W. Hume-Rothery. n.d.
42. Note on Fe-N Close-packed hexagonal phase with Ms comments by Professor J.W. Christian (Perhaps draft for article 'Close-packed hexagonal alloys of iron and nitrogen,' Phil. Mag. (8), 1, 1955.). ?1962
43. 'Notes for Chapter on Aluminium'. n.d.
44. 'A Note on the Freezing Points of Tin-rich Magnesium Alloys,' by W. Hume-Rothery and L. Stump. Typescript. n.d.

IV. Lectures

45. British Association lecture on Solid Solutions in Iron, delivered at Sheffield. Typescript with notes, 16 pages. n.d.
46. Lecture on Gold Alloys. Typescripts with notes, 18 pages. n.d.

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| 47. | 'New Lecture on Gold Alloys'. | n.d. |
| 48. | 'Special Lecture on Copper, Silver & Gold'. | n.d. |
| 49. | 'Special Lecture on Theory of Cu Ag Au Solid Solutions'. | n.d. |
| 50. | Notebook 'Special Lecture for Institute of Metals on Alloys of Iron - The Interstitial Elements' (with explanatory letter from Dr. R.C. Hurst). | 1958 |
| 51. | Lecture on the Constitution of Some Alloys of Iron, with typescript. | n.d. |
| 52. | 'Liquidus and Solidus Curves in General and Fe Alloys in Particular'. | n.d. |
| 53. | 'Special Lecture on Interstitial Elements in Iron Alloys'. | n.d. |
| 54. | '1st Lecture on Intermetallic Chemistry of Iron,' Royal School of Mines. | n.d. |
| 55. | '2nd Lecture on Intermetallic Chemistry of Iron,' Royal School of Mines. | n.d. |
| 56. | '3rd Lecture on Iron Alloys: Interstitial Alloys,' Royal School of Mines. | n.d. |
| 57. | 'Institute of Metals lecture on Theory of Copper Alloys. Second draft. 1st Part: Facts and Empirical Theory'. | n.d. |
| 58. | 'Institute of Metals lecture on the Theory of the Alloys of Copper'. | n.d. |
| 59. | 'Cu Alloys Lectures. 2nd lecture,' pages numbered 1 - 22. | n.d. |
| 60. | 'Final version of lecture on Cu Alloys,' pages numbered 1 -8 plus diagram . | n.d. |
| 61. | 'Structure of Metals II. Lecture on Copper Alloys'. | n.d. |
| 62. | 'Structure of Metals and Alloys II. Special Lecture on Graphite in Cast Iron'. | n.d. |
| 63. | 'Further lecture on Ferromagnetism and Transition Metals'. | n.d. |
| 64. | 'Special lecture on Ni As Structure'. | n.d. |
| 65. | Intermetallic Compounds. Introductory address at Institute of Metals Discussion 15 December 1964. Typescript with notes. | 1964 |
| 66. | 'Preliminary notes for lecture on tempering'. | 1963 |
| 67. | 'Special lecture on Packing of Spheres'. | n.d. |
| 68. | 'Additional Specific Heat Notes for lectures'. | n.d. |
| 69. | Lecture for National Physical Laboratory, 1st draft and related correspondence, January-February, 1961. | 1961 |

