UK National Archive for the History of Computing

Draft Catalogue

Version 1.0

15 August 2005

www.manchester.ac.uk/nahc

Contents

About the NAHC catalogue

The bulk of the UK National Archive for the History of Computing (NAHC)'s contents were obtained in the course of a three-year search and cataloguing programme, begun in 1987 and managed by the Archive's then associate director, Dr Geoffrey Tweedale. In 1990, Dr Tweedale circulated on paper a classmarked listing of the Archive's holdings, bearing the title "National Archive for the History of Computing Catalogue." The content and classifications of this catalogue have served as the basis for all subsequent presentations.

Further accessions to the Archive were made under Dr Tweedale's successors, Dr Geof Bowker and Dr Jon Agar. In the mid-1990s, the text of the catalogue was converted to HTML and made available on the website of the University of Manchester's Centre for the History of Science, Technology and Medicine, with the result that further versions of the paper catalogue were not produced; ultimately the website presentation became the definitive version.

In 2005, concerns about the usability and flexibility of this approach, alongside an ongoing overhaul of the University's web presence, led to the decision to replace the HTML handlist with two alternative presentations: a version encoded using archival description standards, searchable via an online gateway (in progress at the time of writing), and a complete listing of NAHC holdings formatted primarily for printing and ready reference. This document represents the first draft of the proposed new paper catalogue.

Some errors and omissions are inevitable. The Archive has not been surveyed comprehensively in several years, while a number of minor but systematic corruptions of the text are known to have occurred during the original conversion to HTML (most conspicuously, the disappearance of hyphens from some multi-word expressions.) Notifications of problems, and suggestions for improvements, are more than welcome as we strive to improve the quality of the catalogue; please see the Archive's web presence at **www.manchester.ac.uk/nahc** for contact information.

This draft catalogue at present covers only the 'core' holdings described in detail in previous catalogues. As time permits, we intend to extend or supplement it with details of the Archive's pictorial and audiovisual holdings; of the machine literature and trade catalogues collections; of the many offprints of secondary material in the history of computing held by the Archive; of the approximately 100 boxes of miscellaneous material currently awaiting archival appraisal; and, of course, of materials to be obtained by the Archive in years to come.

James Sumner

Associate Director, UK National Archive for the History of Computing

15 August 2005

Classmarking revisions

For obvious reasons, changes to the classmarks used to identify material in the Archive are avoided wherever possible. In the summer of 2005, however, a small number of changes were made, in the interests of internal consistency or consistency with wider archival standards. These are recorded below. Our thanks to Jo Klett for advice on these issues.

- **NAHC/BOO/B5** and **B6** renumbered as **C5** and **C6** (typo in previous catalogues; revised to fit series convention)

- X3J3 Fortran Committee fonds-level marking standardised as **NAHC/FOR** (not **FORTRAN**)

- **NAHC/MET/B** header to **NAHC/MET/C** (typo in previous catalogues)

- **NAHC/MUC/Series 1/A1**, etc: term 'Series' to describe subfonds withdrawn. Classmarking now as **NAHC/MUC/1/A1**, etc.

- **NAHC/NPL/ADD.MS/NPL/DCN1**, etc: revised to **NAHC/NPL/Add.MS/1**, etc.

- **NAHC/NRD 86/1/1**, etc: revised to **NAHC/NRD/C/1/1**, etc.

Note that files under **NAHC/NPL/Add.MS/4** and **NAHC/NPL/Add.MS/5** may bear variant numbers in the forthcoming searchable version of the catalogue. This is under investigation: in the event of queries, please contact the associate director.

How to use the catalogue

The Archive is divided into a number of collections or *fonds*, each representing a coherent body of material – the whole of a donation, for instance, or material relating to one individual or site. Each fonds is represented by an abbreviation, given on the contents page and as page headers in the catalogue.

Each fonds contains one or more *series*, letter-coded according to the consistent scheme

- A: historical and biographical material

- B: correspondence

- C: working papers, reports etc

- D: publications; manuscripts and unpublished typescripts

Where there is more than one series in a fonds, series-level markings are indicated distinctly by subheadings in the catalogue.

Each series then contains numbered *files* (individual items.) The *classmark* for any item is given by combining the fonds-level mark with the series and file number. For example, in the Admiralty Computing Service collection, **NAHC/ACS**, the item with file entry

D1   J.Cossar and A.Erdelyi, "Dictionary of Laplace Transforms" Part 1. Edinburgh University, 1944.

should be cited with the classmark **NAHC/ACS/D1**.

Some of the larger fonds may contain *subfonds*: NAHC/MUC, for instance, is divided into three. Here, for instance, the series of biographical papers in subfonds 1 (papers of F C Williams) is **NAHC/MUC/1/A**, and the entry

A1   Letter to Sir Willis Jackson, FRS. Williams reviews his career, after which he writes: "My arm aches both from writing and from slapping my own back." A list of publications is attached.

has the classmark **NAHC/MUC/1/A1**.

Accessing material in the Archive

At the time of writing, all material documented in this catalogue is held by the John Rylands Library, University of Manchester. Access arrangements are liable to vary; please consult the Archive's web presence at **www.manchester.ac.uk/nahc** for current details.

In order to access material in the Archive, it is necessary to know the relevant classmarks: see 'How to use the catalogue' for details.

Introduction to the first print edition (1990)

Computing, in its many ramifications, is central to technological and social change in the late twentieth century. Britain has played a major role in this technology. Yet although many of the pioneers are still accessible, the artefacts and the historical records are fast disappearing. Aware of this fact, in 1985 a committee of industrialists and computer scientists began discussions which led to the selection of Manchester University as the home for a National Archive for the History of Computing.

The NAHC was officially opened, through the financial generosity of the Leverhulme Trust, on 1 July 1987. The Archive's remit was to

- *produce a comprehensive listing of records relating to the history of computing in Britain and encourage their preservation;*

- *find secure homes, in Manchester University Library or elsewhere, for such records as are at risk;*

- *conduct and record interviews with leading figures in the history of computing to establish an oral history archive;*

- *undertake research into computer history and stimulate research by organising conferences and postgraduate teaching and supervision.*

The following catalogue represents three years' work in collecting and listing records relating to the British computer industry. Priority has been given to cataloguing primary source materials – manuscripts, private papers, unpublished reports – and all the NAHC's current holdings in this area have now been listed (though, of course, new documents are arriving all the time.) In addition, a start has been made in providing a rough sorting of more secondary materials – technical manuals and photographs though more work needs to be done. A large mass of published items, especially technical reprints, also await listing and are not included here. This catalogue is therefore "in progress."

I am grateful to the following individuals, who have helped establish the Archive, collected material and provided technical and historical advice (others are mentioned in the Catalogue): Dr John V Pickstone, Dr David Edgerton, Mrs E D P Symons, Dr Jack Howlett, Dr Peter McNiven, Professor D B G Edwards, Jim Brookes, Professor Brian Warboys, Dr Martin Campbell-Kelly, Professor Simon Lavington, Serena Kelly, Dave Dace, Dr Arthur Norberg, and Dr William Aspray. Mrs Yvonne Aspinall helped with the laborious cataloguing and typing.

Geoffrey Tweedale

June 1990

NAHC/ACS

ADMIRALTY COMPUTING SERVICE

The Admiralty Computing Service was created in 1943 as an offshoot of the Nautical Almanac Office and was designed to centralize computation within the Admiralty. By 1947 the ACS had performed over one hundred investigations besides dealing with inquiries which required only advisory assistance. Though the ACS was hindered by its limited personnel, machines and scope (officially its services were restricted to the Admiralty), it was an important step along the road to Britain's first national computing centre the National Physical Laboratory Mathematics Division.

References: M. Croarken, *Early Scientific Computing in Britain* (Oxford: OUP, 1990).

Collection comprises one box of archive material.

D1	J.Cossar and A.Erdelyi, "Dictionary of Laplace Transforms" Part 1. Edinburgh University, 1944.
D2	J.Cossar and A.Erdelyi, "Dictionary of Laplace Transforms" Part 2A. Edinburgh University, 1944.
D3	J.Cossar and A.Erdelyi, "Dictionary of Laplace Transforms" Part 2B. Edinburgh University, 1945.
D4	J.Cossar and A.Erdelyi "Dictionary of Laplace Transforms" Part 3A. Edinburgh University, 1945.
D5	J.Cossar and A.Erdelyi, "Dictionary of Laplace Transforms" Part 3B. Edinburgh University, 1946.
D6	H.Kober (compiler) "Dictionary of Conformal Representations" Part 1. 1945.
D7	H.Kober (compiler) "Dictionary of Conformal Representations" Part 2. 1946.
D8	E.T.Copson, "The Asymptotic Expansion of a Function Defined by a Definite Integral or Contour Integral". Dundee University College. 1946.

NAHC/AEA

UNITED KINGDOM ATOMIC ENERGY AUTHORITY

Collection comprises one box of archive material.

D1   "Fourth Atomic Energy Electronics News Letter", Atomic Energy Research Establishment Electronics Group, TRE, Malvern, March, 1948.

D2   E.H.Cooke-Yarborough, C.D.Florida & J.Stephen, " The Measurement of the Small Signal Characteristics of Transistors ", Ministry of Supply, (EL/R 1253), 1953.

D3   T.H.O'Dell, "Molybdenum Nickel Iron as a Material for Magnetic Storage Applications", UK Atomic Energy Authority Research Group, (EL/R 2595), 1958.

D4   R.C.M.Barnes, "Data Recording. Summary of a conference held at AERE on 3 October 1958". UK Atomic Energy Authority Research Group, (EL/R 2775), 1958.

D5   R.C.M.Barnes, "Punched Card Machines for Input and Output on Cadet", UK Atomic Energy Authority Research Group, (EL/M 101), 1958.

D6   E.Franklin, "A Twin-Core High-Speed Magnetic Storage Element", UK Atomic Energy Authority Research Group, (EL/M 106), 1959.

D7   A. Hassitt, "A Programme for Solving the Multigroup Neutron Diffusion Equations in Two Space Dimensions on the Ferranti Mercury Computer", UK Atomic Energy Authority Research Group, (T/R 2487), 1958.

D8   E.G.H.Crouch, "Four FloatingPoint Routines for Use on the Ferranti Mark 1 Computer", UK Atomic Energy Authority Research Group, (T/M 156), 1958.

D9   A.Newmarch, "RIPPLE; A method of computing the thermal neutron fine structure for thin plate assemblies", UK Atomic Energy Authority Research Group, (R/R 2425), 1959.

D10   T.P.Moorhead, "Mercury Autocode Program 228 MultiGroup CrossSection Processing", UK Atomic Energy Authority Research Group Report, Reactor Division, (R 3055), 1959.

D11   T.P.Moorhead, "Use of Hassitt Program for Multigroup Calculations for Fast Reactors", UK Atomic Energy Authority Research Group Memorandum, Reactor Division (M 597), 1959.

D12   K.W.Morton, "A Monte Carlo Study on the Resonance Absorption and its Temperature Variation in a Square Uraniumgraphite Lattice", UK Atomic Energy Authority Research Group Report, Theoretical Physics Division, (R 2929), 1959.

D13   D.E.Bendall, "A Programme for Calculating the Gamma Ray Flux Through a Multilayer Shield", UK Atomic Energy Authority Research Group Report, Reactor Division (R 2882), 1959.

D14   E.G.H.Crouch, "A Program for the Calculation of Fission Product Accumulation", UK Atomic Energy Authority Research Group, (T/M 174), 1959.

D15   A.Hassitt, "Additional Notes on a Two Space Dimension Multigroup Program for the Mercury Computer", UK Atomic Energy Authority Research Group, (T/R 2859), 1959.

D16   P.L.Read, "A Note to Describe a Ferranti Mercury Autocode Program for Calculating Convection Loop Transients", UK Atomic Energy Authority Research Group Memorandum, Reactor Division (M 568), 1959.

D17   R.Taylor, "A Method of Computing Magnetic Fields and Particle Orbits in F.F.A.G. Accelerators", UK Atomic Energy Authority Research Group Report, Theoretical Physics Division, (R3097), 1959.

D18 A.R.Curtis, "A Mercury Computer Program for TwoDimensional Least Square Crystallographic Refinement", UK Atomic Energy Authority Research Group Report, Theoretical Physics Division, (R 3134), 1959.

D19 I.C.Pyle, "A Program for the Calculation of the Doppler Broadened Resonance Absorption of Neutrons which are Scattered in Thick Targets (Mercury Autocode Program No.17: Scattering Integrals) ", UK Atomic Energy Authority Research Group Report, Theoretical Physics Division, (R 3228), 1960.

D20 Joan Knock and Mary U. Thomas (eds), Manual for the S2 Language", Atomic Weapons Research Establishment, Aldermaston, Berks. August 1964.

D21 K.V.Roberts, "Scientific Computing and Operational Research", UK Atomic Energy Authority Research Group Report, (CLMR 45), Culham Laboratory, Abingdon, Berks, 1965.

D22 L.E.Raraty and J.H.Gittus, (Reactor Fuel Element Laboratory, Springfields), "System C.I.D. (Computerised Interpretation of Data), An Illustration of the Use of a Digital Computer in the Storage, Interpretation and Recovery of Materials Data", The Reactor Group, HQ Risley, Warrington, Lancs.(TRG Report 1160 (S)), 1966.

D23 F.J.Chatterley, (Reactor Development Laboratory, Windscale), "A GeneralPurpose Multiple Regression Programme for the IBM 7090", The Reactor Group HQ, Risley, Warrington, Lancs.(TRG Report 1198 (W)), 1966.

D24 D.N.Gower, "Production Control by Computer the WASP System", UK Atomic Energy Authority Research Group Report, Management Services Division, (R 6259), 1969.

D25 W.D.Collier, (Central Technical Services, Risley, " Heatran: A finite element code for heat transfer problems", The Reactor Group HQ, Risley, Warrington, Lancs (TRG Report 1807(R)), 1969.

D26 M.J.D.Powell, "A Fortran Subroutine to Invert a Rectangular Matrix of Full Rank", UK Atomic Energy Authority Research Group Report, Theoretical Physics Division, (R 6072), 1969.

D27 G.B.F.Niblett and N.H.Price, "The Status Project: Searching Atomic Energy Law by Computer", UK Atomic Energy Authority Research Group Report, Culham Laboratory, Abingdon, Berks (CLM R101), 1969.

D28 C.W.J.McCallien, (Central Technical Services, Risley), " SNAP: A twodimensional neutron diffusion code", The Reactor Group, Risley, Warrington, Lancs. (TRG Report 1990(R)), 1970.

D29 I.C.Pyle and A.Langsford, "Basic Software for Small Computers", UK Atomic Energy Authority Research Group Report, Theoretical Physics & Nuclear Physics Division (R 6382), 1970.

D30 T.E.Hughes (Reactor Fuel Element Laboratories, Springfield), "Fairfax: A computer program for the interconversion of Bragg angles (0), 20, sin2 0 and interplanar spacings (d) in Xray powder diffraction", The Reactor Group, Risley, Warrington, Lancashire (TRG Report 2099(S)), 1971.

D31 W.D.Collier, J.P.Ellington (Central Technical Services, Risley) and P.M.Rees (formerly Central Technical Services, Risley), "Tress: a finite element code for stress analysis problems ", The Reactor Group, Risley, Warrington, Lancashire (TRG Report 1813(R)), 1971.

NAHC/ARE

ARMAMENT RESEARCH ESTABLISHMENT, FORT HALSTEAD, KENT

Collection comprises one box of archive material.

D1   S M Sims, "On the possibility of coupling two National Accounting Machines." Physical Research Division. Kent. Memo. No. 18/48, November 1948.

D2   K N Dodd, "The Ferranti Electronic Computer (Parts 1 and 2: The Mark I. Model)." Applied Mathematics and Mechanics Division, Report No. 10/53, April 1953. (4 copies).

D3   K N Dodd, "The Ferranti Electronic Computer (Parts 3, 4 and 5: The Mark I Model." Applied Mathematics and Mechanics Division, Report 11/53, May 1953. (3 copies).

D4   H J Gawlik, "A Comprehensive Input System for AMOS. " Applied Mathematics and Mechanics Division, Memo 9/54, June 1954. (2 copies).

D5   F J Berry, "Catalogue of Amos Library Subroutines. " Branch Memorandum B4/2/55.

D6   F J Berry, "Catalogue of Amos Library Subroutines. Supplement 1." Branch Memorandum B4/3/55.

D7   H J Gawlik, "A New and Enlarged Version of the Amos Input System." Branch Memorandum B4/1/56.

D8   F J Berry, "Handbook of AMOS Library Subroutines. " Applied Mathematics and Mechanics Division, A.R.D.E. Report (B) 15/56. August 1956. (2 copies).

D9   F J Berry, "Intercode: An Easy Way of Using the Digital Computer AMOS." (B4), Branch Memorandum B4/3/57.

D10   H J Gawlik and F J Berry, "MIRFAC/80 Users' Manual. " July 1970.

D11   H J Gawlik and F J Berry, "Some Applications of the Programming Language MIRFAC." August 1970.

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ADMIRALTY RESEARCH LABORATORY

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D1   G Owen, "Thermal Stresses in Solid Turbine Rotors: Determination of the Transient Temperature Distribution in a Turbine Rotor by means of a High Speed Digital Computer", ARL/RI/MATHS.4.28, May 1953. (2 copies).

D2   G Owen, "A Tabulation Problem Solved with an Electronic Digital Computer", ARL/RI/MATHS 4.2, September 1953 (2 copies).

D3   T G Weale, "The Integration of a Second Order Differential Equation on the EDSAC", Unclassified Report, ARL/RI/MATHS 2.36, November 1954.

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D2   "Science Library Bibliographical Series No.582. " Science Museum, London, 1942. pp.3.

D3   "Bibliography on Electronic Computing Machines. " Mathematics Division, National Physical Laboratory, June 1948. pp.3.

D4   Tentative bibliography of articles on computing machines and their applications published prior to June 1949. Analysis Laboratory, California Institute of Technology, Pasadena. October 1949. pp.44. (2 copies).

D5   "Bibliography on Computing Devices." October 1951. pp.94.

D6   "W.R.(D) List of Abstracts (Computing) No.25." Directorate of Weapon Research (Defence). May 1953.

D7   "W.R.(D) List of Abstracts (Computing) No.29." Directorate of Weapon Research (Defence). August 1953.

D8   "W.R.(D) List of Abstracts (Computing) No.31." Directorate of Weapon Research (Defence). September 1953.

D9   "W.R.(D) List of Abstracts (Computing) No.35." Directorate of Weapon Research (Defence). October 1953.

D10   "W.R.(D) List of Abstracts (Computing) No. 5. " Directorate of Weapon Research (Defence). January 1954.

D11   "W.R.(D) List of Abstracts (Computing) No. 6. " Directorate of Weapon Research (Defence). May 1954.

D12   "Bibliography on Machine Computation, 1945-1954. " Compiled by Marjorie Comstock, Brookhaven National Laboratory, New York. May 1955. pp.36.

D13   "W.R.(D) Computing and Data Reduction Abstracts, No.7. " Directorate of Weapon Research (Defence). July 1955.

D14a   "W.R.(D) Computing and Data Reduction Abstracts, No.8. " Directorate of Weapon Research (Defence). August 1955.

D14b   "List of Material Held in Research Information Division Library, British Transport Commission", 1956.

D15   "S.A.U. Computing and Data Reduction Abstracts, No.12. " Statistical Advisory Unit. January 1957.

D16   "S.A.U. Computing and Data Reduction Abstracts, No.13. " Statistical Advisory Unit, March, 1957.

D17   "Computers Vol.C2, No.6." Bibliographical Series, June 1958. Published by IOTA Services Ltd. pp.28.

D18   "Partial Bibliography on Numerical Solution of Partial Differential Equations by Difference Methods." G.E. Forsythe and W.R. Wasow, Stanford University and University of Wisconsin, 9 June 1958. pp.10.

D19 "Bibliography on Soviet Computer Literature Collected on Trip to Soviet Union, August-September 1958." J.W. Carr III, Dept. Mathematics, University of Michigan, November 1958. pp.5.

D20 "United Nations Educational Scientific and Cultural Organisation. List of Books on Automatic Control." May 1960. pp.74.

D21 "A Selected DescriptorIndexed Bibliography to the Literature on Artificial Intelligence." Marvin Minsky, in IRE Transactions on Human Factors in Electronics, 1961.

D22 "Recent Additions to the Library." Vol.1 No.2, February 1962. IBM World Trade Laboratories (Great Britain) Ltd. pp.11.

D23 "Recent Additions to the Library." Vol.1 No.3, March 1962. IBM World Trade Laboratories (Great Britain) Ltd. pp.9.

D24 "Recent Additions to the Library." Vol.1 No.4, April 1962. IBM World Trade Laboratories (Great Britain) Ltd. pp.10.

D25 "Recent Additions to the Library." Vol.1 No.5, May 1962. IBM World Trade Laboratories (Great Britain) Ltd. pp.10.

D26 "Transport Electronic News", British Railways Board Research Department Technical Libraries. June 1962, pp.23.

D27 "Recent Additions to the Library," Vol.1 No.7, JulyAugust 1962. IBM World Trade Laboratories (Great Britain) Ltd. pp.12.

D28 "Proceedings of Conferences, Symposia, etc. in Stock at Stevenage". International Computers & Tabulators (Engineering) Ltd. August 1962. pp.13.

D29 "Recent Additions to the Library." Vol.1 No.8, September 1962. pp.11.

D30 "Periodical Holdings at Stevenage". International Computers & Tabulators (Engineering) Ltd., Stevenage. February 1963. pp.10

D31 Bibliography of Magnetic Recording, 1954-1961 Inclusive . R.E. Hadady (ed.) Kinelogic Corporation, Pasadena, California, USA. April 1963.

D32 "Appendixes, Bibliography: Sorting." Extract from the Communications of the ACM, Vol.6 No.5, May 1963. pp.3.

D33 A Bibliography on Magnetostrictive Delay Lines. Samuel Goldstein, Computer Control Co. Inc. Framingham, Mass. Reprinted from July 1963 IEEE Transactions on Ultrasonics Engineering.

D34 "A Bibliography of Foreign Developments in Machine Translation and Information Processing." J.L. Walkowicz. Technical Note 193, U.S. Department of Commerce, National Bureau of Standards, 10 July 1963.

D35 A Select Bibliography on Computer Applications in Commerce and Industry compiled by C.R. Randall, Watford College of Technology Library, September 1963.

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D37 "Some Literature About Design Automation," Stichting Studiecentrum voor Administratieve Automaterisering, June 1965. pp.2.

D38 "Levington Research Station Reprints," Fisons Fertilizers Limited, July 1965. pp.8.

D39 "Literature on Production Control." British Computer Society Library. September 1965. p.1.

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D42   Scientific and Technical Polish Publications Translated Into English 1960-1965. Scientific Publications Foreign Cooperation Center, Central Institute for Scientific, Technical and Economic Information, Warsaw, Poland. 1965. pp.94.

D43   "The Library of the Society. Catalogue of Books, January 1966." Reprinted from The Computer Bulletin, Vol 9, No 4, March 1966. pp.148-158.

D44   "Computers in Libraries; a select bibliography. " Compiled by D.E. Bagley, Hatfield College of Technology Library, June 1966.pp.15

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D47   "Computer Typesetting. A Select Bibliography" compiled by J.T. Graham, Watford College of Technology. 1966. (Two copies).

D48   "Social Aspects of Automation. A Bibliography of Material Available in the International Labour Office." International Labour Office, Geneva, 1966.

D49   "Research Service Bibliographies 1967 No.2; Automation Social Aspects." State Library of Victoria, Melbourne, August 1967.

D50   "The Problem of Privacy in the Computer Age: an Annotated Bibliography Volume 1." Annette Harrison. Prepared for United States Air Force Project Rand and the Rand Corporation. December 1967.

D51   "A DDC Bibliography on Online Computer Systems, Vol.1. " Defense Documentation Center, Alexandria, Virginia. September 1968.

D52   "Bibliography of Library Automation. 1964-1967 " compiled by C.F. Cayless and Hilary Potts. The Council of The British National Bibliography Ltd. October 1968. pp.107. (Three copies).

D53   Bibliography on the Application of Computers in the Construction Industry 1962-1967. Ministry of Public Building and Works, HMSO, 1968. (Two copies).

D54   Numerical Control. A Bibliography. Katherine A. Rempp. Institute of Science & Technology, University of Michigan, 1968. pp.96.

D55   The Computer in Education. D. Unwin and F. Atkinson. Foreword by Basil Z. de Ferranti. The Library Association, 1968. pp.74 (Three copies).

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D57   Management Information Systems, R.I.Tricker, General Educational Trust of the Institute of Chartered Accountants in England and Wales. February 1969. pp.127.

D58   Gossip Annotated List of Some Geologists Who Use a Computer , compiled by T.V.Loudon and E.P.Adams, Geology Department of Reading, April 1969.