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| 70. | 'The Metallic Atoms' (typescript with corrections), pages numbered 1 - 19. | n.d. |
| 71. | 'Lecture on Zones and Phase Equilibria' . | n.d. |
| 72. | 'Electron Theory lecture on Mg and a c.p. hexagonal structure'. | n.d. |
| 73. | 'Special Single Lecture on Intermediate Phases in Alloys'. | n.d. |
| 74. | 'Lecture on Electron Theory of Alkali Metals'. | n.d. |
| 75. | 'Lecture on Theory of Transition Metals' (typescript with notes) pages numbered 1 - 9 . | n.d. |
| 76. | 'Lecture on the Problem of the Transition Metals' (typescript with notes) pages numbered 1 - 31. | n.d. |
| 77. | 'Two lectures on Electron Theory of Transition Metals. Preliminary Notes.'. | n.d. |
| 78. | 'Special lecture on Theory of Transition Metals'. | n.d. |
| 79. | 'A Note on the Writing of Scientific Papers and Theses' Notes, drafts, Mss and typescript. May 1957. | 1957 |
| 80. | Hatfield Memorial Lecture I. Sheffield, 19 May 1965. Typescript with notes. | 1965 |
| 81. | 'Sheffield Lecture' Ms and typescript. | n.d. |
| 82. | 'Sheffield 2nd lecture'. | n.d. |
| 83. | Notebook 'Sheffield,' inside 'Sheffield Lecture on Titanium'. | n.d. |
| 84. | 'Sheffield Lecture on Eutectic'. | n.d. |
| 85. | 'Explanation of Eutectic Distribution Curve'. | n.d. |
| 86. | 'Sheffield Lecture on Theory of Copper Alloys,' April 1959. | 1959 |
| 87. | 'Notes on Tetrahedral Compounds'. | n.d. |
| 88. | 'Lecture Note Summary of Last Section of Geneva Lecture' . | n.d. |
| 89. | Two lectures for Dounreay on Transition Metals. | n.d. |
| 90. | Two lectures for Dounreay on Iron Alloys (typescript with notes) pages numbered 1 - 27 (1st lecture), 28 - 70 (2nd lecture). | n.d. |
| 91. | '1st Dounreay Lecture: The Ideas of Wave Mechanics'. | 1967 |
| 92. | '2nd Dounreay Lecture: Free Electron Theory' . | 1967 |
| 93. | '3rd Dounreay Lecture: Brillouin Zones'. | 1967 |
| 94. | '4th Dounreay Lecture: Alloy Structures: Empirical'. | 1967 |

95. '5th Dounreay Lecture: Electron Theories of Metals and Alloys' and related correspondence, 1966 - 67. 1967
96. 'Lecture on Experimental Methods for Determining the Constitution of Alloys at High Temperatures.' (typescripts with Notes). n.d.

V. Lecture Notebooks

97. Notebook, labelled 'Structure of Alloys I'. n.d.
98. Notebook, labelled 'Structure of Alloys II,' with name and address. n.d.
99. Notebook, labelled 'Lectures on Atomic Theory, 1961'. 1961
100. Notebook, labelled 'Zones Lectures, 1962. W.Hume-Rothery'. 1962
101. 'Lectures on Ferrous Metallography and other Iron-Alloy Lectures'. 1964

VI. Publications

102. Thesis submitted for Part II, Honour School of Natural Science, Oxford, 1922. 1922
103. 'The Freezing Points. . . β Sub-Groups' annotated copy. 1934
- 104.- 'Atomic Theory for Students of Metallurgy,' Institute of Metals 1958
109. Monograph and Report Series, No. 3. Correspondence and notes for revisions. (see index on file cover).
110. 'Elements of Structural Metallurgy,' Institute of Metals Monograph and Report Series, No. 26, 1961. Related correspondence. 1960 - 68
111. 'Electrons, atoms, metals and alloys,' 1963. Correspondence relating to Dover edition and Japanese translation. 1960 - 68
112. 'Metallurgical Equilibrium Diagrams,' with J.W. Christian and W.B. Pearson, 1952. Correspondence relating to new edition. 1965 - 66
113. 'The Constitution of Alloys of Gold and Mercury,' with C. Rolfe Journal of Less-Common Metals, 1967. Related correspondence. 1967
114. 'The Constitution of Niobium-Cobalt Alloys,' Journal of Less-Common Metals, 12, 366, with J.K. Pargeter. Typescript with corrections, Ms. addition, related correspondence. 1966
115. 'Note on the Close-packed hexagonal phases in the later transition series,' Acta. Met., 14, 560, 1966. Draft. 1966
116. Miscellaneous correspondence regarding various articles and reviews. 1967 - 68