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D62   Involvement of Computers in Medical Sciences. Abstracts of International Literature. Swets & Zeitlinger N.V. Amsterdam. 1969. pp.227.

D63 "Compass a Flexible Computer Program for OnStream Analysis." J.P. Stuart, Ministry of Technology, Stevenage. December 1969. pp.8.

D64 "Optical Character Recognition and Optical Page Reading Devices: A Selected Bibliography 1961 69". Oldham Public Libraries Technical Library Services. July 1970. (Two copies).

D65 Kwic Index. A Bibliography of Computer Management. M.H.Gotterer. Brandon/Systems Press, Princeton & New York. 1970. pp.152.

D66 "Optical Character Recognition: A Selected Bibliography ", J.Murphy, Watford College of Technology Library. August 1970. pp.36. (Three copies).

D67 "A World List of Computer Periodicals." The National Computing Centre Ltd. 1970. pp.102. (Two copies).

D68 "Computer Literature Classification Scheme." Working edition. National Computing Centre Ltd, Manchester. June 1971. pp.80.

D69 "A Guided Bibliography to Sorting." H. Lorin. IBM Systems J., No.3, 1971. pp.244-254.

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D71 "Computer Security, Backup and Recovery: A Selective Bibliography." Canning Publications, Inc. Vista, California, USA. January 1972. pp.8.

D72 "An Annotated and CrossReferenced Bibliography on Computer Security and Access Control in Computer Systems." J.G. Bergart and others. Prepared for Office of Naval Research. Ohio State University. Distributed by National Technical Information Service, US Department of Commerce. November 1972. pp.57.

D73 "Computer Information Security and Protection: A Bibliography with Abstracts." D.M. Craig and E.A. Harrison.Distributed by National Technical Information Service, US Department of Commerce. June 1974. pp.122.

D74 "Computers." County Technical Service, Central Library, Chatham, Kent. February 1978. pp.26.

D75 "Computer Applications: A Select Bibliography. " C.I. Barnes. Hatfield College of Technology, Hatfield, Herts. pp.72 Undated.

D76 "Bibliography on Automatic Digital Computing Machinery. " pp.10.

D77 "Bibliography on HighSpeed Automatic Calculating Machines. " Mathematics Laboratory, Cambridge University. pp.8. Undated.

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D81 "Automation in Traffic." Stichting Studiecentrum voor Administratieve Automatisering. pp.2. Undated.

D82 "Appendix: A Survey of Paperbacks on Automation. " pp.6. Undated.

D83 Banking Automation: Bibliography."Stichting Studiecentrum voor Administratieve Automatisering". pp.19. Undated.

D84 "Some Literature on Automation in the Medical Field. " The Netherlands A.D.P. Research Centre, Amsterdam. pp.11. Undated.

D85 "Literature About Network Planning Methods." pp.11. Undated.

D86 "Technical Summary Reports List." U.S. Army. pp.13. Undated.

D87   "Short Bibliography on Automatic Digital Computing Machines." pp.3. Undated.

D88   "Stock Control: A Selection of Articles." p.1 Undated.

NAHC/BOO

DR ANDREW D BOOTH

Dr Andrew Donald Booth first become involved in automatic calculators during the Second World War, whilst working on the determination of crystal structures using X-ray diffraction data. The computations involved were extremely tedious and there was ample incentive for automating the process. Booth was employed as a mathematical physicist in the X-ray team at the British Rubber Producers' Research Association (BRPRA), Welwyn Garden City, Hertfordshire, from August 1943 to September 1945. After this he moved to Birkbeck College, University of London, though still being retained for a while as a consultant by BRPRA. This link with BRPRA later proved fortuitous in respect of workshop facilities for his Automatic Relay Computer (ARC), which he designed during 1947-49.

Some time in 1945, Booth met Professor Douglas R Hartree, and began to think about the possibilities of general-purpose automatic digital computers. A visit to John von Neumann's group at the Institute for Advanced Study at Princeton (from March to September 1947) set Booth firmly on the design of a stored-program computer. As contemporary projects went, Booth's group was probably the smallest in terms of resources and personnel. He had one programming assistant, Miss Kathleen Britten (later Mrs K H V Booth). He had stated that at no time did he have more than one engineer working for him. Despite these limitations, Booth produced an electronic stored-program computer in full operation at the Birkbeck College Computation Laboratory, University of London, by the end of 1952.

Provenance: University of Manchester, Department of Computer Science, courtesy Professor Dai B G Edwards. Material collected by Professor Simon Lavington.

References: S.H. Lavington, *Early British Computers* (Manchester: Manchester University Press, 1980); "A.D. Booth", Pioneers of Computing No.9 (Science Museum Oral History Tapes, 1976). Copy in NAHC.

The Booth Collection comprises one box of archival material.

NAHC/BOO/A. Biographical and Personal

A1   S.H. Lavington, "An Evaluation of the ARC Project", unpublished typescript, pp.17, 1979. Contains biographical details on Booth and references to his publications.

NAHC/BOO/C. Reports and Working Papers

C1   A.D. Booth and K.H.V. Britten, "General Considerations in the Design of an All-Purpose Electronic Digital Computer", typescript, pp.22, 1947. Written whilst at IAS Princeton.

C2a   A.D. Booth and K.H.V. Britten, "Coding for ARC ", typescript, pp.31, September 1947.

C2b   A.D. Booth and K.H.V. Britten, "Coding for ARC", typescript, pp.39, 2nd edition 1948.

C3a   A.D. Booth, "Neon Parallel Storage Device", typescript, pp.2, 1950.

C3b   A.D. Booth, "An 'Unconditional' Multiplication Procedure ", typescript, pp.1, n.d.

C3c   A.D. Booth, "The Use of New Magnetic Materials in Computer Design", typescript, pp.8, n.d.

C3d   "Computing Machine Publications by Staff of Birkbeck College Computation Laboratory", typescript, pp.1, n.d.

C4   Envelope marked "Table of Squares in Octal Notation Printed Out on PERC at D.A. Booth's Birkbeck Laboratory, 21 May 1952".

C5   "A Review of Magnetic Matrix Stores of Coincident Current and |Other Types and Methods of Writing Into and Reading Out of Such Large Stores" (Birkbeck College, 1954), pp.31.

C6   D. Kitz, "A Description of the ARC", typescript, pp.4, n.d.

NAHC/BOO/D Publications

D1 "Recent Computer Projects", pp.2, n.d.

D2 "The Electronic Principles of Digital Computers", Electronics Forum (1948).

D3 (with K.H.V. Booth) "Principles and Progress in the Construction of High-Speed Digital Computers", Quarterly Journal of Mech. and Applied Math. 2 (1949).

D4 "A Magnetic Digital Storage System", Electronic Engineering (1949).

D5 "Design Principles of All Purpose Digital Computers, " Acta Physica Austriaca (1950).

D6 "The Physical Realization of ... An Electronic Digital Computer", Electronic Engineering (1950).

D7 "On Optimum Relations Between Circuit Elements and Logical Symbols in the Design of Electronic Calculators", Journal of British Institution of Radio Engineers (1952).

D8 "Computers: The Next Generation", Purchasing Journal (1960).

D9 (with K.H.V. Booth) Automatic Digital Calculators (London: Butterworths, 1965). Photocopies of various pages, e.g. bibliography.

NAHC/CSI

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

Collection comprises one box of archive material.

D1   T Pearcey and M Beard, "The Logic Basis of HighSpeed Computer Design", Council for Scientific & Industrial Research, Division of Radiophysics, Sydney, Australia, RPR 83, April 1948.

D2   T Pearcey and M Beard, "The Organisation of a Preliminary HighSpeed Computer", Council for Scientific and Industrial Research, Division of Radiophysics, Sydney Australia, RPR 84, June 1948.

D3   T Pearcey, "Automatic Computation: The Design of the Mk.1 Automatic Computer", Commonwealth Scientific & Industrial Research Organization, Division of Radiophysics, Sydney, Australia, RPR 119, June 1951 (2 copies).

D4   T Pearcey, "Automatic Computation: Part II, Programmes for an Automatic Computer", Commonwealth Scientific & Industrial Research Organization, Division of Radiophysics, Sydney, Australia, RPR 120, July 1951 (2 copies).

D5   M Beard, "Electronic Computer", Commonwealth Scientific & Industrial Research Organization, Division of Radiophysics, Sydney, Australia, RPR 117, September 1952.

D6   T Pearcey, "Automatic Computation: Part III Programmes for the Mk.1 Computer: Pt.1", Commonwealth Scientific & Industrial Research Organization, Division of Radiophysics, Sydney, Australia, RPR 122, August 1953.

D7   R D Ryan, "Electronic Computer Test and Monitor Equipment ", Commonwealth Scientific and Industrial Research Organization, Division of Radiophysics, Sydney, Australia, RPR 128, April 1954 (2 copies).

D8   R D Ryan, "Mercury Delay Line Memory C.S.I.R.O. Computer ", Commonwealth Scientific and Industrial Research Organization, Division of Radiophysics, Sydney, Australia, RPR 129, June 1954.

NAHC/EDS

UNIVERSITY OF CAMBRIDGE COMPUTER LABORATORY

The University of Cambridge Computer Laboratory was founded in 1937 as the 'Mathematical Laboratory' (the name was changed in 1970). Early work at the Laboratory involved analogue devices, such as the differential analyser. After the Second World War the director of the Computer Laboratory, Maurice V Wilkes, headed what was perhaps the most influential of Britain's postwar computer projects the building of the EDSAC. Modelled on the American stored-program concept that Wilkes had heard outlined at the Moore School lectures in August 1946, the EDSAC (Electronic Delay Storage Automatic Calculator) ran its first calculation in May 1949. The objective of the design team -- Wilkes, W Renwick, S Barton and G Stevens on the hardware side, and D J Wheeler on the programming side -- was to provide a useful and reliable computing service.

Such a service, the first in the world using a stored-program computer, was available from early 1950. A significant feature of the Cambridge approach was the attention paid to user convenience and programming; hence the group's book, The Preparation of Programmes for an Electronic Digital Calculator (1951), became the first textbook on programming a stored-program computer, and was soon regarded as a classic. Hence also, the international computer conference in June 1949 and the regular series of computing seminars that were held at the Laboratory. Wilkes and the EDSAC group ensured frequent contact amongst British computer groups, besides providing inspiration by their own endeavours. They even made a film on how to use the EDSAC! (Copy in NAHC). On the hardware side, the EDSAC influenced the design of the Lyons LEO through the Laboratory's close informal association with J Lyons. Developments at the Laboratory continued into the late 1950s, when a new computer, EDSAC II, was designed and built. Computer design and development has continued to the present day and involved such major projects as the TITAN.

Provenance: University of Manchester Department of Computer Science; Cambridge University Computer Laboratory. Anthony J.T. Davie (C18-C34)

References: Maurice Wilkes, *Memoirs of a Computer Pioneer* (Cambridge, Mass: MIT Press, 1985).

The Cambridge collection comprises five boxes of archival material.

NAHC/EDS/A. Personal and Historical

A1　Draft article by Martin Campbell-Kelly, " Early Programming Activity at the University of Cambridge ", typescript, pp.55 + figures, 1978. Later published in Annals of History of Computing (1980).

A2　Listing of manuscripts from the Computer Laboratory, ca. 194560, which were subsequently deposited at the Cambridge University Library.

A3　M.V. Wilkes, " My Recollections of Howard Aiken ", typescript, pp.3, December 1986.

A4　M.V. Wilkes, " The Development of Modern Computers ", lecture, pp.10, 23 February 1988.

A5　D.J. Wheeler, " Programmed Computing at the Universities of Cambridge and Illinois in the Early Fifties ", typescript, pp.11, 1989. Forthcoming in S.G. Nash (ed.), A History of Scientific and Numeric Computation (Reading, MA: AddisonWesley, 1989).

A6　D. Wheeler, " Events in the History of the Computer Laboratory, Cambridge University 19371970 ", typescript, pp.2, 1989.

A7　Press cuttings, ephemera, re. Computer Laboratory.

NAHC/EDS/C. Reports and Working Papers

C1　" A Brief Description of the EDSAC ", anon. typescript, pp.5, 1949. There are two pages of freehand circuit diagrams at the back of the report.

C2   M.V. Wilkes, " Programming for a HighSpeed Automatic Calculating Machine ", typescript, pp.12, 1949? A signed letter from Wilkes to A.J. Crawley, Ministry of Supply, 10 May 1949, is inside.

C3   Programme notes, list of speakers, lectures, etc. for Conference on HighSpeed Automatic Calculating Machines, 2225 June 1949.

C4a   Lists of speakers and lectures for various Mathematical Laboratory colloquia on computers, ca. 1950.

C4b   Notes on Colloquium on Whirlwind Computer by S. Gill, typescript, pp. 4, ca. 1955.

C5   Bound photocopy of freehand notes and circuit diagrams of EDSAC, JanuaryMarch 1948.

C6   Bound photocopy of the first EDSAC logbook begun on 6 May 1949.

C7   " Report of a Conference on HighSpeed Automatic CalculatingMachines, 2225 June 1949 " (Mathematical Laboratory and Ministry of Supply, January 1950) pp.141. 2 copies.

C8   " Report on the Preparation of Programmes for the EDSAC and the Use of the Library of Sub Routines " (Cambridge: Mathematics Laboratory, September 1950).

C9   " Introduction to Programming for EDSAC 2 " (Cambridge: Mathematical Laboratory, 1957) pp.34 + appendix.

C10   " A Programmers' Guide to EDSAC 2 " (Cambridge: Mathematical Laboratory, 1957) pp.36. " Supplement No.1 " is inserted at the back.

C11   M.V. Wilkes, " Time Sharing " (1968). Typescript draft book.

C12   Wilkes, " Some Reflections on Automatic Programming and on the Design of Digital Computers ". Technical Memo 61/2, 1961, pp. 10.

C13   C. Strachey and Wilkes, " Some Proposals for Improving the Efficiency of ALGOL 60 ". Technical Memo 61/5, 1961, pp. 11.

C14   John H. Mathewman, " An Experimental Syntax Directed Compiler for EDSAC 2 ". Technical Memo 64/4, pp. 22.

C15   R.K. Livesley, " A Beginner's Guide to the EDSAC 2 Autocode ", typescript, pp. 24, 1961.

C16   D.W. Barron, " Users' Guide to the EDSAC Magnetic Tape System ", typescript, pp. 19, 1961.

C17   Mathematical Laboratory Cambridge (with University of London Institute of Computer Science), " CPL Elementary Programming Manual " (3rd edition, 1966).

C18   D.F. Hartley, 'EDSAC 2 Autocode programming manual', September 1961

C19   File containing following reports: M.V. Wilkes, 'Technical memorandum No.63/1. An experiment with a self-compiler for a simple list-processing language', February 1963; D.F. Hartley, 'EDSAC 2 Autocode programming manual' (2nd edition), 1962-63; Martin Fieldhouse, 'User's guide to EDSAC LP program', September 1961; C. Strachey and M.V. Wilkes, 'Some proposals for improving the efficiency of ALGOL 60', July 1961; D.W. Barron, 'Programming for EDSAC 2 with main store', November 1962; D.W Barron, 'User's guide to the EDSAC magnetic tape system', October 1962; 'EDSAC service routines', October 1962; M.V. Wilkes, 'Some reflections on automatic programming and on the design of digital computers', May 1961; R.K. Livesey, 'A beginner's guide to the EDSAC 2 Autocode', August 1961; D.F. Hartley, 'The EDSAC Autocode translator', June 1962

C20   N.E. Wiseman, 'Application of list processing methods to the design of interconnections for a fast logic system', June 1963

C21   M.V. Wilkes, 'A language for facilitating the use of formal derivatives in numerical analysis', March 1965

C22   H.P.F. Swinnerton-Dyer, 'The planning of an Autocode compiler', September 1965

C23   P.J. Brown, 'ML/I user's manual', (Third edition), June 1967

C24   I.R. Jackson, 'PENNY: a language for the manipulation of documents and phases', October 1967

C25   J. Larmouth, 'TITAN mixed language system - MLS specification of permissible commands', December 1967

C26   'FORTRAN subroutine library', August 1967

C27   'The Mathewman paginating program - Mark 2', August 1967

C28   D.W. Barron and A.D. Hall, 'SARA reference manual', August 1967

C29   M.F. Bott, 'An introduction to machine code programming for TITAN', October 1966

C30   P.J. Brown, 'The use of ML/I in implementing a machine-independent language in order to bootstrap itself from machine to machine', January 1968

C31   'TITAN mixed language system - MLS. The IAL library', August 1967

C32   C. Whitby-Strevens, 'ETAL user's manual', July 1967

C33   M. Richards and C. Whitby-Strevens, 'The IAL loader for TITAN', undated (late 1960s)

C34   'TITAN machine-code programming manual', (Second edition), September 1967

NAHC/EDS/D. Publications

D1a   J.E. Lennard Jones, M.V. Wilkes and J.B. Bratt, "The Design of a Small Differential Analyser", Proc. Cambridge Philosophical Society 35 (1939).

D1b   M.V. Wilkes and W. Renwick, "An Ultrasonic Memory Unit for the EDSAC", repr. from Electronic Engineeering (1958).

D2   M.V. Wilkes, "Programme Design for a HighSpeed Automatic Calculating Machine", repr. from Jnl of Scientific Instruments and of Physics in Industry 26 (1949).

D3   M.V. Wilkes, "Progress in HighSpeed Calculating Machine Design", repr. from Nature 164 (1949).

D4a   M.V. Wilkes, "Electronic Calculating Machine Development in Cambridge", repr. from Nature 164 (1949).

D4b   M.V. Wilkes, "THe Use of EDSAC for Mathematical Calculation ", Appl. Sci. Res. (1950).

D5   John Bennett, "HighSpeed Digital Calculating Machines ", 2part illustrated article in Distribution of Electricity (March/May 1950).

D6a   M.V. Wilkes, D.J. Wheeler, and S.Gill, The Preparation of Programs for an Electronic Digital Computer (Cambridge, Mass.: AddisonWesley, 1951). Tom Kilburn's copy. There is also a supplement.

D6b   M.V. Wilkes, "Automatic Calculating Machines", Journal of Royal Society of Arts 100 (1951).

D7   "Introduction to Programming for an Automatic Digital Calculating Machine and Users' Guide to the EDSAC" (1954). Issued as a supplement by the Mathematical Laboratory to Wilkes, Wheeler and Gill (above). 2 copies.

D8   "Programming for EDSAC 2" (2nd edn, 1959). 2 copies.

NAHC/EEC

ENGLISH ELECTRIC COMPANY LIMITED

Collection comprises two boxes of archive material.

D1   Envelope of DEUCE data cards, n.d.

D2   Rugby/Whetstone DEUCE Bulletin, Issue No.1 May 1 1959

D3   Rugby/Whetstone DEUCE Bulletin, Issue No.2 June 1 1959

D4   Rugby/Whetstone DEUCE Bulletin, Issue No.3 July 1 1959.

D5   DEUCE Bulletin, Issue No.4 August 1 1959.

D6   DEUCE Bulletin, Issue No.5 September 1 1959.

D7   DEUCE Bulletin, Issue No.6 October 1 1959.

D8   DEUCE Bulletin, Issue No.7 November 1 1960.

D9   DEUCE Bulletin, Issue No.8 January 19 1960.

D10   DEUCE Bulletin, Issue No.9 February 22 1960

D11   DEUCE Bulletin, Issue No.10 June 13 1960.

D12   DEUCE News, Nos.45, 512, 1960.

D13   DEUCE Programme Codes, ca.1961: General Interpretive Programme (G.I.P.7); English Electric Multiple Regression Programme; DEUCE Programme No. NPL128 Curve Fitting; DEUCE Instruction Code; Automatic Instruction Modifier; Filler Instructions for DEUCE.

D14   DEUCE Alphacode Manuals.

D15   S.J.M. Denison, "DecimaltoBinary and BinarytoDecimal Conversions". Report NS y 62, 27.6.57.

D16   C.Robinson, Report NS u 242, "Notes on Binary Decimal and Decimal Binary Conversion" (using Brunsviga), 9.9.57.

D17   A.Gilmour, Report NS u 246, "Instructions for Using Automatic Instruction Modifier and 64 Column Read and Punch" , Report NS u 246, 18.9.57.

D18   R.A.Smith, Report Ns y 77, "DEUCE Programme News No.16" , 19.11.57.

D19   Miss A. Birchmore, Report NS y 78, "Standard Operating Instructions for DEUCE", 21.11.57.

D20   P.J.Landin, Report NS y 80, "Preparing and Testing Deuce Programmes", 25.11.57.

D21   Miss A. Birchmore, Report NS y 79, "DEUCE Control Panel Manual", 21.11.57.

D22   Miss A. Birchmore, Report NS y 79, DEUCE Control Panel Manual, 21.11.57.

D23   V.E.Price and G.M.Davis, Report NS y 88, "Basic DEUCE Programming (2nd Issue)", 20.1.58.

D24   S.J.M.Denison, E.N.Hawkins and C.Robinson, Report NS y 87, "DEUCE Programme News No.20, January 1958", 29.1.58.

D25   C.Robinson, Report NS u 259, "DEUCE Schematic Diagram" , 14.2.58.

D26   C.Robinson, Report NS u 258, "Useful Constants" , 14.2.58.

D27   P.J.Landin, Report NS u 261, "Notes on GIP 5" , 18.2.58.

D28   R.A.Smith, Report NS y 103, "DEUCE Programme News No.26, August 1958: DEUCE Subroutine Library", 28.8.58.

D29   J.Boothroyd, Report NS u 272, "DEUCE Programming Examples" , 16.9.58.

D30   Miss A. Birchmore, Report NS y 104, "A DEUCE Programme to Calculate H.C.F.", 16.9.58.

D31   M.J.Kelly & B.Randell, Report W/AT 216, "Preliminary Report on EASICODE", 19.10.58.

D32   B.W.Clark, Report W/M(4A).p.11, "General Decimal Punch Subroutine", 31.10.58.

D33   B.W.Clark, Report W/M(4A).p.12, "AlphaNumeric Punch Out Subroutine", 11.11.58.

D34   E.N.Hawkins, Report NS y 114, "Supplement to DEUCE News No.20, DEUCE Alphacode (Mark 2)", 4.12.58.

D35   C.G.Broyden, Report W/AT 255, "STEVE", 15.12.58.

D36   D.J.Ozanne, Report NS u 286, "DEUCE Programmers' Course No.8", 20.1.59.

D37   C.G.Broyden, Second Amendment to W/AT 255, "Further Notes on 'STEVE' and 'BEVERLEY'", 17.11.59.

D38   R.A.Smith, Report NS y 85, "DEUCE Programme News No.18, January 1958. Lists of DEUCE Library Routines", Undated.

D39   Programming notes on "STEVE" and "BEVERLEY" , ca.1958.

D40   DEUCE Programming notes, including "DEUCE Programme No.19012: Tabular Interpretive Scheme" (pp.21) n.d.

D41   Miscellaneous DEUCE progrmming notes.

D42   Computer printout, Bristol Mk.II drum filling.

D43   Computer programming notes and printout, Atomic Power Division, EE Co Ltd.

D44   Computer printout, programming notes, including "TIP Mark 2 Order Code", typescript, Mechanical Engineering Laboratory, EE Co Ltd.

NAHC/FER

FERRANTI LTD, 1948-63

A Ferranti Computer Group was set up in 1949 at the factory in Moston under J D Carter, manager of the Instrument Department, to make the computer designed by Professor F C Williams of the University of Manchester. Henceforth, in close collaboration with the University, Ferranti produced a string of technically successful machines: the Pegasus, Mercury, Perseus, Sirius and Orion. Development work culminated in the ATLAS computer which, when it was delivered in December 1962, was considered to be the fastest computer in the world. Ferranti also installed the first computer in Canada (the Ferut), and its Canadian subsidiary (Ferranti-Packard) developed the FP6000 (the rights on which were later acquired by ICT). The commercial returns, however, were less satisfactory and in September 1963 Ferranti sold its computer interests to ICT. The firm, however, continued its development work on computerised control and command systems.

Provenance: Manchester University Computer Science Department, courtesy Professor D B G Edwards. Material collected by Professor Simon Lavington. Ferranti Packard documents donated by John M Chapman.

References: S Lavington, *Early British Computers* (Manchester: Manchester University Press, 1980).

See also the D G Prinz, University of Manchester Department of Computer Science and NRDC collections (NAHC/PRI; NAHC/MUC/Series 13; NAHC/NRD). The NAHC has an extensive collection of Ferranti catalogues and reports in the computer literature collection (NAHC/CL) and trade catalogue collection (NAHC/TC).

The Ferranti collection comprises six boxes of archival material.

NAHC/FER/A. Personal and Historical

A1   Press cuttings and ephemera file.

NAHC/FER/B. Correspondence

B1   Copy of cables from Ferranti to E. Grundy, Ferranti, October 1948 asking for preliminary report on digital computing.

B2   Copy of letter, 1 November 1948, from J.D. Carter re. F.W. Williams' lectures on electronic computer.

B3   Copy of letter of B. Lockspeiser to E. Grundy, 26 October 1948, giving Ferranti authority "to construct an electronic calculating machine to the instructions of Professor F.C. Williams."

B4   Ferranti circular, 23 December 1948, re. arrangements for proceeding with the Williams' machine.

B5   Copy of memo. signed by S. Gill, 9 May 1957, re. order code for future scientific computer.

NAHC/FER/C. Reports, Working Papers, etc.

C1   Ferranti Ltd, "Fifth Report on Progress of Development of an Electronic Digital Computer to the Requirements of Professor F.C. Williams of Manchester University", 19 February 1949. Photographs included.

C2   "University of Toronto Digital Computer", typescript, 1950, pp.7. Photographs.

C3   G.I. Thomas, "Digital Computing Machines", typescript, 1950, pp.6.

C4   Copy of an early o/p from the Ferranti Mark I. D.G. Prinz.

C5   J.M. Bennett, "Ferranti Mrk I Computer. Logical Design" , typescript, pp.58 + tables, 1951. (2 copies).

C6   D.G. Prinz, "Introduction to Programming on the Manchester Electronic Digital Computer", typescript, pp.26, 1951(?). 3 copies.

C7   "Power Supply (Demos II)", typescript, n.d.

C8   J. Kates, "Electrostatic Storage Theory", typescript, pp.13, 1951.

C9   "Coding for the Ferranti High Speed Parallel Printer" , typescript, pp.13, 1951.

C10a   "Uses for the Manchester University Digital Computer" , typescript, pp.6, 1953.

C10b   "The Use of Digital Computers in Aircraft Design" , typescript, pp. 6, 1953. By BVB (Bowden?) and DJ.

C10c   "The Manchester Universal Electronic Computer: Functional Description", typescript, pp. 156 + diagrams, 1953.

C11   "Chequeue", typescript, pp.11, 1954.

C12   "A Radix 32 Input and Organisation Scheme for Ferranti MK.I* Digital Computers", typescript, 1954.

C13a   "Instructions in the Radix 32 Code", typescript, pp.20, 1954. (2 copies).

C13b   "Proposals for Computer Research and Development Programme", typescript, pp. 9, 1954.

C14   "The Manchester Universal Electronic Computer Mnemonic Code Handbook", typescript, pp. 95 + appendices, 1954. (2 copies).

C15a   "A Universal Matrix Scheme", typescript, pp.19, 1955.

C15b   C.E. Owen, "The FPC1 Logical Circuits", typescript, pp. 8 + diagrams, 1955.

C15c   "Preliminary Notes on Programming for the Ferranti Mark II Computer", typescript, pp.25.

C16a   Ferranti Computer Dept, "Performance Reports for DC1 and 2 Universities of Manchester and Toronto: Year of Operation 1954", typescript, 1955, pp.15 and graphs.

C16b   "Syllabus Programming for Ferranti Mercury Computer" , July 1956.

C16c   R.A. Brooker, "An Autocoding Scheme for Ferranti Mk II Computer", typescript, pp.23, 1956.

C17   B.V. Bowden, "The Ferranti High Speed Digital Computer" , typescript, pp. 30, 1956. 3 copies, one includes photos.

C18   Folder marked "Tape Reader Plate Diagrams", ca. 1957.

C19   Folder marked "Ferranti Mercury Computer", inc. logic diagrams, performance tests, coding sheets, etc., ca. 1957.

C20a   Five typescripts marked "ATLAS Computer Project Progress Reports", 19612.

C20b   Two folders containing material re. arrangements for the ATLAS inauguration at Manchester University, 7 December 1962. Includes catalogues and photographs.

C21   Folder marked "ATLAS block and logic diagrams" , inc. overall block diagram (1963), page address registers (19623).

C22   "Intercode Handbook: Ferranti Mark 1* Digital Computer" , typescript, 1960.

C23   "Operations Research and Management Decision: An Introductory Course for Non Mathematicians", Melbourne Computer Centre, typescript, 1962.

C24   "The Ferranti Orion Computer System: Vol.1 Preliminary Logical Description. Vol.2 The Microprogramming", typescript, 1962.

C25   "Data Transfer System", folder inc. typescript and diagrams, 1963.

C26   "Data Flow Paths: Printed Circuit Board Artwork Generating Program", typescript, pp.4, n.d.

C27   M.W. Gribble, "Proposal for an Automatic Interconnection System", typescript, pp.9 + tables, 1968.

C28   M.W. Gribble, "A Comparison of the Labour Involved in Producing the ARGUS 500 Processor Art Work by Existing Manual Methods & By Automatic Methods Using the GCHQ Milling Machine" , typescript, p.11, 1968.

C29   M.W. Gribble, "Technical Memo.: Preparation of Data for Adam", typescript, 1969.

C30   B.B. Swann, "The Ferranti Computer Department" , unpublished typescript history, ca. 1975, pp.86 and tables. The original is in the Ferranti Archives, Moston.

C31   Ferranti Ltd, "List of Principal Argus Computer Installations: Excluding Military Sales", typescript, May 1979, pp.27.

C32   Records of Ferranti-Packard Electric Ltd., Canada, ca.19628. Material includes, inter alia: Technical Reports, ca.1963. FP 6000 Computer, programming notes and records.

Customer reports

A Proposal for an Airport Information System.

NAHC/FER/D Publications

D1   P.L. Young, "The Growth of a Computer Department" , reprint of a paper re. Ferranti from The Electrical Manufacturer (1958).

D2   "A Review of the Ferranti Digital Systems Department" , Supplement to Ferranti International News (1966).

NAHC/FOR

AMERICAN NATIONAL STANDARDS INSTITUTE: X3J3 FORTRAN COMMITTEE

The Minutes of the ANSI X3J3 Committee cover the period 1968 to the development of FORTRAN 77 (up to 1977-8). FORmula TRANslating System (FORTRAN) was devised in about 1954 by John W. Backus of IBM and was the first of the major highlevel languages.

Provenance: David T. Muxworthy (University of Edinburgh).

References: Richard L. Wexelblat, *History of Programming Languages* (New York, 1981).

The collection comprises 10 boxes of archival material.

NAHC/FOR/C. Minutes

[Cataloguing here is non-standard. Items appear to have unique document numbers appended, but some of these themselves do not follow the standard rule and I have not yet had the opportunity of examining the material itself. JS 2005-08-05]

Minutes	Document number
7th meeting USASI WG X3.4.3B Fortran Apr 4-5, 1968 X3.4.3B/7	
8th meeting Jun 6-7, 1968	9
9th meeting Sept 12-14, 1968	10
9th meeting USASI WG X3.4.3 Fortran Jan 22 1969 X3.4.3/	6
10th meeting Mar 24-26, 1969	7
11th meeting Jun 5-7, 1969	10
12th meeting USASI TG X3.4.3 Fortran July 28-30, 1969	12
14th meeting ANSC TG X3.4.3 Fortran Dec 4-6, 1969	15
15th Feb 12-14, 1970	16
16th Apr 6-8, 1970	17
17th Jun 4-6, 1970	18
18th July 20-22, 1970	19
25th meeting X3J3 Fortran Sept 22-24, 1971 X3J3/30	
26th Nov 18-20, 1971	31
27th Jan 24-26, 1972	33
28th Mar 22-25, 1972	34
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31st Sept 20-23, 1972	37
Collection of X3J3 Approved items	38
32nd meeting X3J3 Fortran Nov 15-18, 1972	39
33rd Jan 15-17, 1973 X3J3/40	
Reorganisation of X3J3 Working Group & Operational Guidelines	41

NAHC/FOR

**AMERICAN NATIONAL
STANDARDS INSTITUTE:
X3J3 FORTRAN COMMITTEE**

NAHC/HAR

DOUGLAS R HARTREE

Professor Douglas R Hartree (1897-1958) was one of the most influential mathematicians and computer pioneers of his day, whose work bridged both the calculating machine and electronic digital eras. As Beyer Professor of Applied Mathematics at the university of Manchester in the mid 1930s, Hartree built a differential analyzer based upon the machine of the American, Vannevar Bush. Hartree's international reputation ensured that he kept in close touch with American developments, and during the Second World War he became involved with the ENIAC project. On his return to England (where he had accepted a chair at Cambridge University) Hartree publicised American activities and was an enthusiastic supporter of British efforts to build stored program computers.

References: Maurice Wilkes' introduction to Hartree, *Calculating Machines* etc. (Cambridge, Mass; MIT Press, 1984).

A small number of Hartree papers are deposited in the Archives of Churchill College, Cambridge. See listing by Contemporary Scientific Archives Centre (CSAC 45/9/76). Copy in NAHC.

The collection comprises one box of archival material.

NAHC/HAR/A. Personal and Historical

A1   Ephemera file, press cuttings, e.g. Manchester differential analyzer.

A2   "Douglas R. Hartree", Obituary Notices of Fellows of Royal Society, 4 (1958).

NAHC/HAR/C. Working Papers, Reports

C1   "US Developments in Calculating Machines". An informal and unofficial survey by Hartree from notes made in the course of a visit to the USA, MayJuly 1945. Typescript, pp.17. Document is stamped "Confidential" and is marked on top: "Given to L.J. Comrie by JRW" [Womersley?].

C2   Hartree, "Experimental Arithmetic", typescript, pp.7, ca 1947.

C3   "Lecture given by Professor D.R. Hartree on April 15th 1947". 2 typescripts, pp.3, pp.8.

C4   Hartree, "Differential Analyser", Ministry of Supply Monograph, January 1949, pp.75 + diagrams.

NAHC/HAR/D. Publications

D1   Hartree, "The Differential Analyser", *Nature* 135 (1935).

D2   Hartree and Porter, "The Construction and Operation of a Model Differential Analyser", *Memoirs & Proceedings of the Manchester Literary and Philosophical Society*, 79 (1934- 35). (2 copies).

D3   Hartree and J.R. Womersley, "A Method for the Numerical or Mechanical Solution of Certain Types of Partial Differential Equations", *Proceedings of the Royal Society of London* , 161 (1937). (2 copies).

D4   Hartree, "The Mechanical Integration of Differential Equations", *Mathematical Gazette*, 22 (1938). (2 copies).

D5   Hartree and Arthur Porter, "The Application of the Differential Analyser to Transients on a Distortionless Transmission Line", *Journal of the Institution of Electrical Engineers* , 83 (1938).

D6   Hartree, "The Bush Differential Analyser and its Applications", *Nature*, 146 (1940).

D7   Hartree, "The Application of the Differential Analyser to the Evaluation of Solutions of Partial Differential Equations", Canadian Mathematical Congress, Montreal, (1946). (3 copies).

D8   Hartree, "The ENIAC, an Electronic Computing Machine", *Nature*, 158 (1946). (4 copies).

D9   Hartree, "Recent and Prospective Developments in Large Digital Calculating Machines", *RNSS Journal* (1947).

D10   Hartree, "Recent Developments in Calculating Machines", *Journal of Scientific Instruments*, 24 (1947).

D11   Hartree, *Calculating Machines*. (Cambridge University Press, 1947). (3 copies).

D12   Hartree, "Experimental Arithmetic", *Eureka*, 10 (1948).

D13   Hartree, M.H.Newman et al, "A Discussion on Computing Machines", *Proceedings of the Royal Society, Series A*, 195 (1948).

D14   Hartree, "Modern Calculating Machines", *Endeavour* (1949).

NAHC/ICL

INTERNATIONAL COMPUTERS LTD (ICL), ca 1907-80

ICL was founded in 1968 under the Wilson Labour Government in the Industrial Expansion Act as part of its industrial rationalisation programme in order to create an international presence in computers. The formation of ICL was the culmination of a series of mergers and acquisitions during the late 1950s and 1960s which brought together the two strands of punched-card equipment manufacturers and general electrical equipment manufacturers, both of which were diversifying into computers. The immediate merger brought together International Computers and Tabulators Ltd (ICT) and English Electric Computers. (See overleaf for details of the ICL lineage.) Later, Standard Telephones and Cables (STC) became parent company.

Provenance: Mr John M Chapman, and the Department of Computer Science, University of Manchester.

References: Martin Campbell-Kelly, "ICL Company Research and Development", (2 parts), *ICL Technical Journal*, 5,6 (1986, 1988); Martin Campbell-Kelly, *ICL: A Business and Technical History* (Oxford University Press, 1990); Tim Kelly, *The British Computer Industry* (London: Croom Helm, 1987).

The collection comprises 10 boxes of archival material.

NAHC/ICL/A. Historical

A1   Files of historical material (photocopies and typescripts) on ICL, including:

"The Hollerith Machines", 1914.

A Thomas, "Punching and Sorting Machinery", 1930.

"Hollerith Handbook and preliminary Report on new Products", 1938.

"List of Punched Card Machines", 1939.

"Modern Applications of Powers", 1947.

"Powers Samas Accounting Machines: Thirty Years' Progress", 1948.

F.G.English, "The Measure of Progress", Powers Samas Gazette (1952).

Typescript history of Powers Samas Accounting Machines Ltd., n.d., pp.36, but a few pages missing (copied from original in Vickers Archive, Cambridge University Library, Doc. 771.

"Powers Samas: History of the Company, 1954.

"Hollerith Cavalcade': Fifty Years of Company History", 1957.

The Beginnings: Reminiscences of C.A. Everard Greene. First Executive of the Tabulator Limited and later General Manager and Director of the British Tabulating Machine Company Ltd", 1958.

"International Computers and Tabulators Limited", ca.1964.

"Some Notes on ICL History and Organisation Structure", ca.1968.

"International Computers Ltd", 1970.

"ICL Origins and Background", 1973.

"International Computers Limited Research and Advanced Development", 1975.

"ICL's Relations with Government", 1975.

"70 Years On", 1979.

John Tysoe and Patrick Hickey, "ICL and the Computer Industry", 1979.

NAHC/ICL/B Correspondence

B1   Miscellaneous correspondence of John M. Chapman, Systems Dept, Ferranti-Packard ICT Canadian subsidiary acquired from ferranti), ca.1966-9. Some notes on the Ferranti-Packard Mini Processor are also contained in the file.

B2   Chronological file of correspondence of John M. Chapman, 1974-81. Concerns sales and technical support for ICL computers.

NAHC/ICL/C Working Papers and Reports

Cl   Instruction notes, hardware and software instruction sets, course notes on data communications for ICL computers (mainly 1900), ca 1965-70. (18 envelopes).

C2   F.H. Sumner, E.C.Y. Chen (University of Manchester) and A.B. Cooper (ICT), "Report on a Visit to USA", Typescript, p.18, 1965.

C3   ICT ATLAS 2. ABL Reports, 1965.

C4a   "1900 Series: user Introduction for the George 3 Operating System", confidential typescript, pp.12, 1967.

C4b   "Logic Diagrams for 1904", ca. 1965.

C5   F.G. Heath, "ICL Hardware Developments", typescript (4 papers), 1968.

C6a, b   Folders of miscellaneous typescripts, including:

        J.A. Gripton, "The 1900 Series. Technical Description", 1968.

        "Direct Access Consolidation", 1968.

        "MAL Manual: Microassembly Language for the E1 Emulator", n.d.

        "Formal Semi-Compiled Language Definition", 1969.

        Consolidator Working Party Documents, 1969.

        "Contents List and Proposed Changes to Range Definition, n.d.

        "Interim Report of ID-PN 25 Performance Measurement", 1971.

        N.A.H. Jeffery, "High level Language Source Tracing Results", 1971.

C7   J.K. Iliffe, "Research and Advanced Development Organisation: Interpretive Machines", typescript, pp.52, 1972.

C8a,b   Notes and papers of John M Chapman (ICL) including following reports and typescripts (there is also some loose correspondence):

        "Systems Department: Applications Group Report", 1969.

        "A New Method of Generating Printed Circuits", 1969.

        "Trip Report: Western Provinces", 1969.

        "Trip Report: Faul-Coradi Incorporated, Skaneateles, New York", 1969.

        "Standardization in Data Processing", n.d.

        "Problem Definition and Systems Analysis", 1971.

        "Problems in Defining and Standardizing Programming Languages". 1971.

        "Scanners", 1976

        "Computers I Have Known and Loved -- or Otherwise", 1980.

C9   Papers re. New Range Source Documentation Study Group, 1973.

C10   Miscellaneous reports:

"Environmental Design Standard for ICL Equipment", 1973

"1112529 Design Specification for Micro-programmed Computer System MICOS 1", 1973.

"Course Notes for 1900/2903 Diagnostic Seminars", 1975.

C11a,b   ICL Company Announcements, Nos. 382-647, May 1976 - December 1981.

C12   ICL Education and Training Manual, "Sizing TP Systems, Introduction and Overview" n.d., 1975?

C13   "ICL Salesmen's Guide Ä 2903", n.d.

C14   "ICL. An introduction to electronic data processing", undated

C15   "ICL. An introduction to binary arithmetic", undated

C16   "ICL. Managing with PROSPER", undated

C17   "ICL. Network planning. PERT: Program Evaluation and Review Technique", 1900 Series, undated

C18   "ICL. 1900 Series software", undated

C19   "ICL. 1903T. Decisive management response", 1972

C20   "ICL. International computers and the 1900 S", 1971

C21   "ICL. One-time recording for multi-processing", 1969

C22   "ICL. Computers and data processing equipment", 1969

C23   "The 2903 range from ICL", 1978

C24   "ICL. 2903/30", 1976

C25   "ICL. 2903. System introduction", 1973

C26   "ICL. 2900. The total information system", 1981

C27   "ICL. 2900 for management", 1979

C28   "ICL. 1500. The transaction system", 1977

C29   "ICL. Key edit. Series 2", 1981

C30   "ICL 2900 PERT. Effective project planning and control", large brochure, 1982

C31   "ICL. VME 2900 architecture", 1982

C32   "2960/10 computer system", 1979

C33   "2960 computer system", 1978

C34   "ICL. 2955 computer system", 1980

C35   "ICL. 2946 computer system", 1981

C36   "2946 computer system", 1980

C37   "ICL. VME 2900. Advanced communications and networking", 1982

C38   "Key-edit. Console quick reference guide", 1974

C39   "ICT. 558 electronic computer", 1961

C40   "ICT. Data processing equipment for the wool textile industry. Production and stock control", 1964

C41   "ICT. Rate accounting with TCT 40-column punched card data processing equipment", 1961

C42   "ICT. Punched cards for profitable printing", 1964

C43	"ICT 40. Data processing for motor distributors", 1964
C44	"ICT 40. Data processing for hosiery and garment manufacturers", 1964
C45	"ICT 40. Data processing equipment in the engineering industry", 1964
C46	"ICT 1600. Electronic data processing system", 1964
C47	"ICT real-time computer system demonstration", undated
C48	"ICT Rapidwrite programming manual", 1961
C49	"ICT 1300 series. Data processing systems 1300/1301/1302", 1964
C50	"ICT 1300. Breakthrough", 1963
C51	"ICT. Business data processing with the 1301", 1962
C52	"ICT 1004 series. Data processors", 1964
C53	"ICT 1004 & 1004/2. Data processors", 1964
C54	"ICT 1004", 1963
C55	"ICT 1900 series. CUT and FILL programs", 1967
C56	"ICT 1900 SCAN", 1966
C57	"ICT 1900 Series. FIND", 1966
C58	"ICT 1900 Series. PERT for installation of a computer", 1966
C59	"ICT 1900 software", 1967
C60	"ICT 1900 series. 1906A computer system", 1967
C61	"ICT 1900 series. 1902A and 1903A computer systems", 1968
C62	"ICT 1900 series. On-line document handling", 1967
C63	"ICT 1900 series. On-line document handling", 1966
C64	"ICT 1900 series. Direct access", 1966
C65	"ICT 1901", 1965
C66	"ICT. The inside story of a modern computer system", 1967
C67	"ICT 1900. Electronic data processing system", 1964
C68	"ICT. Programmed system for numerically controlled machine tools", 1964
C69	"ICT. A progress report on production control by computer", 1964
C70	"ICT. Use of computers in ICT production control", 1961
C71	"ICT. Use of computers in ICT production control", undated
C72	"Controlling production by computer", reprinted from Data Processing, July-September 1959
C73	"Accounting for a progressive borough with the ICT 1900 series computer", 1965
C74	"Electronic data processing in the service of the Rootes Group", 1963
C75	"ICT. Computers in university administration", 1966
C76	"ICT. Special projects in data handling. Data collection system", 1962
C77	"ICT. Special projects in data handling", 1961
C78	"ICT. Automatic data recording from multiple remote inputs", 1961
C79	"ICT. Automatic production and performance recording", 1964
C80	"ICT, Punched card control of automatic processing", 1964

C81   "ICT. Data distribution system. Datasend", 1963

C82   "ICT. UKAP remote control", 1960

C83   "ICT. Paper tape preparation by ICT 1020/1021", 1966

C84   "ICT. 8500 range of equipment. High speed automatic document processing", 1962

C85   "ICT. Controlled document processing. Electronic document processor and encoding equipment", 1961

C86   "ICT. Punched card arranging machines. Sorters. Collators", 1964

C87   "ICT. 900 series tabulators", undated

C88   "ICT. Types 700 and 707 non-printing tabulators", 1964

C89   "ICT. Automatic punches. Automatic verifiers", undated

C90   "ICT. Reproducing and gang punches", undated

C91   "The ICT range of 40-column punched card accounting machines", undated

C92   "ICT 40. Data processing equipment", 1964

C93   "ICT 40 column punched card data processing", 1961

C94   "The ICT 21 column range of punched card accounting machines", 1962

C95   "Progress in Scotland assisted by ICT data processing", 1961

C96   "Progress in the North-West with ICT data processing", 1962

C97   "ICT. Midland data processing bureau", 1961

C98   "ICT. 80-column punched card dat processing. Automatic data processing for the stockbroker's office", 1962

C99   "The use of ICT Type 555 plugged program computer for scientific computation", by J.E. Hailstone (Harwell), 1959

C100   "ICT. Electronic rate accounting", by K. Neville (Corporation of the City of London), 1961

C101   "Lancashire County Council. County Treasurer's Department. Payroll production", undated

C102   "ICT. Dividend service bureau", 1961

C103   "A presentation of ICT data processing equipment", 1965

C104   "ICT. Type 542 multiplier. Type 550 Calculator", 1964

C105   "ICT 915. Data processing - 80 column equipment", 1961

C106   Copies of ICL Marketing 1-123 plus Specials, 22 July 1968 - April 1975

C107   Spare copies of ICL Marketing, 1969-1973

C108   "ICL. An introduction to International Computers Ltd", box of cassette tapes and accompanying leaflets, 1970s

C109   "ICL. International computers at Computer 70. Exhibition stand manual", 1969

C110   "ICL. At IFIP 68. Exhibition stand manual", 1968

C111   "Information manual. Business efficiency exhibition. City Hall Manchester, 20-25 April 1964", undated

C112   "ICT. Exhibition stand manual", for the Manchester and Lancashire Private Exhibition, 1962

C113   "ICT Information Manual. Business efficiency exhibition, Queens Hall, Leeds", 1962

C114   "ICT Information Manual. BEE Grand Hall Olympia and Electronic Computer Exhibition, National Hall, Olympia", 1961

C115   "ICT Information Manual. BEE Grand Hall Olympia and Electronic Computer Exhibition, National Hall, Olympia", 1961

C115   "ICT Information Manual. BEE Grand Hall Olympia", 1960

C116   "ICT Information Manual. BEE, King's Hall, Belfast", 1959

C117   "Staff Rota. Business Efficiency Exhibition, Olympia, 4-13 October 1965", 1965

C118   "ICL. Demonstration services. Reading. Bristol", 1980s

C119   "Corporate systems standards manual", Organisation and Methods, ring binder, May 1975

C120   "ICL. Blue Border Procedure", Systems and Technical Support, ring binder, February 1977

C121   "ICL Personal Computer. Running MS-DOS applications on your ICL Personal Computer", 1984

C122   "ICL. UKD order entry system overview", ring binder, 1984

C123   "How to use the 7700. Independent study course. Part 2", ring binder, 1979

C124   "ICL. 2900 VME. Program Performance Analysis", ring binder, undated

C125   "ICL. VME. System management", ring binder, 1984

C126   "ICL. VME 2900. Using Reportmaster", 1982

C127   "ICL. Your guide to Network Management", 1986

C128   "ICL. DRS20. Distributed Resource System. Implementing CP/M", ICL Batch mode communications reference manual, 1982

C129   "ICL 1900 Series. Data communications and interrogation", 1970

C130   "ICL Consultancy and Training Services. Office systems. ICLMAIL. Supervisor's guide", 1985

C131   "ICL. Quickbuild. User guide", 1985

C132   "ICL Technical publications list", November 1986

C133   "ICL 6402/11. Video Terminal", 1984

C134   "ICL Group Information Services. Impact V Standards", 1984

C135   "ICL Application development product line. ICL-Pascal: interactive testing system", 1984

C136   "ICL Application development product line. ICL-Pascal: Using the ICL-Pascal compiler", 1984

C137   "ICL VME. Setting up a simple database", 1985

C138   "ICL. VME 2900. Reference. Introduction", 1983

C139   "ICL 1900. Management and systems training manual", ring binder, 1969

C140   "ICL. Customer Engineering Division Training. FF004: retail systems. Part B - ancillaries. Training manual", ring binder, 1978

C141   "ICL. System 25", ring binder, 1982

C142   "ICL Consultancy and training. Printers Ricoh 1300. Ricoh 1600", 1983

C143   "ICL. DNX 2000. Distributed network exchange", 1982

C144   "Microelectronics 1/1 microcomputer systems", British Telecom Technical College, 1982

C145   "ICL. Customer Engineering Division Training. Training manual. Introduction to digital computers", 1978

C146   "ICL. An introduction to ICL", contains 23 individual files, 1980

C147   "ICL. Induction module", 1974

C148   "ICL. Your guide to network management. Sales presentation", with slides, 1980s

C149   "ICL 1900 series. Introduction to computer systems", 1966

C150   "ICL 1900 series. Communications 1900 series. Manager", 1974

C151   "ICL 1900 series. Communications peripherals", 1976

C152   "ICL 1900 series. 7071 and 7072 teletypewriters. Operating", 1971

C153   "ICL Converting 1900 series Cobol jobs to 2900 VME", and "Cobol 1900 series source program conversion to Cobol 2900", 1982

C154   "ICT 1901. Introductory manual", 1965

C155   "ICL. Operating 1900 series peripherals. The line printer Model 1933 and similar units", 1972

C156   "ICL. Update", issues 100-158, September 1983-23 November 1984

C157   "ICL. Update", issues 159-196, November 1984-September 1985

C158   "ICL. Update", issues 199-252, September 1985-October 1986

C159   "ICL. Update", issues 253-301, November 1986-November 1987

C160   "ICL. Update", issues 302-333, November 1987-June 1988

C161   "ICL. Update", issues 334-357, July 1988-December 1988

C162   "ICL. 9500 information sheets", 1979-1980

C163   "ICL. System 25", ring binder, 1986

C164   "ICL. DRS 8801 service manual" and "Engineering software documentation", 1981?