117. 'Part II.' Part of Ms. lodged with W.W. Fea during Second World War. n.d.
118. 'The form of liquidus and solidus curves in binary alloys,' Scripta Met., 2, 271. Draft with related correspondence with J.W. Christian. 1968
119. 'The Structure of Metals and Alloys' Institute of Metals Monograph and Report Series. 1936. Second edition, 1944; Third edition (revised), 1954, and Fourth edition (revised), 1962 (with G.V. Raynor); Fifth edition (revised), 1969 (with R.E. Smallman and C.W. Haworth). Drafts and working notes.
120. 'Structure of Metals and Alloys,' conversation notes and related correspondence. 1966 - 68
121. 'Structure of Metals and Alloys,' related correspondence. 1940 - 1966
122. 'Structure of Metals and Alloys,' correspondence relating to translation. 1955 - 1960
123. 'The Structure of Alloys of Iron: an Elementary Introduction,' Commonwealth and International Library of Science, Technology, Engineering and Liberal Studies, 1965. Working papers and Mss. 1965
124. 'The Structure of Alloys of Iron,' related correspondence. 1958 - 70
125. 'The Structure of Alloys of Iron,' annotated copy.
126. 'The Structure of Metals and Alloys,' annotated copy.

VII. Correspondence

127. Correspondence, conversation notes and annotated offprints relating to consultancy at AERE, Harwell. 1965 - 68
128. Correspondence etc. relating to Membership of Basic Properties of Metals Committee, Ministry of Aviation. 1960 - 64
129. with J.A. Buckley. 1967
130. with Dr. Jesse O. Betterton. 1960 - 63
131. with Professor Bryan Coles. 1962 - 66
132. with Professor Charles A. Coulson. 1954 - 68
- 132a. Professor Charles Coulson's file of correspondence with Hume-Rothery. 1955 - 63
133. with Professor Charles A. Coulson. 1945 - 54
- 133a. Professor Charles Coulson's file of correspondence with Hume-Rothery. 1945 - 54
134. with Dr. Larry Kaufman. 1966

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| 135. | with Professor D.R. Hartree. | 1932 - 34 |
| 136. | with Professor D.R. Hartree. | 1932 |
| 137. | with Volker Heine. | 1959 - 67 |
| 138. | with Professor H. Jones. | 1935 - 66 |
| 139. | with W.M. Lomer.
with Ashok Sinha. | 1958 - 64
1966 - 67 |
| 140. | Miscellaneous Scientific Correspondence (see list on file cover). | 1956 - 68 |
| 141. | Royal Society correspondence on nomination of Foreign Member
(to be consulted only with permission of the Keeper of Western
Manuscripts). | 1962 |
| 142. | Royal Society correspondence on publications policy. | 1961 - 64 |
| 143. | Royal Society correspondence on nomination (to be consulted
only with permission of the Keeper of Western Manuscripts). | 1964 - 68 |
| 144. | Application for Royal Society grant. | 1966 |
| 145. | Correspondence <u>re</u> British Association. | 1942 - 56 |
| 146. | Invitations to lecture. | 1966 - 68 |
| 147. | Correspondence with Ministry of Aviation. | 1965 - 66 |
| 148-
150. | Miscellaneous Appointments and Awards. | |
| 151. | Technical Report on 'Structure of Alloys of Iron'. | 1966 |
| 152. | 'The Electronic Structure of the Transition Metals'. Report
of a conference held at Abingdon, November, 1952 by Basic
Properties of Metals Committee (includes article by Hume-
Rothery). | n.d. |
| 153. | Photocopies of letters written to Mr. G. Hedley about the
progress of Hume-Rothery's early researches in metallurgy. | 1924 - 31 |

VIII. Index of Principal Correspondents
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