C165   "ICL. DRS20. Distributed Resource System. Introduction to models 16,30", 1982

C166   "ICL. DRS20. Model 30 user guide", ring binder, 1982

C167   "ICL. Computer Education in Schools and Project ACINAB - A Computer is Not a Brain", ring binder with photographs, 1969-1970

C168   "ICL. Computer Education in Schools. Information retrieval in schools. Teachers' guide", 1976

C169   "ICL. Computer Education in Schools. 1. The fundamentals of computing", 1969

C170   "ICL. Computer Education in Schools. Computer studies. Worksheets 1", 1981

C171   "ICL. Computer Education in Schools. Computer studies. Teachers' guide. Book 1", 1980

C172   "ICL. Computer Education in Schools. Computer studies. Teachers' guide. Book 2", 1982

C173   "ICL. Computer Education in Schools. Computer studies. Teachers' guide. Book 3", 1977

C174   "ICL. Computer Education in Schools. Computer studies. Further questions. Book 1", 1980

C175   "ICL. 7500 series", 1977?

C176   "ICL. 7502 series", 1977

C177   "ICL. 7502 counter terminal system", undated

C178   "ICL. 7500 series info sheets" and "7700 info. processor engineer's handbook", 1979

C179   "ICL. 7500 series. 2412 servo line printer & coupler", 1973

C180   "ICL Company Announcements", 1-200, July 1968-February 1972

C181   "ICL Company Announcements", 201-400, February 1972- September 1976

C182   "ICL Company Announcements", 401-600, September 1976- November 1980

C183	"ICL Company Announcements", 601-786, December 1980-June 1984
C184	"ICL (UK) Ltd Announcements", 93-304, May 1984-May 1991
C185	"ICL Company Announcements", for display on company noticeboards, 1987-1991
C186	"ICL One Per Desk. Handbook", 1984
C187	"ICL (UK) Product Notices", 1-150, 1984-1985
C188	"ICL (UK) Product Notices", 151-300, 1985-1986
C189	"ICL (UK) Product Notices", 301-450, 1986-1987
C190	"ICL (UK) Product Notices", 451-550, 1987
C191	"ICL (UK) Product Notices", 551-650, 1987
C192	"ICL (UK) Product Notices", 651-800, 1987-1988
C193	"ICL (UK) Product Notices", 801-931, 1988
C194	"ICL 2950 2956. P/L. DR/N. 345 and 353", 1979?
C195	"ICL 2900. Salesman's Guide", undated
C196	"ICL. DRS20. Distributed Resource System. System Description Manual", 1984
C197	"ICL. DRS20. Distributed Resource System. 8085 Assembler programmer reference manual", 1982
C198	"ICT Price Manual", ring binder, 1963
C199	"ICT Price Manual", ring binder, 1967-1968
C200	"ICL. 2900. Marketing guide", 1980
C201	"ICL Comms hardware guide", ring binder, 1983
C202	"ICL Machine Information/Description Index (MIDI)", 1982
C203	"ICL. Marketing Manufacturing Translation File (MMTF)", 1984
C204	"ICT. 1004 data processor", 3 manuals, 1964
C205	"ICL. Basic management course. Beaumont", 1974
C206	"ICL. UKD manpower reduction exercises", ring binder, 1980- 1985
C207	"ICL. Pizza Hut information", 1987
C208	"ICL. Customer Engineering Training. F023:7400 magnetic tape units. Training handout", 1980
C209	"ICL. Thinking as a programmer: basic principles of flowcharting", 1971
C210	"ICL. 2900. Customer engineering audio tape training. E038: Line Printers LP 13/14/15", 2 manuals, 1977
C211	Three ICL manuals that belonged to J. Rietiker, 1973
C212	"Engineers EPOS. Fault finding and command guide for Marks and Spencer", by P. Briscoll, 1987
C213	"ICT. Engineering standards. Section 1. Drawing and design. Volume 2", ring binder, 1961-1963
C214	"ICT. Field engineering manual. Tabulator Type 902", ring binder, 1955-1960
C215	"ICT 1200 series computers. Standard programs and sub- routines. Volume 1", 1961
C216	"Hollerith. Field engineering manual. Computer machine Type 1202. Volume 1", 1958

C217 "Hollerith. Field engineering manual. Computer machine Type 1202. Volume 2", 1958

C218 "ICL 1900 series. FORTRAN: 32K/48K Disc Compilers", 1972

C219 "ICL 1900 series. FORTRAN: 16K Disc Compiler", 1971

C220 "ICL 1900 series. Fortran", 1971

C221 "ICL 1900 series. COBOL compilers", 1976

C222 "ICL 1900 series. COBOL compilers", 1970

C223 "ICL 1900 series. Compiling systems", 1971

C224 "ICL. Product notices & descriptions. Sun graphics range", 1987-1988

C225 "ICL 2966", 1980

C226 "ICL. Glossary of computer terms & Data and Tables", 1981

C227 "Hollerith. Field engineering manual. Punches and verifiers. Machine Types 1-199", ring binder, 1957

C228 "ICT. Field engineering manual. Types 203 and 208. Reproducers", ring binder, 1963

C229 "ICT. Field engineering manual. Types 203 and 208. Reproducers", ring binder, 1963

C230 "ICL. OEM. Desk top card reader", with photographs, 1972

C231 "ICL. Management information systems. Software application systems", 1983

C232 "ICL. Field store manning level", by G.J. Foley, 1984

C233 "ICL. Review of field stores organisation", by P-E Consulting Group, 1982

C234 "ICL. Germany strategic review. 1982/3", 1982

C235 "ICL. Marketing Manufacturing Translation File (MMTF). Juen 1982. Oct. 1983. April 1985", 1982-1985

C236 "ICL. DRS 8800. Course notes. Forms design. Wordskil", ring binder, 1982

C237 "ICT 1500 computer. Standard programs and software library procedures", ring binder, 1964-1965

C238 "ICT 1900 series. Introductory manual", ring binder, undated

C239 "ICT. Control and simulation manual. Part 2 1900 CSL", ring binder, 1966

C240 "ICT. Price manual. Descriptive section", undated

C241 "ICT. Sales handbook", 1966

C242 "ICT. Sales manual", ring binder, 1963

C243 ICT. Ring-bound plastic sheets with engineering information, undated

C244 "ICT 1900 series. Introductory manual", 1964

C245 "ICL 1900 series. Data communications and interrogation", 1968

C246 "ICL 1900 series. Magnetic tape sorting", 1968

C247 "ICL 1900 series. FIND", 1967

C248 "ICL 1900 series. FIND-2 single enquiry system", 1969

C249 "ICL 1900 series. FIND-2 multiple enquiry system", 1969

C250 "ICL 1900 series. Central processors", 1968

C251 "ICL 1900 series. Basic peripherals", 1976

C252 "ICL. CLAN. Sales Guide" and "ICL. CLAN. Systems appreciation", and "ICL. Departmental systems. Working better together", 1987

C253 "ICT. Software aspects of computer series design", 1968

C254 "ICT. 1500 programming notices", ring binder, 1964-1966

C255 "ICL. D001: Data communications introduction training handout", 1969

C256 "BTM. Reminders for Hollerith operators", ring binder, includes handwritten notes, issued to Miss McClymont of ESA Ltd, 1950s?

C257 "BTM. Type 541 multiplier. Type 542 multiplier. Type 550 calculator", 1956-1958

C258 "BTM 413 wire interpreter", 1955

C259 "ICL 1900 series. Programmers reference manual", 1969

C260 "ICL. 2900 overviews", many individual files, 1979

C261 "ICL. Essential features of 2900 hardware", 1975

C262 "ICT 1900 series. Programmed text. Book one", 1964

C263 "ICL. Introduction to computer systems", 1969

C264 "ICL. Logic diagrams", annotated (includes drawing of an "IBM spy", 1972?

C265 "ICL. C001 System 4 peripherals introduction. Training Hand- Out", 1969

C266 "ICL 9500. Service manual volume 1. POS terminal", 1978

C267 "ICL 9500. Operator instructions. POS terminal", 1978

C268 "ICL. Engineers guide to the Hammicks POS system", 1985

C269 "ICL. D013: protocol ICLC03. Training handout", 1973

C270 "ICT Program specification system", 1965

C271 "ICL. 2903 range. Marketing guide", undated, 1980s

C272 "ICL. Integrated management information services. Program specifications", ring binder, 1 of 2, 1968

C273 "ICT 1900 series. Operator's reference manual of peripherals", 1967

C274 "ICT 1900 series. Installation details. 1902 and 1903", includes technical drawings, undated

C275 "ICT 1900 series. Installation details. 1904, 1905 and 1909", undated

C276 "ICL. Introduction to computer systems", 1969

C277 "ICL 1900 hardware guide", 1978

C278 "ICT. Installation details of ICT 1900 computer system", ring binder, 1964

C279 "ICL 2900 series. Catalogue sheets", many individual files, 1980

C280 "ICT data processing. Department guides. 1960-1965", issued by Sales Services, 1960-1965

C281 "ICL House style, 1980", 1980

C282 "ICT. Quality assurance procedure manual", ring binder, 1969?

C283 "ICL. Using WORDSKIL", 1979

C284 "ICL customer services. Care of your small business system, the environmental needs", 1982

C285 "ICL system 25 plus +. Your formula for success", 1985

C286 "ICL. Technical publications list", 1987

C287 "ICL. Sales development and training. OP training course", includes handwritten notes, 1987

C288 "ICL departmental systems. CLAN 5. CLAN 6. CLAN 7. Getting ready for CLAN 5, CLAN 6 or CAN 7", 1987

C289 "ICL CLAN. Sales guide", 1984

C290 "ICL Office Systems. Executive action. Introduction", 1984

C291 "ICL Software. Personnel 20. User guide" and "ICL Software. Personnel 20. Absence recording", 1984

C292 "ICL. VME 2900. Using ADRAM", 1982

C293 "ICL DRS20. Distributed resource system. Planner 20", 1984

C294 "ICL DRS20. Distributed resource system. Sourcewriter 20", 1984

C295 "ICL VME. IDMS Part 3: using a database", 1984

C296 "ICL VME 2900. Message text handling", 1982

C297 "ICL VME. IDMS Part 2: database establishment", 1984

C298 "ICL DRS20. Distributed resource system. Systems implementation", 1983

C299 "ICL DRS20. Distributed resource system. N mode utilities reference manual", 1983

C300 "ICL DRS20. Distributed resource system. Implementing CP/M", 1983

C301 "ICL. GIS standards and utilities", ring binder, 1986

C302 "ICL Application development product line. ICL-Pascal: language", 1983

C303 "ICL INDEPOL. Reference manual. Volume III: using an INDEPOL based system", 1986

C304 "ICL INDEPOL. Reference manual. Volume I: system building", 1986

C305 "ICL. Application development product line. ALGOL(E): language", 1981

C306 "ICL. Application development product line. Relational cafs interface. User guide (RCI.100)", 1984

C307 "ICL. Application development product line. Data dictionary system. Describing COBOL files and data using DDS.700", 1984

C308 "ICL. Application development product line. Algol. Using the ALGOL(E) compiler", 1984

C309 "ICL. Application development product line. BASIC", 1984

C310 "ICL. Application development product line. Algol. Using the ALGOL 68 compiler", 1984

C311 "ICL. VME. IDMS Part 4: database programming", 1984

C312 "ICL. VME. IDMS Part 5: database design", 1984

C313 "ICL. DRS20. Distributed resource system. Implementing CP/M", 1984

C314 "ICL. DRS20. Distributed resource system. Model 40 diskette system. Operator reference manual" and "Service manual Volume 1", 1982

C315 "ICL (UK) Ltd. Market introduction bulletin. August 1984 (No. MIB/1) to July 1987 (no. 130)", 1984-1987

C316 "ICT. Company instructions manual", 1965-1966

C317 "ICL. DRS20. Distributed resource system. DRS20 user guide" and "Introduction to Models 10, 40, 50" and "Expansion cabinet. Service manual volume 1", 1983

C318 "ICL. One Per Desk. BASIC", 1984

C319 "ICL. One Per Desk. Guide to online public databases", 1986

C320 "ICL. One Per Desk. Into action", 1986

C321 "ICL. One Per Desk. Thermal printer", 1985

C322 "ICL. VME. Batch recovery techniques", 1984

C323 "ICL. Manufacturing Market Sector. Selling in the Office Environment. Session papers", 1987

C324 "ICL. Logistix for management support: workshop", 1987

C325 "ICL. VME 2900. Planning and designing a transaction processing service" 1982 and "ICL. VME/B 2900. Planning a transaction processing system", 1976

C326 "ICL. Implementing a transaction processing system (TPMS305)", 1982

C327 "ICL Consumer Attitudes 1984", includes "ICL tracking study. Report on Stage IV. December 1984" and "Report on consumer attitudes to ICL corporate image and advertising" by Independent Appraisers, 1984

C328 "An organisation analysis at ICL Dataskil", by Stephen Opalka, submitted for a Diploma in Management Studies, Slough College of Higher Education, 1976

C329 "ICL. Company strategy papers. Publicity/advertising", 1983- 1984

C330 "ICL Customer Engineering Services Organisation/Customer Engineering Division announcements", 1969-1974

C331 "ICL. Technical publications. Listing", 1960-1985

C332 "ICL. Technical publications list", ring binder, 1987

C333 "ICL. Personal computer. Reference manual", 1982-1984

C334 "ICL Forum. Taking the micro to the limits", 1985, and "Microcomputers: a 1987 industry update", 1987, illustrations for presentations,

C335 "ICL. Training manual. Integrated Management Information Systems (IMIS). Program specifications. 2 of 2", 1968-1969

C336 "ICL. Software collaboration procedures", 1983

C337 "ICL. Configurer. UK integration phase 1. System specification", 1987

C338 "Personal Computers Business Centre. DRS PWS applications database", by Sue Elliott (PCBC), 1988

C339 "ICL. Quickbuild. User guide", 1986

C340 "ICL ME29. TME dump reference guide", 1983

C341 "ICL. Marketing Manufacturing Translation File (MMTF). Volume 7. Group Trading Set", 1987

C342 "ICL. Operating 1900 series peripherals. The magnetic tape units. Models 1972/3 (variant 2) 2504/5/6/7", 1972

C343 "ICL. Medium systems hardware guide (2900 series)", 1982

C344 "ICL 2900. Marketing guide. 1980", 1980

C345 "ICL. Student course guide. Operations and programming. 6- K11-00-500-1", undated

C346 "ICL. Disc memory unit. Burroughs D3", 1973

C347 "ICL. Machine Information Description Index (MIDI). Volume 6. Group Trading Set", 1987

C348 "ICL PERQ. Confidence tests", 1984

C349 "ICL. Company announcements. June 1984-December 1986. Nos 84/1 (787) to 86/59", 1984-1986

C350 "ICL (UK) Ltd. Competitive Marketing Bulletin. March 1985- May 1989", 1985-1989

C351   "ICT. Field Engineering. Letchworth. Training programme 1959-67" and "Basic electricity training", 1959-1967

C352   "ICT. Card and paper tape punching codes and keyboards", 1967

C353   "ICL. Card and paper tape punching codes and keyboards", 1967

C354   "Get the most out of ICL Customer Services", 1980s?

C355   "ICL Information Guide. A focus on opportunity. October 1983", 1983

C356   "ICL DRS20. Sales handbook", 1983

C357   "ICL. Catalogue of software", 1984

C358   "ICT 1900 series. Programmed text. Book one", ring binder, 1964

C359   "ICL. The professional's handbook", ring binder of plastic cards, 1980s

C360   "ICL. Customer Engineering Service. Employee's reference book", small ring binder, 1979

C361   "ICT. Engineers reference book", small ring binder, 1963

C362   "ICL. MP/MII. Introductory training package", binder with two audio cassettes (two also missing?), undated

C363   "ICL Office Systems. VMEMAIL. VMEMAIL users handbook", 1987

C364   "ICL VMEMAIL. Reminder card. For users of the ICL DRS 8800", 1987

C365   Putney Bridge Approach 1-7 (produced by ICD 2900 technical support), 1977-1978

C366   Putney Bridge Approach 8-12, 1978

C367   Putney Bridge Approach 13-16, 1978-1979

C368   Putney Bridge Approach 17-19, 1979

C369   Putney Bridge Approach 20-22, 1979-1980

C370   Putney Bridge Approach 23-28, 1980

C371   Putney Bridge Approach 29-32, 1981

C372   Putney Bridge Approach 33-38, 1981-1982

C373   Putney Bridge Approach 39-42, 1982

C374   Putney Bridge Approach 43-47, 1983-1984

C375   "ICL. Finance Manual. Volume 1. Sections 1-7", 1977

C376   "ICL. Finance Manual. Volume 2. Sections 8-14", 1977

C377   "ICL. Code of Accounts. User guidelines", 1979

C378   ICL, includes "Expenditure Guidelines 1985", "Operations control 1986", "GSS pay review 1986", "Budget guidelines 1986/7", "Finance aims and objectives 1986/7", "Budeting procedure 1989", "Accounts forecasting 1989", ring binder 1985- 1989

C379   "ICL. Finance courses", 1969-1984

C380   ICL, "STC Account Plan. 1985", 1985

C381   "ICL. Marketing Bulletin", 290-337, 1986-1988

C382   "ICL. DRS 300. Concurrent DOS Reference", 1986

C383   "ICL User Training. Strategic Systems. Proposals and Contracts. Levels 1 and 2", by Management Services ICL (UK) Ltd, 1987

C384   "ICL. Traderpoint commission agreement manual. Administrative systems and procedures", 1982

C385 "ICL. Traderpoint handbook", 1983

C386 "ICL. Office automation guidelines", 1985

C387 "ICL (UK) Ltd. Strategic computer systems", 1985

C388 "ICL. Quickbuild. Sales guide", 1983

C389 "ICL. Company instructions", for posting on company noticeboards, 1-61, 1968-1972

C390 "ICL. UKD annoucements. Head Office notices. WMG organisation notices. Logistics division announcements", 1979- 1983

C391 "ICL. VME. The Personal Data System (100 level)" and "ICL. VME. Running PDS in VME", 1983

C392 "ICL. European Division. DRS European Forum. Amsterdam. 27- 29 June 1984", 1984

C393 "ICL. Information Director. Index Part III", 1970

C394 "ICL. Series 1500. Field engineering diagnostic manual", 1977

C395 "ICL. 1500 series", training manuals, 1974

C396 "ICL. 1500 series", training manuals, 1974

C397 "ICL. 1500 series", training manuals, 1974

C398 "ICL. Personal Computer", 3 manuals, ring binder, 1982

C399 "ICL. UKD Order entry. Specs.", 1984

C400 "ICL. UKD Plan. 1983/4. Includes product descriptions", 1983

C401 "ICL. Industrial and Commercial Division. Personnel handbook", 1976

C402 "ICL. Directory. United Kingdom. Overseas. Internal", 1973- 1974

C403 "ICL. ICL Training. Guide to management accounts in UKD", 1980

C404 "ICL. United Kingdom Division. Price manual. Hardware and Services", 1989

C405 "ICL. Accounting code manual and Location code manual", 1983

C406 "ICL. Accounting code manual", 1970-1972

C407 "ICL. Information sheets", 1975-1980

C408 ICL, "Customer Engineering Division. Service plan resource and expenditure evaluation (SPREE)", 1976

C409 "ICL. Open Ways Networks sales guide", 1988

C410 "ICL. Consultancy and Training Services. DRS", various manuals and handwritten notes, 1983-1984

C411 "ICL. DRS", manuals, computer disks, Information Sheets, and handwritten notes, 1982-1983

C412 "ICL. Service guide. ME29", undated (1980s)

C413 "ICL. Service guide. 9505/9507", undated (1980s)

C414 "ICL. Service guide. Personal computer", 1983

C415 "ICL. Service guide. DRS Wordskil 8800", undated (1980s)

C416 "ICL. Personal Computer. Running MS-DOS applications on your ICL Personal Computer", 1984

C417 "ICL. Personal Computer. Models 16 and 36 user guide", 1984

C418 ICL, 7500 disks, undated (1970s)

NAHC/IMP

IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY

Collection comprises one box of archival material.

D1   K D Tocher, "Report on the Work of the Computer Group", Mathematics Department, October 1952. (3 copies).

D2   "Proposed Code for ICCE II", Department of Mathematics, 1952e.

D3   S Michaelson and D G Burnett-Hall, "The Manchester Mercury Autocode System, No.5: A Glossary of Terms and Formulae", Issue 2, October 1959.

NAHC/LEO

LEO COMPUTERS

Collaborations between J Lyons & Company, a British catering company with strong interests in new office management techniques, and the University of Cambridge led to the production of a series of important computers, called LEO -- Lyons Electronic Office. LEO, operational in 1951, ran 'the world's first regular routine office computer job'. LEO Computers Ltd was formed in 1954 with Anthony Salmon, J R M Simmons and T R Thompson as directors. The company installed LEO computers in many British offices, including Ford Motor Company and the 'clerical factory' of the Ministry of Pensions at Newcastle. LEO Computers Ltd merged with the computer interests of English Electric in 1963 to form English Electric LEO. Subsequent mergers eventually found LEO incorporated into ICL in 1968.

References: Peter Bird, *LEO, the First Business Computer*, Hasler, 1994; David Caminer, John Aris, Peter Hermon and Frank Land, *The World's First Business Computer: User-Driven Innovation*, London: McGraw-Hill, 1996; John Hendry, 'The teashop computer manufacturer: J. Lyons, LEO and the potential and limits of high-tech diversification', *Business History* (1987) 29, pp73-102

Other collections: J R M Simmons' papers are held at the Modern Records Centre, Warwick University, listing in NAHC. Records relating to J Lyons & Co are kept at the London Metropolitan Archives, 40 Northampton Row, London, EC1R 0HB. Accession number 3527.

Provenance: John Pinkerton (C1-C13, and C52-97); Peter Bird (A9, B1-B14, C98-C195); John Aris, Peter Byford, Gordon Foulger, A.L. Jacobs, G. Parry, Phil Andrews, Ann Sayce, Gordon Foulgar, Mike Hancock. Much of the collection was made available through the generous assistance of the Leo Computers Society, whose website is at <www.leo-computers.org.uk/>.

NAHC/LEO/A Historical

A1 Diary by John Aris of a visit to the USA with John and Muriel Simmons and A.K. "George" Robey of J. Lyons, 1963

A2 Contributions submitted for the book User-Driven Innovation but not used in it, various authors, 1990s

A3 "Summary of visits made by D.T. Caminer and J.M.M. Pinkerton during visit to USA", March/April 1958

A4 "LEO chronicle, supplement 1955-1961", includes letter to John Aris from "Tommy", 1975

A5 Peter Bird, "LEO - the pride of Lyons", British Journal of Administrative Management, 1990-1991

A6 File, containing British Journal of Administrative Management 75th Anniversary Issue (includes O&M and Simmons) November 1991, "Simmons, the visionary", British Journal of Administrative Management April 1991, and "Conversation: J.M.M. Pinkerton", Annals of the History of Computing 5(1), January 1983

A7 "LEO Computers", a draft historical account based on interviews with Salmon, Simmons and Stevens and published work, by D.J. Richardson, 1974

A8 "LEO Chronicle", a listing of important events 1947-1961

A9 Correspondence between Peter Bird and various LEO people and LEO users, collected in preparation of LEO: The First Business Computer: Leo Fantl, B.V.J. Healey, John Hall, T. Carroll, Peter Roddam, A.M. Morgan, Peter Dick, R.S. Logan (Ravenscraig steel), Ing. Josef Prerost and Jiri Petru (Nova Hut, Czechoslovakia), H.I.A. Archibald (British Steel, Teesside), Robert Bender (Tubemakers, Australia), Michael Miller (British Telecom, re T.H. Flowers, includes copy of Flowers' paper on history electronic switching and exchanges), A.J. Smith (British Telecom), Malcolm O'Neill (British Telecom), Peter Lain (Shell, Australia), Bryan

Clark (Shell UK), E.J. Ferrier (rayon), Ministry of Defence (re computers at the four dockyards; Rosyth, Portsmouth, Devonport, Chatham), M.J. Wood (Meteorological Office. Includes article by Mavis Hinds on history of Met Office computerisation), Colin Boast (DHSS, Newcastle), Customs & Excise, W. Mack (Royal Bank of Scotland), F. Hardy and Peter Murton (Colonial Mutual), Allan Thompson (Renold), H.A. Gracie (Coventry Gauge), M.A. Clversley (Wayne Kerr), Ilford Ltd, Smiths Industries, Ford Motor Company Ltd, David Sadler (ICL), A. Clark (Sun Alliance), Sysop Ltd, Troy Systems Ltd, Freemans Ltd, Courtaulds, Julian Edwards (Dataflow Corporation Ltd), Michael Pinches (ex-Ministry of Pensions and National Insurance), Robin Jackson (ex-British Oxygen), David Edwards (ex-RAF), R.S. Goble (Lucas), R.J. Harman (Kodak), Elwyn Rees (ex-W.D. and H.O. Wills).

NAHC/LEO/B Correspondence

B1   File, Company Secretary's Office correspondence, 1956-1958

B2   File, Company Secretary's Office correspondence, 1958-1960

B3   File, Company Secretary's Office correspondence, 1959-1960

B4   File, Company Secretary's Office correspondence, 1960

B5   File, Company Secretary's Office correspondence, 1960-1961

B6   File, Company Secretary's Office correspondence, 1961

B7   File, Company Secretary's Office correspondence, 1961-1962

B8   File, Company Secretary's Office correspondence, 1962-1963

B9   File, Company Secretary's Office correspondence, 1963

B10   File, Company Secretary's Office correspondence, 1963-1965

B11   File, 'Leo patents', 1950-1961

B12   File, 'Leo patents', 1961-1991 (mostly 1961-1965)

B13   File, 'LEO Computers Ltd. Finance', 1959-1963

B14   File, 'International Computers Ltd.', 1965-1975 (probably a continuation of the series B1-B10)

B15   File, 'Lyons Computer Services Limited', 1970-1972

B16   File, 'Lyons Computer Services Limited', 1972-1974

B17   File, 'Computers - computer courses (general information)', (in fact, mostly a proposal from Structural Communication Systems Limited), 1970-1972

B18   Copy of collection of Ernest Lenaerts papers. Copy was made for Peter Bird in 1992. Includes correspondence from Lenaerts secondment to Cambridge during construction of EDSAC, 1940s-1960s

B19   Copies of important and miscellaneous correspondence, collected by Peter Bird. Includes: correspondence leading to merger with English Electric, first suggestion to name the computer project LEO (1949), visit by Lord Halsbury (1950), memorandum from Simmons to Major Montague Gluckstein re demonstration of "calculator" (1951), report by Thompson to Gluckstein (1952), future policy for LEO (1953), LEO Report on budget and profits (1955), agreement between Lyons and Imperial Tobacco Company for LEO (1956), John Pinkerton's job application letter (1948), closing down of LEO I and offer to the Science Museum, Lyons office mechanisation in the 1920s, and much else. 1920s-1990s

NAHC/LEO/C Reports, Working Papers, etc

Note: many of the files donated by John Pinkerton contain correspondence.

C1   File, Programming general. From 1950 to 1960, including LEO I and II

C2   File, Programming general. From May 1960 to December 1961, LEO III

C3   File, Programming. From January 1962

C4   File, Programming (CLEO). From February 1961 to June 1962

C5   File, CLEO. From July 1962

C6   File, LEO III programming. From September 1963 to July 1964

C7   File, Programming. February 1965 to August 1968. Includes RRE Memorandum, 'Networks for real time programming', by C.S.E. Phillips, April 1966

C8   File, Microprogramming. From January 1960 to September 1962

C9   File, Microprogramming. From October 1962

C10   File, Microprogramming for LEO III/F. From 1962 to 1964

C11   File, Microprogramming. Part IV. July 1970 to 1980

C12   File, Storage Part I. 1965-1969

C13   File, Storage Part II. 1969-1977

C14   "LEO III users' manual. Volume I. Computer facilities', June 1963

C15   "LEO III users' manual. Volume II. The CLEO programming system', November 1963

C16   "LEO III users' manual. Volume III. Intercode specification and intercode translater', September 1961

C17   "LEO III users' manual. Volume III. Intercode specification and intercode translater', from Peter Byford, April 1963

C18   File containing LEO III programming course notes, handwritten and printed, from Peter Byford, 1961

C19   File, LEO III programming course additions and handwritten notes, from Peter Byford, 1961

C20   "LEO management manual", 1961

C21   "LEO Computers Ltd. January 1961. Training course for programmers and operators", syllabus. Also includes a LEO coding sheet, and photocopies of circuit diagrams, 1961

C22   "LEO III training courses", from Gordon Foulger, 1963

C23   "LEO. Courtaulds Limited: stock register specification", draft, from Peter Byford, undated

C24   "LEO Computers Ltd. Esso Petroleum Co. Ltd. Sales procedures. Job plan volume 3", from A.L. Jacobs, July 1958

C25   "LEO Computers Ltd. E58 Greenwich Metropolitan Borough Council. Specification for payroll", from A.L. Jacobs, January 1958. Also includes: "Programme for visit of Metropolitan Mayors and press", 23 July 1958, and "Quis" (2 copies), undated

C26   "LEO Computers Ltd. Scottish Gas Board. Credit billing. Outline job plan", from A.L. Jacobs, February 1959

C27   File containing various LEO II manuals, etc. Including "LEO II schedule of registers, order code and order times", 1958, "Magnetic tape arrangements on LEO II", 1958, "LEO II control desk", and "LEO I synthesis orders", from A.L. Jabobs, 1958-1959

C28   "Office management manual", from J.M.M. Pinkerton, June 1946. Also includes: "Clerical organisation", January 1951, and "Clerical Department. J. Lyons & Co", February 1955 (a list and tree of names and positions in firm)

C29   "LEO 326", from Phil Andrews, includes action times and circuit diagrams, 1960s

C30   "LEO 326", from Phil Andrews, includes action times and circuit diagrams, 1960s

C31   File, collection of papers from Gordon Foulgar re GPO telephone billing using a LEO computer. Includes: some correspndence, LEO III computer code summary, EELM particulars of employment, billing punched cards, LEO computers staff handbook (1962), intercode data vet program for first stage of telephone billing, and notebook, 1962-1968

C32   Papers concerning Shell-Mex and BP's computer evaluation in 1960, from Mike Hancock, 1960

C33   Papers concerning the Royal Navy Dockyards computers (with Autolector), includes many examples work cards and forms

C34   Note, "Form and layout of computer code instructions and table entries in the store", for LEO III, 1960s

C35   "Working with the computer", by D.G. Blagbrough (Deputy Chief Accountant South Western Gas Board), about use of LEO III, 1965

C36   "LEO Computers Ltd. LEO III conversion course. No 2", 1962

C37   File of brochures: "LEO: a computer in the service of the steel industry. Stewarts and Lloyds Ltd, Corby, Northants", "EELM. Myriad. A micro-integrated computer", "LEO III data processing system", "Openings in LEO Computers Ltd", also: map of Hartree House Second Floor, 1960s

C38   Scrapbook made from issue of The Manager, February 1954, includes many news clippings re LEO, 1954-1965

C39   File of brochures: "LEO", "EELM. CLEO automatic programming language", "Openings in LEO Computers limited", "A few facts about LEO III", "EELM. Computer Bureau Service. Stockbrokers' accounting", 1960s

C40   "English Electric visit to LEO", 1963

C41   File, includes: two Handbooks for staff of LEO Computers Ltd (1959 and 1962), brochure about pension fund, brochure about the Lyons Club (sports), LEO Automatic Office brochures ('Output printers' and 'Auxiliary storage'), leaflet 'KDF 9 and sales accounting: an English Electric LEO demonstration', brochure 'LEO family: data processing systems'. Reprint from Data Processing on LEO 326 and LEO 360 (1964), two brochures on LEO III: 'The LEO III magnetic tape system' and 'The operational control of LEO III. The Control Desk', 1960s

C42   "ICT. Field engineering manual. Samastronic independent print head for LEO computer. Maintenance information', 1960s

C43   "LEO II programming course", June 1961

C44   "LEO III advanced programming course No 7", from Peter Byford, 1962

C45   Various LEO III coding sheets, some filled in. Also some hand-drawn programming flow diagrams, originally in large unmarked orange folder, 1960s

C46   Program print-out, "31314 Am 19916 -> 19917", from Peter Byford, 1960s

C47   "Intercode programmer's training manual" for LEO III, from Jennifer Williams née Webster, 1966

C48   "LEO III. Engineer's fault records", 1969

C49   "LEO III Engineers course", 1969

C50   LEO engineering drawings of circuits, etc, 1960s

C51 Collection of large (larger than A3 size) engineering drawings of LEO III computer design, 1960s

C52 Loose-leaf book, "Office management manual. Comptroller's department", from J.M.M. Pinkerton, 1960s

C53 'LEO III. Schedule of operators' controls and indicators', March 1961

C54 'LEO III. Schedule of operators' controls and indicators', April 1961

C55 'LEO III. Schedule of operators' controls and indicators', April 1962

C56 'LEO consultants course', 1962

C57 'Staffing a LEO III computer installation', 1961

C58 'Computer development arithmetic and control units and order code', with some handwritten notes, 1959

C59 'LEO computers', prepared by S.H. Benson Ltd's Marketing Department, November 1959

C60 'The LEOmatic office', 1950s?

C61 'Outline description of LEO III computers', September 1959

C62 'Introducing LEO III', undated

C63 'Introducing LEO III', undated (but later than C62)

C64 'LEO III user's manual. Software release notice no. 6', amendments to LEO user's manual, 1969

C65 'LEO III master routine. Draft specification', 1961

C66 'LEO facilities manual', 1961

C67 'Data receipt and despatch', 1962

C68 'LSP 22. Systems specifications', for LEO III, 1960s

C69 File, 'LEO II. Policy and general', 1955-1960

C70 File, 'LEO II. Technical general', 1952-1960

C71 File, 'Store (LEO II)', 1952-1963

C72 File, 'Re: lecture to Bedford BCS on 5th October 1971', 1971

C73 File, 'Reprints', 1954-1960

C74 File, 'LEO film', 1957-1961

C75 File, 'C.D. Pilot Computer', early LEO III, 1958-1960

C76 File, 'G1 Policy', early LEO III, 1958-1962

C77 File, 'Policy (LEO III)', 1962-1965

C78 File, 'G11. Store access unit', 1959-1961

C79 File, 'F4. Arithmetic unit', 1958-1960

C80 File, 'F4. Arithmetic unit', 1961-1965

C81 File, 'G5. Racks and cabinets', 1958-1963

C82 File, 'LEO 300', 1963

C83 File, 'F2. LEO III/F', 1961-1965

C84 File, information about LEO III operating system developed in South Africa by LEO Computer Bureau, 1960s

C85   File, 'F3. LEO/IV', 1961-1963

C86   File, 'KLX. Part I', on Project X, 1962-1963

C87   File, 'Project X. Part II', 1963

C88   File, 'KLX system design', 1964

C89   File, 'KLX general', 1964

C90   File, 'KLX programming file', 1964

C91   File, 'Project D 90', 1963-1964

C92   File, 'Character and word organised machines', 1963

C93   File, 'Future systems', about a possible System 5, 1966

C94   File, 'Summary of visits made by D.T. Caminer and J.M.M. Pinkerton during visit to USA. March/April 1958', 1958

C95   File, 'American diary', 1963-1964

C96   EEL, "Report and recommendations following visit to RCA. November/December 1964", 1964

C97   File, 'GPO', 1956-1968

C98   File, 'L.4. Tea blending control. Job requirements', 1956

C99   Booklet, 'ARDOC. A plain language guide', by Richard Harris (ARDOC - Alpine Refrigerated Deliveries Operations Control', 1965

C100   'Lyons bakeries and staff payroll. Reprint of job specification', 1959

C101   'Standard sales ledger. Computer job plan. Specimens', undated (1971?)

C102   'LEO Computers Ltd. Kodak Limited - Payroll. Job requirements statement', 1956

C103   'Standard purchase accounting system. Feasibility report', undated

C104   'Computer job plan. Henry Telfer Ltd. Sales statistics', 1968

C105   'LEO III. Bakery rounds records', 1963

C106   'LEO III', undated (1960s)

C107   'Schedule of operators controls and indicators', 1962

C108   'Main index - volume 2', LEO II Technical Manual, 1960

C109   'L14. Lyons teashops payroll. Job plan', 1958

C110   'LEO III. Schedule of operators' controls and indicators', 1961

C111   'Wages office. LEO payroll othodox procedure', undated

C112   'LEO II Technical Manual. Main index - volume 4', 1957

C113   Untitled. Arithmetic using LEO II, 1958

C114   'LEO job plan. Caterers' tea. Invoice, sales ledgers and sales statistics', 1959

C115   'L2 teashops orders. Job specification', undated

C116   'L4 tea blending control. Job specification', undated

C117   'L5 A&D. Job specification', undated

C118   'L5 wholesale bakery invoicing and sales statistics. Data and results specimens. Volume II. L5B and L5C programmes', undated

C119   'L2 teashops orders. Job specification', undated

C120 'J. Lyons and Vo. Ltd. Teashops payroll. L14Y end of year programme', undated

C121 'L14 Lyons teashops payroll. Job plan', 1958

C122 'L5 A&D. Data and results specimens', 1958

C123 'L5 A&D. Job specification', undated

C124 'L14 J. Lyons & Company Ltd. Teashops. Payroll specification', 1958

C125 'LEO II Technical Manual. Main index - volume 3', 1960

C126 'English Electric-LEO Ltd. Specification of the LEO/Parnall document reader', 1963

C127 'EELM. LEO. On-line controllers manual', (LEO III), undated

C128 'EELM. LEO III. Users manual. Volume 2: CLEO programming system', 1965

C129 'LEO I. Diagrams', block circuit diagrams in file, undated (1950s)

C130 'The layman's guide to LEO', undated (1950s)

C131 'L4 tea blending control emergency system' (photocopy), 1955

C132 'L4. Tea blending' (photocopy), 1954

C133 'L1 payroll. Job specification' (photocopy, with original diagram), undated (1950s)

C134 Photocopies of reports of visits to the United States. 1) 'Extract from the business diary of the American trip', 1925 (office machinery). 2) Report of Thompson and Barnes, 1955

C135 'Report on a visit by Mr Booth and others to Cambridge, 11.11.47' (photocopy), on EDSAC, 1947

C136 'Development of the electronic calculating machine' (photocopy), second report on Cambridge EDSAC, 1949

C137 Collection of photocopies relating to Daniel Broido, a LEO salesman and Export Manager Eastern Europe in the 1950s-1970s. Briodo's parents were exiled by Lenin from Russia and escaped German anti-semitism in the 1930s by moving to the UK. Briodo developed an atomatic optical mark sensing machine.

C138 'Introduction to coding' (LEO III?), undated

C139 'EELM. Computer installations and orders. System 4, LEO and KD ranges', 1967

C140 'Computer survey. Volume 3 No.1', a quarterly publication listing UK computers, photocopy, 1964

C141 'EE-LEO Ltd Tender....A LEO III automatic office to the Department of Inland Revenue', 1963

C142 'LEO 326 and LEO 360 specifications' (photocopy), 1964

C143 Memorandum, 'Electronic machines in the office', from Simmons. Covering note for report by Thompson and Standingford on their trip to the USA. 'We believe that they have been able to get a glimpse of a development which will, in a few years' time, have a profound effect on the way that clerical work (at least) is performed...'. Urges a Lyons initiative. An important document in computer history. 20 October 1947

C144 'Computer survey. Volume 2 No.4', a quarterly publication listing UK computers, photocopy, 1964

C145 'Electronic Computer Exhibition', photocopy of brochure, 1958

C146 'Electronic Computer Exhibition', photocopy of brochure, 1961

C147 'ICL. Computer installations and orders. System 4, LEO and KD ranges', 1968

C148   'LEO III computer systems. Present development', Stewarts & Lloyds, Colvilles Ltd (Ravenscraig), photocopy, undated (1960s)

C149   'Diagrams', envelope containing loose diagrams, undated

C150   LEO document reader. Envelope containing brochures on Autolector and Xeronic, undated

C151   File, 'Parnell Xeronic correspondence', various documents relating to Xeronic and Xerographics collected by Peter Bird, 1960s-1990s

C152   File, 'Conversations with Pinkerton. LEO Chronicle', conversation as published in IEEE Annals of the History of Computing. Copy of Chronicle.

C153   File, 'LEO Converter', a decimal and sterling to binary converter, 1951

C154   Contents of a miscellaneous box file. Includes some corrsepondence re LEO marketing, newspaper clippings re LEO (1960s-1980s), blueprint of Minerva Road LEO production facility (Acton), correspondence between LEO and IBM (including a joing presentation, 1970), memoranda re LEO III project, memorandum re RCA/English Electric information sharing agreement, technical report on 'Computer manufacturer evaluation' by Lyons Computer Service (1969).

C155   Contents of miscellaneous box file, 'LEO'. Includes: LEO pamphlets (including Czechoslovak LEO pamphlet with photographs), photocopies of articles about LEO and computer history, copy of deed between English Electric and J. Lyons Ltd, memoranda re LEO III project, report from EE-LEO ComputerUsers Association, report 'Staffing a LEO III computer instalation', copy of deeds of corporation 1963, correspondence re LEO at the Science Museum, copy of Pinkerton article 'Taming LEO: overcoming the inherent unreliability of Leo I (IEE Review, January 1991), copy of paper 'The application of electronic digital computers and calculators to accountancy, costing and managerial control' (summer school at Northampton Polytechnic, London, 1955), paper on use of LEO in control of production at Park Gate Iron and Steel (undated, 1960s), copy of article 'LEO' (Electronic Engineering, 1954), copy of article 'A vital race for rapid reports' (on Census of Production, reprinted from International Business Automation, 1964), DHSS booklet 'Newcastle Central Office (includes account of use of computers at the Department of Health and Social Security, 1986), three business cards.

C156   Contents of miscellaneous box file, 'LEO references'. Includes: forms (automatically generated) re deliveries of Lyons cakes (August 1964), 'LEO installation planning guide' (undated 1960s), memo on LEO and Management Accounting and Planning (1964), LEO Chronicle copy, copy of Computer Management special issue on first business computer (June 1977), report 'Brief details of computer hardware installed and applications running [within J. Lyons Group's UK operations]' (1976), family tree of Cohen and Lyons family, various other articles, master copies of parts of 'A semi- technical description' (account of LEO).

C157   Envelope 'Shell, Australia'. Photocopies of articles on LEO in Shell's Australian offices, from Shell Times. Also copies of feasibility report and report of computer selection group, both 1962.

C158   Completed Census of Production form for LEO Computers Ltd, 1958.

C159   File, papers and correspondence re Ministry of Aviation returns on sales of electronic capital goods, 1957-1962

C160   File, papers and correspondence re Ministry of Aviation returns on sales of electronic capital goods, 1962-1963

C161   File, correspondence re Lyons Computer Services Ltd, 1969-1970

C162   'ARD. Preparation procedure to provide invoicing Tesco', undated (1980s). The following files from the 1980s (C162 onwards) relate to Lyons Computer Services Limited

C163   'Report on J.L. Catering point of sale computer installed at Strand Corner House', by Patricia Eden, July 1981

C164   'Cash Book. Draft system specification', November 1983

C165   'Stocktaking specification', by L. Baxby, April 1983

C166   'Lyons Brooke Bond (PVT) Limited. Computer study', by Peter Bird, September 1979

C167   'Tax, cash flow, CCA figures. Quotation', December 1983

C168   'Sol Club Ltd. JLPL business information study. Interim report', June 1981

C169   'Homburg file', 1976-1984

C170   'Divisional information technology study, 1989', with presentation notes, 1989

C171   'Central information system for Embassy Hotels', 1984

C172   'Three year trends computerisation', 1983

C173   'Embassy Hotels Ltd. Hotel Piccadilly computer study', with two revisions, 1981-1982

C174   'System specification for register of contracts', 1982

C175   'The Secretariat. A computerised company record keeping system', undated (1990s)

C176   'The Secretariat. A computerised company record keeping system', undated (1990s)

C177   'The Charities Administrator', 1991

C178   'New payroll system', undated (1980s?)

C179   'Customer and Supplier prints', by P. Eden, August 1982

C180   'Invitation to tender for the supply of an integrated accounting system for Normand Limited', by Peter Bird, March 1980

C181   'Invitation to tender. Sol Cafe Ltd and Soft Drinks Ltd', November 1981

C182   'J.L. Private Label computer report. Hardware evaluation', 1982

C183   'Lyons Brooke Bond (PVT) Limited. Computer study', March 1984

C184   'Embassy Hotels Limited. Appraisal report on the hotel computer systems. Supplied by ADP and OPTIM-MCS', by L. Baxby, January 1984

C185   'Evaluation of computer proposals for Embassy Hotels Limited', by Peter Bird, January 1981

C186   'Capital projects. Normand Limited', by Peter Bird, September 1980

C187   'Departmental petty cash/foreign travel. System specification', by P. Eden, August 1982

C188   'Word processing report', June 1981

C189   'Review of IBM 3790 processors. Report No.1', by N.A. Beasley, December 1981

C190   'J.L. Catering Limited. Business information study. Report No.1', by J.F. Clissold, July 1981

C191   'Report on the acquisition of an IBM System 36 computer by Sol-Tenco Limited', March 1984

C192   'Tea purchases and stock recording system', 1980

C193   'J. Lyons (Ireland) Ltd. Tea purchases and stock recording system. Report No.1', by Peter Bird, December 1979

C194   'Hotels. Computerised stocktaking system specification', by L. Baxby, July 1983

C195   'Lyons Computer Services Ltd. Utility Manual', 1979

NAHC/LEO/D Publications

D1   D.T. Caminer, "...and how to avoid them", 1959?

D2   Large file, mostly of offprints of articles about LEO but also documents about the LEO library service, description of LEO II, list of jobs using LEO computers, introduction to LEO III, brochure describing "LECTOR", advertisements and press releases, from Frank Land, 1953-1980s

D3   Political & Economic Planning, "The LEO Computer: a case study in the use of an electronic computer in routine clerical work", reprinted from Three Case Studies in Automation, July 1957

D4   Various news cuttings re LEO computers, 1970s and 1980s

D5   Folder, LEO press cuttings, 1980s

D6   Folder, photocopies of LEO press cuttings, 1950s

D7   Folder, photocopies of LEO press cuttings, 1950s

NAHC/MAR

MARCONI WIRELESS TELEGRAPH COMPANY LTD

Marconi began computer manufacture in 1959 with the TAC (Transistorised Automatic Computer). Research was also undertaken into microcircuit techniques, both semiconductor integrated and thin film, and by 1962-3 manufacture had also begun in this area. The result was a machine named the MYRIAD. The Marconi computer interests were later merged with Elliott Bros.

Provenance: W Digby Worthy

References: W J Baker, *A History of the Marconi Company* (London: Methuen, 1970).

The collection comprises two boxes of archival material.

NAHC/MAR/C. Working Papers and Reports

C1   File of material re. Transistorised Automatic Computer (TAC), including: circuit diagrams, summary of order codes, technical assessments, ca.1962.

C2   File of miscellaneous material, including:

"Mentor Design Specification", typescript, 1963. Notes re. Enhanced Myriad Machine, 1965.

W.D. Worthy, "ALGOL Primer", typescript, 1965.

Typescript re "Stop!?!", 1965.

"Software Proposal: Language Assembly System and Compiler Generator Feasibility Study", typescript, 1965.

W.D. Worthy, "Unlimited Autoextraction by Digital Filtering", interim technical memo, 1970.

E.R. Eastal, "A Guide to the Literature Published in 1969-70 on Computer Technology", Marconi Survey Series, 1971.

C3   Collection of Baddow Research Laboratories Interim Technical Memoranda:

W.D. Worthy, "Early Warning Radar Trackers", No.409.

W.D. Worthy and M.J. Woodhead, "TAC High Speed Digital Computer", No.499.

W.D. Worthy, "The TAC Transistorised Automatic Computer for General Purpose Computation", No.537.

W.D. Worthy, "The Digital Differential Analyser", No.601.

W.D. Worthy, "Boolean Algebra and Binary Arithmetic", No.617.

"W.D. Worthy, "Schizophrenic Computer", No.621.

M.J. Woodhead, "TAC High Speed Digital Computer. PN Unit Version", No.635.

W.D. Worthy and M.J. Woodhead, "Mutual Checking of Two Computers", No.739.

M.J. Worthy, "ITM 836 TAC How It Works", No.836.

W.D. and M.J. Worthy, "TAC Programmer's Manual. First Edition June 1961", No.954.

N.R. Sudweeks, "Trigonometrical SubRoutines for TAC", No.1002.

W.D. Worthy, "DIC Drum Incremental Computers", No.1089.

W.D. Worthy, "Magnetic Core or Film DDA", No.1205.

W.D. Worthy, "TAC Order Code: Revised August 1962", No.1284.

W.D. Worthy, "Diffusion and Surface Conductivity", No.1340.

B.Lewis and W.D. Worthy, "Minimal Computer", No.1447.

W.D. Worthy, "Computer with Language Oriented Order Code", No.1825.

W.D. Worthy and K. Hosking, "Floating Point for Myriad", No.2047.

N. Hannon, "Polynomial Function Manipulation on the KDF9 Computer", No.2048.

W.D. and M.J. Worthy, "Design of a Simple Parallel Computer. An explanation of the programming and mode of operation of a computer designed for simplicity of construction and operation", No.2183.

W.D. Worthy, "Study of a Partially Analogue and Partially Digital System", No.2353.

W.D. Worthy, "Data Analysis", No.2735.

W.D. Worthy, "Digital Specification and Synthesis of an FM Waveform", No.3335.

NAHC/MET

METEOROLOGICAL OFFICE

Weather forecasting demands considerable computational power, so not surprisingly the Meteorological Office has been a foremost user of the most powerful computers available. In 1951 the Met. Office began using Lyons' copy of the EDSAC at Cadby Hall. After switching to the Ferranti Mark I computer at the university of Manchester in 1958, the Met. Office purchased a Ferranti Mercury computer for its own use. It was named "Meteor". In 1961, after the Met. Office moved from Dunstable to Bracknell, an English Electric KDF9 computer (named "Comet") was installed. However, use was increasingly made of the faster ATLAS computer, first at Manchester and later at the Rutherford Laboratory. The need for a still more powerful computer was reflected in the installation of an IBM 360/195 in 1971.

Provenance: Chris Little and Mavis K Hinds, Met Office, Bracknell.

References: M K Hinds, "The Computer Story", *Meteorological Magazine* 110 (1981), pp.6981.

NAHC/MET/A. Historical and Personal

A1   "History of Met Office Computing" (1980), typescript, pp.8

NAHC/MET/C. Reports and Working Papers

C1a,b,c   Three files of loose material typescripts, reports, routines and miscellaneous correspondence mainly re. Ferranti Mercury computer, ca.1959.

C2   Large folder containing reports, routines etc. concerning computer room, mainly re. Comet Laboratory, ca.1961.

C3   "Data Processing by Machine Methods," typescript, 1962.

C4a,b   Folders of miscellaneous material re. KDF9 at Bracknell.

C5   "Meto Mark III. Draft Manual", typescript, ca.1965.

C6   J.M. Craddock, "The Users' Manual for the Meto Computer Language", typescript, pp.102, 1966.

C7   J.M. Craddock, "Assessing the Significance of a 3 x 3 Contingency Table", typescript, pp.7 + graphs, 1966?

C8   J.M. Craddock and C.R. Flood, "Met 0 13 Branch Technical Memoranda No.21: A Computer Language for Statistical Meteorology", typescript, pp.17, 1968.

C9   J.M. Craddock and C.R. Flood, "Users' Digest of the Meto Computer Language (Mark III)", typescript, pp.35, 1968.

C10   Folder of miscellaneous material re. ATLAS, ca.1970.

C11   R.J. Bentham, "The Timescale of Project Implementation", typescript, 1974.

NAHC/MIS

MINISTRY OF SUPPLY

Collection comprises one box of archival material.

D1   A. Schendel, "Volkenrode Translation," Report No. MOS143. (1943?)

D2   Symposium on Information Theory. Report of Proceedings. September 1950.

D3   C.A. Reiners,"Survey of Computing Facilities in the UK", Report No.13/53, September 1953.

D4   IPM List of Controlled Automatic Computers as at Winter 1952/53, TIB/T4338, May 1954.

D5   H.Rutishauser, A. Speiser and E. Stiefel, "Programme Controlled Digital Computers (Electronic Calculating Machines), TIB/T4322, July 1954.

D6   Catalogue of the MOS Computing and Data Reduction Library, Directorate of Weapons Research (Defence), May 1955.

D7   Catalogue of the MOS Computing and Data Reduction Library, Directorate of Weapons Research (Defence) May 1955 May 1957.

D8   WR(D) Computing and Data Reduction Abstracts, No.9, Directorate of Weapon Research (Defence), January 1956.

D9   WR(D) Computing and Data Reduction Abstracts, No.10, Directorate of Weapon Research (Defence), March 1956.

D10   R.Sauer and H. Posch, "Integrating Machine for ordinary differential equations", SR7 (Technical Records), Undated.

NAHC/MSC

MISCELLANEOUS MANUSCRIPTS AND UNPUBLISHED TYPESCRIPTS

D1   Arthur Burks, Herman H Goldstine and John von Neumann, "Preliminary Discussion of the Logical Design of an Electronic Computing Instrument", typescript pp.53, plus table and diagram (June 1946).

D2   Helmut Hoelzer, "Application of Electrical Networks to the Solution of Differential Equations and the Stabilisation of Previous Rules", typescript dissertation (in German), pp.72 (1946).

D3   P W Woodward, "History and Binary Arithmetic"; "Computing Processes", Lectures I and II in Electronic Digital Computer, TRE Lecture Series, typescripts, pp.6 (1947).

D4   A BodleyScott, "A Note on the Miller Integrator and its Allied Circuits", Torpedo Experimental Establishment, Greenock, Technical Note No.37, typescript pp.11, plus diagrams (1947).

D5   H J Dreyer (ed.), "Development of Mathematical Instruments in Germany 1939 to 1945", typescript reports (in German), with photographs, Reports B2a, B7d (1947).

D6   Raymond Thompson, "LEO Chronicle", typescript, pp.23 (1947).

D7   George W Patterson (ed.), "Theory and Techniques for Design of Electronic Digital Computers", Moore School of Electrical Engineering, Philadelphia, Vol.IV (1948).

D8a   Preston C Hammer and Arthur H Stroud, "Numerical Evaluation of Multiple Integrals II, Technical report No.5 typescript, pp.20, Office of Ordnance Research, US Army, November 1957.

D8b   Metropolitan Vickers Co Ltd, "Symposium on Digital Techniques and Control, 56 February 1957 (2 copies).

D9   Arthur Stroud, "Remarks on the Disposition of Points in Numerical Integration Formulas", typescript, pp.7, Office of Ordnance Research, US Army, January 1958.

D10   Arthur H Stroud, "Numerical Integration Formulas of Degree 2", typescript, pp.10, Office of Ordnance Research, US Army, January 1959.

D11   Bruce A Chartres, "An Exact Method of Generating Random Normal Deviates, Technical Report No.5", typescript, pp.15. for Dept. of Army Signals Corps, March 1959.

D12   B. A. Chartres, "Numerical Methods for the Stability Analysis of ManyDimensional Linear Systems", typescript, pp.74, Brown University, Providence RI, April 1959.

D13   J Fell and H R Lowday, "The Spectral Analysis of Noise Records by Fourier Series Methods", typescript pp.24 and charts, Sir W G Armstrong Whitworth Aircraft Ltd, Armaments Division, June 1959.

D14   R W Bemer, "Survey of Modern Programming Techniques: a Lecture following the Annual General Meeting of The British Computer Society", September 1960.

D15   T E Bell, "Computer Performance Analysis: Measurement objectives and tools", A Report prepared for National Aeronautics & Space Administration and US Air Force Project, Rand, Santa Monica, February 1971.

D16   BBC TV "All our Working Lives", selected typescripts.

D17   Folder containing:

     Konrad Zuse, "Some Remarks on the History of Computing in Germany", Lecture at the International Research Conference on the History of Computing, University of California, June 1015, 1976;

Konrad Zuse, "My first computer and first thoughts about data processing", Speech at Symposium in Lund/Sweden on 'Computer Design Past, Present, Future', typescript pp.23, October 1987

Simon Lavington, "Helmut Schreyer: Summary of Schreyer's work on electronic computing devices in Germany, 19391944", typescript pp.3, July 1980.

Interview with Konrad Zuse, "Computer History: A Personal Perspective", reprint from Siemens Review, 4/89. "Zuse and Schreyer", Reprint from Randell: Origins of Digital Computers published 1973.

D18   Paul Drath, "The Relationship Between Science and Technology: University Research and the Computer Industry", Manchester University PhD, 1973, pp.200.

D19   John M. Bennett, "Some Reflections on Large Systems Computing and Others", typescript pp.25, 1983.

D20   Serena Kelly, "Report of a Survey of the Archives of British Commercial Computer Manufacturers", IEE, pp.279, 1985.

D21   Nicholas A. Vonneuman, "John von Neumann as Seen by His Brother", typescript, pp.71, 1987.

D22   W.S.Elliott, "ComputerAided Mechanical Engineering, 1958 to 1988", typescript, pp.50, 1988.

D23   James Small, "Analogue Computers: Technical Change and Designer History", Manchester University MSc, pp.143, 1988.

D24   John Hendry, "Innovating for Failure: Government Policy and the Early British Computer Industry", typescript, pp.386.

D25   M. Eloina Pelaez V., "A Gift from Pandora's Box: The Software Crisis", Edinburgh PhD, pp.260, 1988.

D26   Peter J. Bird, "LEO Pride of Lyons. The Birth of Business Computing", typescript, pp.232, 1989.

D27   I. Bernard Cohen, "The Computer: A Case Study of the Support by Government, especially the Military, of a New Science and Technology", typescript, pp.36, n.d.

D28   United Birmingham Hospitals and University of Birmingham Medical School, "Towards a Hospital Computer Service", typescript, pp.75 + appendix, 1967.

D29   United Birmingham Hospitals, "Queen Elizabeth Medical Centre Computer Project: Systems Design Report", typescript, pp.104 1970.

D30   United Birmingham Hospitals, "Queen Elizabeth Medical Centre Computer Project: Systems Design Appendices", typescript, 1970.

NAHC/MUC

UNIVERSITY OF MANCHESTER DEPARTMENT OF COMPUTER SCIENCE

The University of Manchester has played an important role in the development of computer science. As early as the 1930s Douglas R Hartree (1897-1958) had constructed a differential analyser, a mechanical calculating machine, based upon the designs of the American engineer, Vannevar Bush. This was an analogue device. After the Second World War these machines were overtaken by electronic stored program digital computers.

In 1946 Professor (Sir) Frederic C Williams (1911-1977) and (Professor) Tom Kilburn began work at the university of Manchester with the intention of developing a novel form of computer storage using cathode ray tubes. The system which involved the use of the "Williams tube" to store "bits" of information was perfected during 1947, with Kilburn publishing the results, together with the outline design for a hypothetical computer, in December of that year. The team was also joined by Geoffrey C Toothill, who, like Williams and Kilburn, had previously worked at the Telecommunications Research Establishment at Malvern. A prototype machine, (the forerunner of the Manchester Mark I), was built and on 21 June 1948 it became the world's first stored-program computer to operate. The successful running of this first program, recorded Williams, "was the breakthrough and sparks flew in all directions". The Manchester group doubled its size in 1948 by taking on two research students (DBG Edwards and G E Thomas). The team was a remarkably talented one: besides Williams and Kilburn, who provided the electrical engineering skills, Professor M H A (Max) Newman (1897-1984) and Alan Turing (the latter having joined the Mathematics Department in 1948) gave theoretical expertise. Turing, for example, designed, with Edwards and Thomas, the paper tape input/output system and wrote a programming manual.

In 1948 the attention of Sir Ben Lockspeiser, the then Government Chief Scientist, was drawn to the Mark I. The result was a Government contract with Ferranti Ltd to make a production version of the machine "to Professor Williams" specification'. The first Ferranti Mark I was installed at the university of Manchester in February 1951, thereby becoming the world's first commercially available computer to be delivered. The Government's involvement with the university of Manchester proved worthwhile: royalties from the Williams' patents (the first of which had been filed on 11 December 1946 by the Ministry of Supply) gave an important boost to the National Research Development Corporation (NRDC) a Government body, set up to advise on, and support, developments in British industry.

The University's involvement with Ferranti continued into the 1950s when the design team (increasingly headed by Kilburn as Williams' interest turned to other engineering matters) was working on a Mark II computer nicknamed MEG (megacycle engine). Collaboration in these years eventually resulted in the ATLAS computer, an ambitious project that pioneered many concepts in storage and addressing which are in common use today. On its official inauguration on 7 December 1962 it was considered to be the most powerful computer in the world.

Later in the 1960s, developments elsewhere, particularly in the USA, had overtaken Manchester. New computer software as well as new hardware, such as transistors and silicon chips, eroded the University's lead in computers. Nevertheless, it is worth recording that besides building the world's first stored-program computer, as well as the world's first commercially available computer, Kilburn and his group can be credited with building the first fully-transistorised computer in 1953 (the Metropolitan Vickers Company later built a commercial version of the design). Both in commercial and technical terms the legacy of these "vintage" years of computing was immense (42 computer patents emanated from the University of Manchester during 1948-50). And it must not be forgotten that the Computer Science Department itself was involved in pioneering the teaching of a wholly new subject within the British university system. Finally, all these developments established an important link between the University and the computer industry, which has lasted through various projects to the present day.

Provenance: Manchester University Department of Computer Science, courtesy of Professor D B G Edwards. The material was collected by Professor Simon H Lavington.

References: Martin Campbell Kelly, "Programming the Mark I: Early Programming Activity at the University of Manchester", *Annals of the History of Computing* 2 (April 1980): pp13-68; Simon H Lavington, *History of Manchester Computers* (Manchester: NCC, 1975); Simon H Lavington, *Early British Computers: The Story of Vintage Computers and the People Who Built Them* (Manchester: Manchester University Press, 1980).

See also NAHC Ferranti, Prinz, Turing manuscript collections (NAHC/FER, NAHC/PRI, NAHC/TUR).

The Manchester University Department of Computer Science collection (44 boxes) is divided as follows:

NAHC/MUC/1 Papers of Professor Sir F.C. Williams (1911-1977)

NAHC/MUC/2 Papers of Dept. of Computer Science, circa 1946-1965

NAHC/MUC/3 Papers of Dept. of Computer Science, circa 1965 to date.

NAHC/MUC/1. Papers of Professor Sir F.C. Williams (1911-1977)

Frederic Calland Williams was appointed to the Chair of Electrotechnics in the University of Manchester in December 1946. His wartime work had involved radar development at the Telecommunications Research Establishment (TRE) in Malvern. Here he had begun his work on cathode ray tube storage, which he was to bring to a successful conclusion at the University of Manchester with his invention of the "Williams' tube". The work involved the collaboration of Tom Kilburn, whose name appears alongside Williams on many of the Manchester patents.

The first patent for the "Williams Storage System" was filed on 11 December 1946 by the Ministry of Supply. This and a large number of other patents were managed by the National Research Development Corporation (NRDC). The NRDC negotiated rights on the Williams' tube with IBM and defended the invention when rival claims were made on the tube in the USA. Within the University Williams defended the then novel idea that the discoverer should be able to patent the results of university research.

The following papers cover most aspects of Williams' university career, the NRDC material being particularly extensive.

References: Tom Kilburn and L S Piggott, "Frederic Calland Williams 1911-1977", *Biographical Memoirs of Fellows of the Royal Society* 25 (1978).

NAHC/MUC/1/A. Biographical and Personal Papers

A1   Letter to Sir Willis Jackson, FRS. Williams reviews his career, after which he writes: "My arm aches both from writing and from slapping my own back." A list of publications is attached.

A2   T. Kilburn and L.S. Piggott, "Frederic Calland Williams 1911-1977", reprint from Biographical Memoirs of Fellows of the Royal Society 24 (1978).

A3   S. Bennett, "F.C. Williams: His Contribution to the Development of Automatic Control", unpublished typescript (pp.14) based on interviews with the subject.

A4   "How to Invent". Interview with F.C. Williams, reprinted form International Science and Technology (1964).

NAHC/MUC/1/B. Correspondence

B1a   File of letters (1947-8), mainly with the Telecommunications Research Establishment (TRE) at Malvern, where Williams had worked during War as Principal Scientific Officer. The letters document discussions with the National Physical Laboratory (NPL) concerning Williams' possible collaboration on the ACE; Williams' possible acceptance of a Chair of Electrotechnics at the University of Manchester; and the secondment of Tom Kilburn from the TRE to work at Manchester.

B1b   File of letters (ca. 1949-54), mainly with the Ministry of Supply, London, concerning inter alia the supply of cathode ray tubes, computer storage techniques and radar.

B1c   Correspondence with Ministry of Supply concerning Atomic Energy, 1950-1. Viscount Portal of Hungerford writes to Williams, 30 November 1950, enquiring about use of the Manchester computer to assist in calculations for the British atomic energy project.

B1d Correspondence (1951-8) with Ministry of Supply, Atomic Energy, Harwell, concerning inter alia introduction of transistors. E.H. CookeYarborough tells Williams (25 October 1951), "...transistors are very important, but can be oversold"; later Williams asks CookeYarborough (24 January 1952) for a few transistors since he had heard he was "the proud possessor of about a dozen Americanmade transistors."

B2 File of correspondence (1948) with Royal Aircraft Establishment (RAE), concerning disagreement between TRE and RAE regarding integrators. Williams writes to Professor Willis Jackson at Imperial College, 17 December 1948, appending a typescript play: "A Tragedy in Seven Acts". "The date is January 7th or 8th, 1948. The scene is a laboratory in the RAE. In the foreground FCW is talking to an RAE officer...".

B3a Letters and agreements (1951) between the University of Manchester and Electrical Engineering Dept. regarding patent rights, payment for use of computer, etc.

B4 Correspondence (1951-69) with Ferranti Ltd concerning Toronto computer, ATLAS inauguration, visit to Sebastian Ferranti, and Williams' consultancy agreement.

B5 Correspondence (1951) with Marconi, Ministry of Supply, GEC, Cossor, and EMI regarding EF.50 valves.

B6 Letters (1954, 1962) to Dr. A.L. Samuel, IBM, New York. Correspondence (1954) briefly comments on Williams' recent US trip and discusses publications. In 1962 Williams recommended Tom Kilburn for Fellowship of the Institution of Radio Engineers: a detailed listing of Kilburn's (and Williams') patents and publications is appended.

B7 File of papers, reports and letters (1954-65) concerning users, fees, running costs for use of Manchester University computers.

B8 File of miscellaneous letters (1951-9), concerning departmental matters, seminars, etc.

B9 Correspondence relating to patents, mainly with NRDC, 1947- 58.

NAHC/MUC/1/C. Unpublished Drafts, Working Papers

C1a Box file relating to Manchester University interference suit, 1946-52. Williams' cathoderay tube storage system was patented in 1946. In 1950 the EckertMauchly Corporation claimed in the Proc. of the IRE to have anticipated Williams' device. The Williams' claim was successfully defended by the NRDC. The development of the c.r.t. storage system is extensively documented in the files.

C1b File of material from Williams' papers relating to NRDC, including report of a grant for Williams' work at the University of Manchester; typescript notes on visits to MIT (18 December 1951) and University of California at Berkeley (31 December 1951); and typescript "Notes for Discussion on Manchester University Computing Papers at IEE" (1953).

C1c Two files relating to Williams' trip to IBM in USA in 1949 and the subsequent agreement between NRDC and IBM for the use of the Williams' tube in IBM computers.

C2 File of letters, reports and working papers (some in Williams' own hand) (ca. 1949-50), concerning a new computer building. Various reports give details on projected costs, staff and progress to date.

C3 F C Williams, "Engineering Research Must Not Degenerate into Mathematics", National Physical Laboratory, 5 May 1965 (typescript, pp13).

> FCW writes: "The engineer is inevitably associated with trade; what he does is directed to useful ends, and the public at large in this country have not yet fully set aside their traditional aristocratic attitude, that to be really tops two things are required:
>
> (a) One must be supremely good at something;
>
> (b) The something at which one is supremely good must be absolutely useless."

C4   File of freehand notes, calculation, sketches (ca.1955) on various electrical engineering problems e.g. television colour transmission.

C5   Draft article, "Early Computers at Manchester University" (1975), typescript, pp.10. Published in Radio and Electronic Engineer 45 (1975).

NAHC/MUC/1/D. Publications

Reprints and Copies of Articles

D1   (with F.J.U. Ritson) "Automatic Strobes and RecurrenceFrequency Selectors", Journal of IEE 93 (1946).

D2   (discussant) "Calculating Machines", Nature 161 (1948).

D3   (with T. Kilburn) "A Storage System for Use with BinaryDigital Computing Machines", Proceedings of IEE 96 (1949).

D4   "A CathodeRay Tube Digit Store", Proc. of Royal Society of London 195 (1948).

D5   "High Speed Universal Digital Computers". Two lectures delivered at Chalk River, Ontario (National Research Council of Canada, Atomic Energy Project, Research Division, 1949).

D6   (with T. Kilburn and G.C. Toothill) "Universal HighSpeed Digital Computers: A Smallscale Experimental Machine", Proc. of IEE 98 (1951).

D7   (with T. Kilburn and G.E. Thoms) "Universal HighSpeed Digital Computers: A Magnetic Store", Proc. of IEE, 99 (1952).

D8   "Electronic Digital Computer Machine", Manchester Association of Engineers, annual lecture, 1952.

D9   (with G.B.B. Chaplin) "A Method of Designing Transistor Trigger Circuits", Proc. of IEE 100 (1953).

D10   (with T. Kilburn et al) "Recent Advances in CathodeRayTube Storage", Symposium of Papers on Digital Computers, Proc. of IEE 100 (1953).

D11   "Inventive Technology: The Search for Better Electric Machines", The Bakerian Lecture, Proc. of Royal Society , 283 (1965).

Patents

D12-21 F.C. Williams was a prolific inventor, whose patents covered not only computing technology, but also advances in radio and other electrical machines. The NAHC has 10 boxes of Williams' (and Kilburn's) patents, ca. 1939-76, which were managed under the auspices of the NRDC. Box D.12 has a folder containing copies of index cards for all computer patents originating from the University of Manchester up to 1969; a covering letter from J.F.M. Scholes (NRDC); and an analysis of the patents by Simon Lavington. There are three boxes (D19, 20 and 21) of correspondence regarding Williams' patent applications and the NRDC.

NAHC/MUC/2. Papers of the Department of Computer Science, ca.1946 ca.1965

NAHC/MUC/2/A. Biographical and Personal Papers

A1   Tom Kilburn, "A Storage System for Use with Binary Digital Computing Machines", typescript (p.52 + photos and graphs, etc.) 6 copies, some of which are 1978 reprints of original. This was the first formal report to be issued by the computer design group at the University of Manchester. About 50 copies were made in December 1947 and widely

disseminated in the UK and US a fact that became important when the NRDC defended the Williams' tube against US interference. The report represented the successful completion by Kilburn of about a year's development of a practical digital storage system, at a time when none of the other proposals for computer storage had been realistically tested. It also constituted a means of keeping the TRE and NPL informed of progress. The report was a basis of a paper presented at the IEE in November 1948.

A2   Tom Kilburn, "Lecture Notes on Computer Science", 3 volumes, covering: vol.1, 1966-78; vol.2, 1961; vol.3, 1965.

A3a   "Professor Kilburn's Computer Cases, 1946-62". Dated 14 February 1962. Typescript (pp.4). Listing of Kilburn's patents.

A3b   Kilburn, press cuttings and ephemera.

A4   I.J. Good, "Early Notes on Electronic Computers", photocopy of notes (pp.78) covering the period 1945-8, with an introduction dated 23 March 1972, and a letter dated 7 April 1976. Good was appointed mathematics lecturer at the University of Manchester 1945-8 and was involved in programming the Mark I.

NAHC/MUC/2/B. Correspondence

B1   Copy of letter from Chief Government Scientific Officer to E. Grundy, Ferranti Ltd, 26 October 1948, giving authority for the firm "to construct an electronic calculating machine to the instructions of Professor F.C. Williams."

B2   Copies of letters concerning Royal Society grant for the Computing Laboratory: M.H. Newman to Cooper, 11 November 1948; Royal Society to Newman, 17 November 1948; Newman to Vice Chancellor, 13 October 1949.

B3   Letter from Blackett to Rainford re. charging for use of computer, 30 January 1952 (with F.C. Williams' calculations of cost, 28 January 1952).

B4   Copy of letter from P.D. Greenhall, Dept. of Scientific and Industrial Research, 8 April 1958, re. scrapping of Mark I.

B5   "Draft Report on the Manchester Electronic Computer Project" by C. Strachey, J. Howlett, D. Wheeler and E.H. CookeYarborough (1958), and associated letters. Originals and copies.

B5a,b,c   Miscellaneous correspondence, ca. 1958-62, concerning inter alia, visits to the department, use of computer, and programming.

B6   Letters relating to ATLAS agreement between Ferranti Ltd and the University of Manchester, 1962.

B7   Correspondence with users of Mercury, 1958-62. Users (filed in alphabetical sequence) include: Battersea College of Technology; Birmingham University; British Cotton Industry Research Association; British Nylon Spinners; British Rayon Research Association; BISRA; British Shipbuilding Research Association; David Brown Industries Ltd; Building Research Station; CEGB; CERN; Constructors John Brown Ltd; Cooperative Wholesale Society; Cork College; Edinburgh University and Observatory; Electrical Research Association; English Electric Co Ltd; Fairfield Engineering and Shipbuilding Co Ltd; Ferodo Ltd; Forestry Commission; Geigy and Co Ltd; General Electric Co Ltd; Glasgow University; Hall, Russell & Co Ltd; Hawker Siddeley Nuclear Power Co Ltd; Hydraulics Research Station; ICI Ltd; Imperial College, London; Jodrell Bank Experimental Station; Keele University; Kent Education Committee; Lanchester College of Technology; Liverpool University; London University; Joseph Lucas Ltd; Manchester College of Science and Technology; Maudsley Hospital, London; Metropolitan Vickers; Ministry of Aviation; Ministry of Supply; National Institute of Oceanography; North Western Gas Board; Nottingham University; Nuclear Power Group; Oxford University; C.A. Parsons Ltd; Queens' University, Belfast; Robson, Morrow & Co; A.V. Roe Ltd; Rolls Royce Ltd; Rothamsted Experimental Station; St. Andrews' University; Salford Royal Technical College; SHAPE; SimonCarves/Henry Simon; South

Western Electricity Board; UK Atomic Energy Authority; US Office of Naval Research; VickersArmstrongs (Shipbuilders) Ltd; Wool Industries Research Association.

NAHC/MUC/2/C. Drafts, Working Papers, Reports

C1   Photocopy of University prospectus showing staff of Dept. of Electrotechnics, June 1948.

C2   Papers concerning Royal Society Grant for Computing Laboratory, inc: Royal Society Minutes (copy); and Minutes of Meeting at University of Manchester, "Arrangements for Royal Society Computer Machine Laboratory, Friday 15 October, 1948. Present: The Deputy ViceChancellor (in the Chair), Professors Blackett, Newman, Rosenfield, Williams and Dr. Tyson. Mr. Turing attended by invitation."

C3   Notebook kept by G.C. Toothill whilst working on Mark I, 4 June 1948 28 November 1948. The notebook is of particular interest, since it verifies the running of the world's first stored program on 21 June 1948.

C4   Reports and notes on the Manchester University Mark I by G.C. Toothill, ca. 1949.

C5   "Programmers' Handbook for Manchester Electronic Computer Mark I" (1950). pp.97 + tables. This was subsequently revised by R.A. Brooker as: "Supplement to the Programmers' Handbook (2nd Edn.). For the Manchester Electronic Computer Mark I" (1952); "Manchester Electronic Computer Mark I. Supplement to the Programmers' Handbook (3rd Edition)" (1956).

C6   Mark I Log Books, 1951-58 (6 vols.). These books, signed by engineers and programmers, give a fascinating insight into the trials and tribulations involved in running a computer reliably in the early days.

C7   "Extracts from the Office of Naval Research, Quarterly Project Summary. 1st January 1949." Typescript, pp.1. F.C. Williams' copy.

C8   "Meeting to be Held at Manchester University, Friday 13 April, 1951, to discuss proposals for the Ferranti Mk.II computer," pp.30. Tom Kilburn's copy. J.M. Bennett, "Proposals for Mark II", typescript pp.26.

C9   Miscellaneous reports, 1951, inc.:

A Mark I programme sheet, pp.2;

"Stores for Manchester University [Mk.I]" (28 August 1951), pp.3;

"Notes on Kilburn's Arguments Againt Whirwind", pp.2.

"Symposium on Williams' Type Electrostatic Storage, NBS, Dec.1314, 1951". Programme with freehand notes attached by [?].

C10   Folder marked "Manchester University Mark I Autocode, 1952".

C11a   Miscellaneous reports, 1952:

"Solution of the PoissonBoltzmann Equation on the Manchester Electronic Computer" 1952(?), pp.2.

"Summary of Work in Progress on the Manchester University Electronic Computer Mk II", October 1952, pp.4.

"Crystallographic Calculations on the Manchester University Electronic Digital Computer", by D.W.J. Cruikshank, 26 June 1952, pp.1.

G. Ord, "Universal High Speed Digital Computers: A Decimal Storage System". (Manchester University M.Sc. thesis, 1952), pp.31.

"Comparison of the Manchester University Machine and the ACE", pp.3.

"Applications of the Machine in the Field of Industrial and Scientific Research", 14 June 1952, pp.3.

C11b   Programming Courses. Lecture Notices, 1956-62.

C12   Miscellaneous reports, 1953-60:

"Allocation Programme", 3 June 1953, pp.2. Signed (possibly authored) by Dr. D.G. Prinz.

"Report on the Work of the SBAC Electronic Computers Panel, June to November, 1953", pp.5. Letter from Society of British Aircraft Constructors Ltd attached.

Typescripts and notes on "Shirley Problem", analysis of structure, n.d.

Typescript, pp.3, US patent No. 2,548,789.

"The University of Manchester: Electronic Computing Machine", pp.3, 18 November 1955.

Synopsis of paper entitled, "A Review of Developments at Manchester University", by T. Kilburn, 1956, pp.2.

Listing of publications relating to work done on Mark I.

"Programming Research in the Computing Machine Laboratory", 1959, pp.8.

"Some Programming and Application Publications, by Users of the Manchester University Computing Machines", May 1960, pp.4.

C13   MEG handbook, 1954.

C14a   "The Programming of More Complicated Problems", anon. typescript, 1954, pp.19.

C14b   Listings of publications by staff of Manchester University Computer Science Dept., ca.1955.

C14c   List of visitors to the "Computing Machine Laboratory", Manchester University, 1955.

C14d   R.A. Brooker, "An Autocoding Scheme for the Ferranti Mercury Computer", unclassified typescript, AERE, Harwell, 1956, pp.34.

C14e   "Strictly confidential: CRSG Technical Memorandum. Study No.23: Future Fast Computer: Design Study", by S.Gill, 29 May 1959, pp.6.

C14f   Notes on a Broadcast on "Electronic Brains", 2 June 1959.

C15   R.A. Brooker, B. Richards, E. Berg, R.H. Kerr, "The Manchester Mercury Autocode System", typescript, May 1959, pp.56 (5 copies).

C16   S. Michaelson and D.G. Burnett-Hall, "The Manchester Mercury Autocode System", typescript, October 1959, pp.54.

C17   "Mercury Programming Library", ca. 1958-62, 4 vols. and looseleaf wallet.

C18   MUSEATLAS: Folder of Tom Kilburn's Design Notes and Internal Ferranti memos., 1959-60.

C19   S.H. Lavington, "The Effect of Temperature on the PartiallySwitched State of Ferrite Memory Cores", typescript, September 1961, pp.8 + graphs.

C20   D.J. Howarth and R.B. Payne, "The Intermediate Supervisor", typescript, 1962, pp.10.

C21   Folder marked "Fixed Store. Print Output AB", 1963.

C22   Folder of misc. ATLAS typescripts, ca. 1962-4, inc.:

"ATLAS Magnetic Store".

"Preparing a Job for the ATLAS".

"Basic Guide to the Use of ATLAS FORTRAN 4".

"ATLAS Instruction Tables".

"ATLAS Computing Service".

L. Hodgson, "Preparing a Job Description for the ATLAS Computer".

D. Morris, "Some Features of the ATLAS Supervisor".

ATLAS peripheral logic diagram, 1960.

N.B. There is also an unboxed ATLAS diagram, n.d., stored as a roll.

C23 Folder of ATLAS Circulars and ICT ATLAS Programming Bulletins, 1964-5.

C24 Folder marked "ATLAS Autocode Computer", ca. 1965.

C25a R.A. Brooker and J.S. Rohl, "ATLAS Autocode Reference Manual", 1965. (5 copies)

C25b J.S. Rohl, "An Introduction to ATLAS Autocode", typescript, n.d. (2 copies)

C26a Minutes of meeting of computer users held in Dept. of Computer Science, 1 February 1965, pp.3.

C26b "Proposed Developments in Computer Service and Computer Science", n.d.

NAHC/MUC/2/D. Publications

D1 "The Mechanical Brain. Successful Use of Memory Storage". Letter to editor of The Times, 14 June 1949, from M.H.A. Newman, Dept. of Mathematics, Manchester University; and photograph of "The Mechanical Brain". pp.2.

D2 "A Calculating Machine with a 'Memory': the Control Panel; and a Storage Tube in Use". "A Marvel in our Time: the 'Memory' Machine which can Solve the Most Complex Mathematical Problems". Articles in The Illustrated London News, June 25, 1949, pp.865 and 8823.

D3 "Report on Manchester University Computer Inaugural Conference, July 1951", pp.40. (5 copies).

D4 T. Kilburn, "The New Universal Digital Computing Machine at the University of Manchester", reprinted from Nature , Vol.168, p.95, 21 July 1951. (6 copies).

D5 F.C. Williams and T. Kilburn, "The University of Manchester Computing Machine"; and B.W. Pollard, "The Design, Construction, and Performance of a LargeScale GeneralPurpose Digital Computer". Proc. Joint AIEEIRE Computer Conference, Philadelphia, Pa. December 1012, 1951, pp.16. (2 copies)

D6 Ferranti Ltd, "Manchester Universal Electronic Computer". List DC.1, pp.6. August 1952.

D7 R.A. Brooker, "The Design of Circuits Using ElectroMechanical Devices", article reprinted from Journal of Scientific Instruments 29 (1952), pp.4550.

D8 T. Kilburn, and G. Ord, "Universal HighSpeed Digital Computers: A Decimal Storage System", Institution of Electrical Engineers , article revised 12th February 1952, pp.10.

D9 A.A. Robinson, "Multiplication in the Manchester University HighSpeed Digital Computer", Electronic Engineering, January 1953, pp.6.

D10 B.W. Pollard and K. Lonsdale, "The Construction and Operation of the Manchester University Computer", Institution of Electrical Engineers, article revised 2nd February 1953, pp.12. (2 copies).

D11 T. Kilburn and E.R. Laithwaite, "Servo Control of the Position and Size of an Optical Scanning System", Monograph No.81, Proc. IEE. 16 Nov. 1953. pp.6. (2 copies)

D12 T. Kilburn, G.C. Tootill, D.B.G. Edwards and B.W. Pollard, "Digital Computers at Manchester University", Proc of IEE 100 (1953).

D13   R. A. Brooker, "An Attempt to Simplify Coding for the Manchester Electronic Computer", reprinted from British Journal of Applied Physics 6 (1955). (2 copies)

D14   Gordon Watkins, "Can the Electronic Brain Really 'Think'?", Picture Post, 26 February 1955, pp.30 and 31.

D15   K. Lonsdale, and E.T. Warburton, "Mercury: A HighSpeed Digital Computer"; T. Kilburn, D.B.G. Edwards and G.E. Thomas, "The Manchester University Mark II DigitalComputing Machine"; A.A. Robinson, V.L. Newhouse, M.J. Friedman, D.G. Bindon and I.P.V. Carter, "A Digital Store Using a Magnetic Core Matrix"; G.E. Thomas, "The Use of Electromagnetic Delay Lines in the Manchester University Mark II Digital Computing Machine", Proc of IEE 103 (1956)

D16   "Discussion on 'Numerical AnalysisI' at the Convention on DigitalComputer Techniques". April 1956. Proc of IEE 103 (1956).

D17   T. Kilburn, G.R. Hoffman and P. Wolstenholme, "Reading of Magnetic Records by Reluctance Variation", Proc of IEE 103 (1956). (2 copies)

D18   R.A. Brooker and F.H. Sumner, "The Method of Lanczos for Calculating the Characteristic Roots and Vectors of a Real Symmetric Matrix", Proc of IEE 103 (1956). (2 copies)

D19   R.A. Brooker, "The Programming Strategy used with the Manchester University Mark I Computer", Proc of IEE 103 (1956). (2 copies)

D20   "Discussion on 'Magnetic Tape: Input, Output and Auxiliary Storage' at the Convention on DigitalComputer Techniques, 11 April 1956". Proc of IEE 103 (1956). (2 copies)

D21   "Discussion on 'Construction and Performance of Experimental Computers' at Convention on DigitalComputer Techniques, 11 April 1956". Proc of IEE 103 (1956). (2 copies)

D22   R.A. Brooker, "The Autocode Programs Developed for the Manchester University Computers", reprinted from The Computer Journal 1958 (2 copies)

D23   R.A. Brooker, "Further Autocode Facilities for the Manchester (Mercury) Computer", reprinted from The Computer Journal 1 (1959).

D24   T. Kilburn, "Digital Computing Machines". Proc of IEE 106 (1959). (2 copies)

D25   "Measurement and Control Section: Specialist Discussion Meetings on New DigitalComputer Techniques, 1617 February 1959", Proc of IEE 106 (1959). (2 copies).

D26   "Computers Developed at Manchester University from Mark I Prototype to Presentday Model", 1959.

D27   R.L. Grimsdale, F.H. Sumner, C.J. Tunis, and T. Kilburn, "A System for the Automatic Recognition of Patterns", Proc of IEE 106 (1959).

D28   "Electronic and Communication Engineering (including Radio Engineering), Part B. Proc of IEE 106 (1959). (2 copies)

D29   T. Kilburn and R.L. Grimsdale, "A Digital Computer Store with Very Short Read Time"; T. Kilburn, B.G. Edwards and D. Aspinall, "A Parallel Arithmetic Unit Using a SaturatedTransistor FastCarry Circuit"; D.B.G. Edwards, M.J. Lanigan and T. Kilburn, "FerriteCore Memory Systems with Rapid Cycle Times"; G.R. Hoffman, D.H. Smith and D.C. Jeffreys, "HighSpeed Light Output Signals from Electroluminescent Storage Systems", Proc of IEE 107 (1960).

D30   R.A. Brooker, "Some Techniques for Dealing with TwoLevel Storage", reprint from The Computer Journal 2 (1960). (2 copies)

D31   R.A. Brooker and D. Morris, "Some Proposals for the Realization of a Certain Assembly Program", reprint from The Computer Journal 3 (1960). (2 copies)

D32   A. Gibbons, "Running Pegasus Autocode Programs on Mercury", reprint from The Computer Journal 3 (1960).

D33 K.I. Turner and J.E. Thompson, "The Magnetic Drum Store of the 'Mercury' Computer", reprint from Electronic Engineering (1960).

D34 R.A. Brooker, "MERCURY Autocode: Principles of the Program Library", reprint from Annual Review in Automatic Programming I (1960). (2 copies)

D35 G.R. Hoffman, J.A. Turner and T. Kilburn, "Highspeed Digital Storage Using Cylindrical Magnetic Films", reprint from J Brit IRE 20 (1960).

D36 R.A. Brooker, D. Morris and J.S. Rohl, "Trees and Routines", reprint from The Computer Journal 5 (1961). (2 copies)

D37 T. Kilburn, D.J. Howarth, R.B. Payne and F.H. Sumner, "The Manchester University Atlas Operating System. Part I: Internal Organisation", reprint from The Computer Journal 4 (1961). (3 copies)

D38 M.J. Somerville and G.F. Turnbull, "Design of an Accurate Simulator for SampledData Systems", Proc of IEE 109 (1962).

D39 T. Kilburn, R.B. Payne and D.J. Howarth, "The ATLAS Supervisor", reprint from Computers Key to Total Systems Control" , n.d. (3 copies)

D40 W.F. Lunnon and G. Riding, "The ATLAS Autocode Mini Manual", Manchester University Computer Science Department, July 1965. (2 copies).

NAHC/MUC/3. Papers of Manchester University Department of Computer Science, ca. 1965 to Date.

NAHC/MUC/3/A. Biographical and Personal Papers

A1 Tape recording of Professor Tom Kilburn by Dr. Chris Evans for Science Museum. Final edited version (enclosed) received early February 1976. Relevant correspondence also enclosed.

A2 Tony Brooker, "Some Personal Recollections of the Early Days", typescript, pp.4, 1988.

NAHC/MUC/3/B. Correspondence

B1a,b Correspondence of Professor Simon H. Lavington Manchester University (now Essex University), ca. 1968-78. Includes files of letters on, inter alia: Lavington's work on speech conversion; NRDC speech recognition patent 1965; logical design; Manchester University Department of Computer Science Open Days.

B2a,b,c Correspondence of Professor Simon H. Lavington, concerning the history of computers. The papers relate to Lavington's publications: mainly

History of Manchester Computers (Manchester: NCC, 1975)

"The Early Days of British Computers", Electronics & Power (1978-9)

Early British Computers (Manchester: MUP, 1980).

Simon Lavington corresponded with most of the leading computer pioneers, including such luminaries as Booth, Wilkes and Kilburn. There are also letters relating to the organisation of computer history exhibitions; replies to enquirers concerning the history of Manchester computers; and working drafts and proofs of Professor Lavington's publications.

NAHC/MUC/3/C. Reports and Working Papers

C1 Compiler ABL. Correspondence, 1965-7; ABL6 Listing; Library Routines.

C2 Folder of typescripts re. ATLAS autocode compilers, ca.1966.

C3 "Further Literature on Compilers AA and AB", bound typescript, ca. 1966.

C4 "Flow Charts for Compiler AB", bound typescript, pp.112, 1966 (there is also an unbound copy).

C5 Compiler typescripts, 1966, including:

"Notes on Defining Special AA Compilers."

"Notes on Magnetic Tape Input/Output Facilities for Compiler AB".

"Notes on Private ABC Compilers".

C6 "Compiler AB: Blocks 114", 2 folders, ca. 1966.

C7 "Atlas Disc Log Book", 1967.

C8a "1st Year Electronics Laboratory: Experiment Scripts 1967-8".

C8b 3 boxes of notes, working papers, printouts re. S.H. Lavington's Ph.D. thesis on measurement systems for automatic speech recognition, ca.1967-8. There is also a roll of speech converter logic diagrams.

C9 Miscellaneous typescripts, 1967-8:

"University Computing Service: July 1967-June 1968", pp.2. Details of computer use and costings.

P.H. Hughes, "University Computer Benchmark Report July 1967. Atlas/6600/1108", typescript, pp.10 + tables, 1967.

G.Riding, "The Atlas Logging System. Part I General Formats (Revised); Part II Logging Programs (Revised)", typescript, 1967.

M.H.J. Baylis and P.E. Bryant, "FORTRAN A Comparative Study", typescript, pp.29, 1968.

P. Bryant, "FORTRAN A Comparative Study", typescript, pp.29, 1968.

C10 T. Kilburn, D. Morris, J.S. Rohl and F.H. Sumner, "A System Design Proposal (Confidential)", revised January 1968, typescript, pp.21 + tables.

C11 MU5: Provisional Specification for the Order code, May 1968, pp.1.

C12 "Basic Characteristics of Paging as Implemented on the PF51 (1906A) System", typescript, 1968, pp.2.

C13 "City and Guilds Mnemonic Code on ATLAS", typescript, 2nd edition 1968, pp.12 + appendices.

C14 "New Machine Manual (Issue 1)", typescript, 1968.

C15 File of papers marked "1905 E Associative Store: Documentation", 1969.

C16 Miscellaneous reports re. Design Department, 1969.

C17 D. Morris and G.D. Dotlefson, "A Virtual Processor for Real Time Operation", typescript, 1969.

C18 File of miscellaneous typescripts, including:

"Guidelines for Production of Logic Diagrams [for ICL System 67]," n.d.

D. Aspinall, "Documentation for New Machine", typescript, pp.3, 1969.

"ICs and Modules for New Machine", typescript, pp.1, 1969.

"System 67 (69)", freehand notes, pp.2, 1969.

"University Simulation ICL System 69 Facility", typescript, pp.2, 1969.

G.D. Detlefsen, G.R. Frank, R. Lane, T.J. Sweeney, "Programmes Reference Manual VIPER/1900 Virtual Processor E xecutive Routine", draft typescript, 1970.

"A Glossary of Terms Relevant to Digital Computers", typescript, pp.12, n.d.

"A Summary of the COSMOS Commands", n.d.

C19 N. Jordan and R.W.A. Morris, "A Three Dimensional Drawing Package in ALGOL '60", typescript, pp.5 + appendices, n.d., ca. 1969(?).

C20 University of Manchester Regional Computer Centre, "Users' Handbook"; "Users' Manual". 2 vols, 1970.

C21 File of miscellaneous papers, reports, booklets on Department of Computer Science, ca. 1970+. Contains information and photographs of staff, students, courses, facilities, etc.

C22 File of material on Department of Computer Science tutorials, 19712.

C23 Department of Computer Science, Examination Papers, ca.1971.

C24 Papers re. Educational Technology Users' Consultative Committee, 1971-4.

C25 Papers re. SRC new grant application, 1971+.

C26 "Application for a Scientific and Technical Equipment Grant", typescript, 1971. Includes extensive description of Department of Computer Science at this time.

C27 S.H. Lavington, "Logical Design of Computers: CourseTutor's Notes", typescript, 2nd edition, 26, 1971; "Background Notes on Computer System Design", typescript, pp.24, 1971.

C28a "MU5 Basic Programming Manual", typescript, 1972. (2 copies).

C28b "MU5 Manual. Part 4 Chapter 20. Test Programs", typescript, 1971. (2 copies).

C28c "MU5 Manual. Part 4 Chapter 3. The Primary Operand Unit", typescript, 1972.

C29 "MU/MX Operating System. System Manual", typescript, pp.107, 1971.

C30 File of papers re. MU5 Compiler System, ca.1971+, e.g. P.C. Capon, "The MU5 Virtual Machine", typescript, pp.9, 1973; P.C. Capon, "Order Codes That Suit Programming Languages", typescript, 1974.

C31 Notebook marked "Exchange Log", March 1972 January 1973.

C32 Michael A. O'Hare, "Automated Game Playing", a thirdyear project report, 1972.

C33 "Application to the SRC for a Research Grant", typescript, pp.46, 1972.

C34 MU5 Project: Minutes of the Engineering Progress Meeting Held on Tuesday, 29th June, 1972", pp.2.

C35a "ICL Standard Interface", typescripts, 1973.

C35b "Programming Laboratory Manual", typescript, 1974- 5.

C36 "DRP Implementation Description", typescript, 1975.

C37 "1st Year Electronics Laboratory. CS 101. Experiment Scripts, 1975-1976", typescript.

C38 Folder of material re. Committee on Educational Methods, 1975+.

C39a Folder of material re. FORTRAN course, ca.1975.

C39b FORTRAN notebook MU5/2900, 1976.

C40 "MU5 Hardware Manual", typescript, 1976.

C41   "General Information Concerning Third Year Laboratory Projects 1976-1977", typescript, 1976.

C42   "MUSS Basic System Manual", typescript, 1977.

C43   List of publications relating to MU5 (up to 1978).

C44   "Report of a Working Party on the Revision of the Engineering Teaching Laboratories", typescript, 1978. (2 copies).

C45   "A Proposal for the Revision of the Engineering Courses", typescript, 1978.

C46   "1st Year Electronics Laboratory. CS 101. Experiment Scripts, 1978/1979", typescript, 1978.

C47   "Draft Proposal for an MSc course on Integrated Circuit Design", typescript, 1979.

C48   "MU6G Description", typescript, 1979.

C49   Correspondence and papers re. Farrell Bridge Ltd of Rochdale and proposed computer programming course, 1979.

C50   "Submission to IEE in Respect of Degree in Computer Engineering", typescript, 1982. (2 vols).

C51   "The Official Opening of the IT Laboratories by HRH, The Princess Royal, Commemorating 40 Years of Computing at Manchester University 1948-1988". Commemorative folder and leaflets.

NAHC/MUC/3/D. Publications

D1   D. Morris, F.H. Sumner and M.T. Wyld, "An Appraisal for the ATLAS Supervisor", Proc ACM National Meeting (1967).

D2   S.H. Lavington and L.E. Rosenthal, "Some Facilities for Speech Processing by Computer", The Computer Journal 4 (1967).

D3   S.H. Lavington, Logical Design of Computers: A Course of 12 Television Lectures (Manchester, 1968-9).

D4   M. Buckley, P.C. Capon, M.C. Stone and A.J. Willmott, "A Small Medical Computing System", Computer Bulletin13 (1969).

D5   S.H. Lavington, "Computer Science". Brief history from University Prospectus, 1970.

D6   D. Morris, I.R. Wilson and P.C. Capon, "A System Program Generator", Computer Journal 13 (1970).

D7   P.C. Capon, D. Morris, J.S. Rohl and I.R. Wilson, "The MU5 Compiler Target Language and Autocode", Computer Journal 15 (1972?).

D8   S.H. Lavington, "Computer Science"; "Computers on the Campus" (1974). Brief historical sketches from University publications.

D9   S.H. Lavington, G. Thomas and D.B.G. Edwards, "The MU5 Multicomputer Communication System", IEE Trans on Computers C25 (1977).

D10   "Computers Developed at Manchester University from Mark I Prototype to PresentDay Model", n.d., copy of captioned illustrated compilation.

NAHC/NPL

NATIONAL PHYSICAL LABORATORY

In 1945 a Mathematics Division was established in the National Physical Laboraory (NPL) at Teddington, in order to coordinate facilities and techniques relating to machineaided computation. As regards building a stored-program computer, the NPL received most of its impetus from the disbanded COLOSSUS team from Bletchley Park, particularly Dr Alan Turing. In 1946 Turing presented to the Executive Committee of the NPL a complete design for a universal computer an Automatic Computing Engine (ACE). The proposal was accepted by the NPL director, Sir Charles Galton Darwin, who probably thought of the ACE project in terms of a single national effort. The fragmentation of British technical personnel and resources after the Second World War, however, meant that this dream was never realised. Eventually a successful version of Turing's machine (the Pilot ACE) was built, which became the progenitor of the English Electric DEUCE; but by then a disillusioned Turing had left the NPL (leaving J H Wilkinson and E A Newman in charge), and his complicated instruction format ensured that his machine's influence was limited. Turing's design for the ACE, however, has its admirers.

Provenance: Department of Computer Science, University of Manchester, courtesy of Professor D B G Edwards. Material collected by Professor Simon Lavington.

References: Martin Campbell-Kelly, "Programming the Pilot ACE: Early Programming Activity at the National Physical Laboratory", *Annals of the History of Computing* 3 (1981); B E Carpenter and R W Doran, *A M Turing's ACE Report of 1946 and Other Papers* (Cambridge, Mass: MIT Press, 1986).

See also: NAHC/TUR; NAHC/MUC .

The collection comprises two boxes of archival material.

NAHC/NPL/A. Historical

A1   Draft article by Martin Campbell-Kelly, "Programming the Pilot ACE: Early Programming Activity at the National Physical Laboratory" (1979). Published in Annals of the History of Computing (1981).

A2   Press cuttings and ephemera file.

NAHC/NPL/C. Working Papers and Reports

C1   "The Automatic Computing Engine", typescript, pp.62, Military College of Science, Shrivenham, 1947. "This account is based on a series of informal talks given by Dr. A.M. Turing and Mr. Wilkinson of the Mathematics Division of the National Physical Laboratory".

C2   "Progress Report on the Automatic Computing Engine", typescript, pp.127, Mathematics Division, April 1948.

C3   "Second Progress Report on the Automatic Computing Engine", typescript, pp.18 + graphs, Mathematics Division, June 1949. 2 copies.

C4   "Report on the Pilot Model of the Automatic Computing Engine: Part II The Logical Design of the Pilot Model", typescript, pp.16, Mathematics Division and Electronics Section, 1951.

C5   "Automatic Digital Computation", Proceedings of a Symposium held at the NPL on March 25, 26, 27 and 28, 1953, typescript, pp.296, HMSO, 1954. 2 copies.

C6   "Report on the Washington Joint AIEEAIREACM Computer Conference, December 810, 1953 D.W. Davies", typescript, pp.18, Mathematics Division, 1954.

C7   "The Work of Mathematics Division", typescript, pp.4, 1954.

C8   J.H. Wilkinson, "Rounding Errors in Algebraic Processes", typescript, pp.22, NPL, 1956.

C9   Department of Scientific and Industrial Research, "Wage Accounting by Machinery", typescript, pp.54, 1956. Report of a Study Group of which the NPL was a part.

C10   F.M. Blake et al, "Some Features of the ACE Computer", typescript, pp. 28 + diagrams, 1957.

C11   "Specification for Data Processing Modules", typescript, pp. 8 + iv, 1964.

C12   NPL, "Notes for the Reader of Machine Translations", typescript with freehand notes, pp.14, 1966.

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D1   S.W. Skan, "Handbook for Computers", 2 vols, DSIR, 1954.

D2   J.H. Wilkinson, "An Assessment of the System of Optimum Coding Used on the Pilot Automatic Computing Engine at the National Physical Laboratory", Philosophical Trans. of the Royal Society Series A. 248 (155).

D3   J.H. Wilkinson, "Error Analysis of Direct Methods of Matrix Inversion", Journal of Assoc. for Computing Machinery 8 (1961).

D4   J. H. WIlkinson, "THe Calculation of Lame Polynomials", Computer Journal 8 (1965).

NAHC/NPL/Add.MS.

The material in this bibliography consists of documents used by Martin Campbell-Kelly in preparing the report "Data Communications at the National Physical Laboratory 1965-1975." The material has been assigned to four box files according to document type:

NAHC/NPL/Add.MS/1 : Unpublished Memoranda 1965-1969

NAHC/NPL/Add.MS/2 : Unpublished Memoranda 1970-1975

NAHC/NPL/Add.MS/3 : Publications and Conference Papers

NAHC/NPL/Add.MS/4 : Divisional Reports

NAHC/NPL/Add.MS/5 : Divisional Technical Memoranda

Detailed listings for each box are given below. The listing of box 3 is intended to serve as a bibliography of the published articles, books and conference papers generated by the NPL DCN project during the period 196575. Where items are undated, they have been placed at a point suggesting the probable date. Items dated later than 1975 are generally historical or retrospective accounts of the work. Although a handful of items have not been located (in some cases because there is no surviving manuscript of a conference presentation) bibliographical details are included for the sake of completeness. This bibliography serves as a handlist for the document collection, which has been deposited in the library of the Division of Information Technology and Computing, NPL. In Box 1 there is a transcript of D W Davies interviewed by Martin Campbell-Kelly at the NPL, 17 March 1986, pp.32.

Provenance: Documents donated by Dr Martin Campbell Kelly.

NAHC/NPL/Add.MS/1 : Unpublished Memoranda 1965-1969

1.1   D W Davies. n d. Report on a Visit to USA in May 1965.

1.2   D W Davies. Nov 10, 1965. Remote Online Data Processing and its Communication Needs.

1.3   D W Davies. Nov 16, 1965. Further Speculations on Data Transmission.

1.4   D W Davies. Dec 15, 1965. Proposal for the Development of a National Communication Service for Online Data Processing .

1.5   Anon. March 18, 1966. List of Attendees of the Davies Seminar: The Future Digital Communication Network.

1.6   D W Davies. June 1966. Proposal for a Digital Communication Network.

1.6b   Anon. n d. Circulation list for Davies, June 1966 (1.6 above.)

1.7   D W Davies. July 28, 1966. A Computer Network for NPL

1.8   P T Wilkinson. n d. Two Models of a Digital Communications Network.

1.9   R A Scantlebury and K A Bartlett. Aug 22/24, 1966. Node Computer: Some Considerations.

1.10   R A Scantlebury and K A Bartlett. Nov 1966. The Design of a Maximum Hardware Node.

1.11   P T Wilkinson. Nov 1966. The Node Computer: Control Programs for the Elliott 4120.

1.12   R A Scantlebury and K A Bartlett. Dec 1966. Design of a Node Based on XL12 Computer.

1.12b   Plessey. nd. Basic Design Memorandum: Proposed XL12 A.D.T. Input/Output System.

1.13   P.T. Wilkinson. Dec 1966. Characteristics of the XL12 Node.

1.14   R A Scantlebury and K A Bartlett. Dec 1966. The Interface Unit Some Considerations.

1.15   P T Wilkinson. Feb 1967. XL12 Node with Minimum Link Hardware .

1.16   Anon (probably R A Scantlebury and K A Bartlett). Feb 1967. An NPL Data Communications Network Based on the Plessey XL12 Computer.

1.17   R A Scantlebury and K A Bartlett. Apr 19, 1967. A Protocol for Use in the NPL Data Communications Network.

1.18   B A Wichmann. May 1967. An Electronic Typewriter.

1.19   Anon (probably D W Davies). July 1967. NPL Steering Committee: A Digital Communication Network for NPL.

1.20   D W Davies. June 1967. FID/IFIP Conference 1967 on Mechanized Information Storage, Retrieval and Dissemination.

1.21   P T Wilkinson. June 5, 1967. A Proposal on the Facilities to be Provided by the NPL Communication Network.

1.22   K A Bartlett. July 1967. The Effect of the Protocol on the Data Rate of NPL Communication Links.

1.23   K A Bartlett. Aug 1967. The Control of Computer Terminated Links in the NPL Communications System.

1.24   Anon (probably K A Bartlett). Aug.1967. NPL Communications System: Facilities Offered by Low and Medium Speed Terminal Hardware .

1.25   K A Bartlett. Aug 15, 1967. NPL Communications System: Line Control and Status Codes.

1.26   D W Davies. Jan 12, 1968. Communication Requirements for Real-Time Systems.

1.27   P T Wilkinson. Feb 1968. The Main Features of a Proposed National Data Communication Network.

1.28   D W Davies. May 1968. Report on a Visit to the United States of America 20th April 10th May 1968.

1.28b   D W Davies. May 1968. Report on a Visit to the United States of America 22nd April10th May, 1968: Short Version of Report

1.29   D W Davies. n d. The Role of NPL in Computer Science and Technology.

1.30   D W Davies. June 1968. A Comparison of Data Communication Network Designs.

1.31   D W Davies. July 15, 1968. Proposal for an Experimental Low Speed Data Communication Network.

1.32   D W Davies. Sep 17, 1968. The Interface between a Data Communication Network and a Subscriber's Multiaccess Computer .

1.33   D W Davies. Nov 1968. Communication Requirements of a Mintech Computer Network.

1.34   D W Davies. Feb 10, 1969. Observations on the Computer System for Mintech Establishments.

1.35   D L A Barber. Mar 1969. Possible Computer Systems, extract from Mintech network proposals).

1.36   D L A Barber. Oct 1969. Visit to Canada and the USA, 22 September 17 October, 1969.

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NAHC/NPL/Add.MS/2 : Unpublished Memoranda 1970-1975

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2.2   P T Wilkinson. Dec 1970. Connection of the Disc File DDP516 to the NPL Network.

2.3   D L A Barber. nd. A European Data Communications Network .

2.4   P T Wilkinson. Jan 1971. The Organisation of the NPL Data Network.

2.5   Anon. Mar 1971. The Installation of the NPL Data Communications Network.

2.6   D L A Barber, K A Bartlett and P T Wilkinson. Apr 1971. NPL Network: Further Development.

2.7   P T Wilkinson. May 1971. Message handling in the NPL Data Network: Preliminary Specification.

2.8   P T Wilkinson. Oct 1971. Some Thoughts Concerning the ARPA, NPL and PO Networks.

2.9   K A Bartlett. Nov 4, 1971. NPL Data Communications Network Crash Report October 1971.

2.10   P T Wilkinson. Nov 1971. Packet Switching Transit Node: Amended Simulation Model, November 1971.

2.11   A J Gardner. Nov 1971. Modifications in Design of Mark II NPL Data Network.

2.12   A J Gardner. Dec 1971. Message Control Procedures.

2.13   P T Wilkinson. Dec 1971. A Note on Congestion Control in Packet Switching Networks.

2.14   D L A Barber. Feb 9, 1972. Network Traffic.

2.15   P T Wilkinson. nd. Computer Communications Research at the NPL.

2.16   P T Wilkinson. July 26 1972. Packet Switching Transit Node: Two Alternative Link Control Protocols.

2.17   Anon. Mar 1973. System Equipment Manual, (extract).

2.18   Anon. May 1, 1973. Brief Guide to the NPL Data Communication Network.

2.19   P T Wilkinson. 1973. The Network Control Software.

2.20   P T Wilkinson. June 1973. Future Work on the MK11 DCN Software.

2.21   P T Wilkinson. Dec 11, 1973. Status of Work on the DCN Software at 11/12/1973.

2.22   P T Wilkinson. nd. Report on a Visit to Baden near Vienna, October 2026.

2.23   K A Bartlett and P T Wilkinson. nd. The Effect of a Data Communications Network on a Community of Computer Users.

2.24 W L Price. June 1974. Network Management: Parallels Between Performance and Practice in Packet Switched Data Networks and Telephone Networks.

2.25 P T Wilkinson. Mar 11, 1975. The Functions and Organisation of the NPL Data Communications Network.

2.26 D W Davies. nd. Historical Note on the Early Development of Packet Switching.

2.27 D.L.A. Barber. nd. Costic Comments.

2.28 D L A Barber. Apr 1979. A Small Step for Britain; A Giant Step for the Rest.

2.29 D L A Barber. nd. Packet Switched Telecommunications.

2.30 D W Davies. 1985. A Personal View of the Origins of Packet Switching. COMNET 1985, unpublished ms.

2.31 D W Davies. 1986. Transcript of an interview by M.Campbell-Kelly, March 17, 1986.

NAHC/NPL/Add.MS/3 : Publications and Conference Papers

3.1 D W Davies. Feb 1967. A Store-and-Forward Communication Network for Real-Time Computers and their Peripherals. PO Colloquium on Message Switching, Brighton, 14/114/7.

3.2 D W Davies. Apr 1967. Computer Technology. Advances in Computer Control, Bristol, S1 page 1 S1 page 9.

3.3 D W Davies. June 1967. Information Systems in a Community: The Communication Requirements. F.I.D.I.F.I.P. Conference on Mechanized Information Storage, Retrieval and Dissemination, Rome, preprint 2252.

3.4 D W Davies. July 1967. Some Design Aspects of a Communication Network for RapidResponse Computers. Computer Technology Conference , 200205.

3.5 D W Davies, K A Bartlett, R A Scantlebury and P T Wilkinson. Oct 1967. A Digital Communication Network for Computers Giving Rapid Response at Remote Terminals. ACM Symposium on Operating System Principles, Gatlinburg, Tennessee.

3.6 D W Davies. Dec 1967. A Communication Network for Computers and their Remote Peripheral Devices. Symposium on PCM, Brighton.

3.7 D W Davies, K A Bartlett, R A Scantlebury and P T Wilkinson. June 1968. A Data Communication Network for Real-Time Computers. IEEE International Conference on Communications.

3.8 D W Davies. Aug 1968. Communications Networks to Serve RapidResponse Computers. Proc.IFIP '68, 650658.

3.9 D W Davies. Aug 1968. The Principles of a Data Communication Network for Computers and Remote Peripherals. proc. IFIP '68 , 709715.

3.10 R A Scantlebury, P T Wilkinson and K A Bartlett. Aug 1968. The Design of a Message Switching Centre for a Digital Communication Network. Proc. IFIP '68, 723727.

3.11 P T Wilkinson and R A Scantlebury. Aug 1968. The Control Functions in a Local Data Network. Proc. IFIP '68, 734738.

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3.13 D W Davies. Jan 1969. A Communication Network for Real-Time Computer Systems. The Radio and Electronic Engineer 37, 1, 4752.

3.14 D W Davies. Mar 1969. A Versatile Data Communication Network. International Conference on Remote Data Processing, Paris.

3.15 D.L.A. Barber, D V Blake and R A Scantlebury. Mar 1969. Implementation of the British Standard Interface for Data Exchange Between Sources and Acceptors of Digital Data. Colloque International sur la Teleinformatique, Paris. (Text in Com Sci TM20.)

3.16 D W Davies. Apr 1969. The Use of Storage in Telecommunication Networks. IEE Conference on Switching Techniques for Telecommunication Networks.

3.17 K A Bartlett, R A Scantlebury and P T Wilkinson. May 1969. A Note on Reliable FullDuplex Transmission over Half-Duplex Links. Comm ACM 12, 5, 260261.

3.18 D L A Barber. Oct 1969. Experience with the Use of a BS Interface in Computer Peripherals and Communication Systems. ACM Symposium on Data Communications, Pine Mountain, USA. (Text in Com Sci TM 29.)

3.19 R A Scantlebury. Oct 1969. A Model for the Local Area of a Data Communication Network Objectives and Hardware Organization. Ibid.

3.20 P T Wilkinson. Oct 1969. A Model for the Local Area of a Data Communication Network Software Organisation. Ibid.

3.21 D W Davies. Oct 1969. Un Reseau de Transmission de Donnees a Grande Souplesse d'Emploi. L'Onde Electrique 49, 9. (Translation of 3.14).

3.22 D L A Barber. Nov 1969. Data Communications. NPL News .

3.23 D W Davies. 1969. Computers and Communications. Spectrum: Brit.Sci.News, 62, 67.

3.24 D L A Barber and D W Davies. Oct 1970. The NPL Data Network. Conference on Laboratory Automation, Novosibirsk. (Text in Com Sci TM 47.)

3.25 D L A Barber. Oct 1970. Computer Networks. Science Journal 6, 10, 6064.

3.26 R A Scantlebury. Jan 1971. Data Communications: Cornucopia or Bottleneck? Infotech State of the Art Report No.4: Computing Terminals.

3.27 D W Davies. 1971. Packet Switching in a Public Data Network. Proc. IFIP '71, 622627.

3.28 D W Davies. Oct 1971. The Control of Congestion in Packet Switching Networks. ACM/IEEE 2nd Symposium on Problems in the Optimization of Data Communications Systems, Palo Alto, California. (Text in 3.35 and Com Sci TM 56).

3.29 R A Scantlebury and P T Wilkinson. Oct 1971. The Design of a Switching System to Allow Remote Access to Computer Services by Other Computers and Terminal Devices. ACM/IEEE 2nd Symposium on Problems in the Optimization of Data Communications Systems , Palo Alto, California. (Text in Com Sci TM 57).

3.30 D W Davies. Dec 1971. Teleprocessing and Data Communication of the Future. Electronics and Power 17, 464467.

3.31 D L A Barber and R A Scantlebury. Current and Future Computer Network Options. Infotech State of the Art Report No.6: Computer Networks.

3.32 D W Davies. JanFeb 1972. Design for a Public Network. Data Processing, 4850.

3.33 D L A Barber, K A Bartlett and I G Dewis. May 1972. A Review of the Performance of the NPL Data Communications Network. Symposium on Computer Networks, Bonn, Germany.

3.34 W L Price. May 1972. Simulation of Data Transit Networks. Symposium uber Computer Netze, Bonn. (Text in Report Com Sci 56.)

3.35 D W Davies. June 1972. The Control of Congestion in Packet-Switching Networks. IEEE Trans. on Communications COM20, 546550.

3.36 D L A Barber. Sept 1972. Packet Switching Networks. AGARD Conference on Image Storage and Transmission Systems for Dissemination of Information, reprint 92.

3.37 D L A Barber. Oct 1972. The European Computer Network Project. Proc. ICCC, Washington.

3.37b   K A Bartlett and R A Scantlebury. Oct 1972. Control apparatus for units which become ready for operation at irregular times . British Patent 1294326.

3.38   P T Wilkinson. 1972. An Operating System for a Communications Control Computer. Proc. First European Seminar: Computing with Real-Time Systems, AERE, Harwell.

3.39   P T Wilkinson. May 1973. The NPL Packet-Switching Network. Conference Lecture Notes of the Minicomputer Forum, Brunel University.

3.40   I G Dewis. July 1973. An Outline of the Software of the NPL Data Communications Network. Proc. Software 73, Loughborough University.

3.41   W L Price. Nov 1973. Simulation of Packet Switching Networks Controlled on Isarithmic Principles. Proc. 3rd IEEE/ACM Data Communications Symposium, St. Petersburg, Florida.

3.42   D W Davies and D L A Barber. Dec 1973. Communication Networks for Computers. Chichester, UK:Wiley.

3.43   W L Price. July 1974. Design of Data Communication Networks Using Simulation Techniques. Computer Aided Design 5, 3, 171175.

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3.45   R A Scantlebury and P T Wilkinson. Aug 1974. The National Laboratory Data Communication Network. Proc. ICCC, Stockholm. (Revised text in Report Com 85.)

3.46   D W Davies. 1974. Packet Switching, Message Switching and Future Data Communication Networks. Proc. IFIP '74, 147150.

3.47   W L Price. 1974. Simulation Studies of an Isarithmically Controlled Store and Forward Data Communication Network. Proc IFIP '74, 151154.

3.48   Price, W.L. 1977. Data Network Simulation: Experiments at the National Physical Laboratory 196876. Computer Networks 1, 199210.

NAHC/NPL/Add.MS/4 : Divisional Reports

[File-level classmarks in Add.MS/4 may not match those supplied via Archives Hub. This is under investigation – JS 2005-08-05]

4.13   D L A Barber and E P H Woodroffe. July 1966. The NPL Standard Interface. Auto 13.

4.28   D L A Barber and E P H Woodroffe. Apr 1967. Some Aspects of a Highway Interface. Auto 28.

4.38   D L A Barber and D V Blake. May 1968. The Implementation of the British Standard Interface at NPL. Com Sci 38.

4.43   D L A Barber and D V Blake. Feb 1970. The Derivation, Description and Application at NPL of British Standard Specification 4421. Com Sci 43.

4.48   Anon. Apr 1971. Division of Computer Science: Progress Report July 1969 February 1971. Com Sci 48.

4.56   W L Price. Apr 1972. Simulation of Data Transit Networks . Com Sci 56.

4.58   W L Price and C O Baillie. July 1972. Further Simulation Studies of an Isarithmic Data Transit Network. Com Sci 58.

4.60   W L Price. Nov 1972. Survey of NPL Simulation Studies of Data Networks, 196872. Com Sci 60.

4.62   W L Price (ed). Dec 1972.Logical Description of a Program for the Simulation of Computer Networks. Com Sci 62.

4.64   R Healey. Jan 1973. Computer Network Simulation Study . Com 64.

4.68 W L Price. Apr 1973.Simulation of a Packet-switched Data Network Operating with a Revised Link and Node Protocol. Com 68.

4.70 D W Davies. Sept 1973. Introduction to the Post Office Experimental Packet Switched Service. Com 70.

4.71 W L Price. Sept 1973. Simulation of a Packetswitched Data Network Operating Under Isarithmic Control with a Revised Link and Node Protocol. Com 71.

4.72 W L Price. Mar 1974. A Study of Bifurcated Routing in a Data Network and the Effect of Isarithmic Flow Control in this Context. Com 72.

4.74 Anon. Apr 1974. Progress Report 197273. Com 74.

4.76 W L Price and G W Cowin. Sept 1974. The Effect of Link Errors and of Selective Upgrading of Link and Node Speed on Network Performance. Com 76.

4.78 P T Wilkinson. Feb 1975. Link Protocols for Use in Packet-switching Networks. Com 78.

4.81 W L Price. Dec 1975. Further Simulation Experiments on Adaptive Routing Using Locally Available Parameters. Com 81.

4.85 R A Scantlebury and P T Wilkinson. Dec 1976. The National Physical Laboratory Data Communication Network. Com 85.

4.87 W L Price. Jan 1977. Simulation of the 10Node Data Communication Network Operating with Link Speeds of 9.6 kb/s. Com 87.

4.92 W L Price. Sept 1977. Simulation Methods in Communication Network Design. Com 92.

NAHC/NPL/Add.MS/5 : Divisional Technical Memoranda

[File-level classmarks in Add.MS/5 may not match those supplied via Archives Hub. This is under investigation – JS 2005-08-05]

5.4 R A Scantlebury and K A Bartlett. August 1967. A Protocol for Use in the NPL Data Communications System. Com Sci TM 4.

5.7 Transmission Control Equipment for Use in the NPL Data Communication System. ComSci TM 7.

5.14 D L A Barber and A T Davies. Nov 1968. The Adaptation of NPL Standard Interface Equipment to Meet the British Standard Interface Specification. Com Sci TM 14.

5.20 D L A Barber, R A Scantlebury and K A Bartlett. Jan 1969. The Use of the British Standard Interface with Digital Computers . Com Sci TM 20.

5.25 D W Davies. June 1969. Transparency in a Data Communication Network. Com Sci TM 25.

5.28 Anon. Sept 1969. Some Aspects of the Work of the Division of Computer Science. Com Sci TM 28.

5.29 D L A Barber. Oct 1969. Experience with the Use of the B.S.Interface in Computer Peripherals and Communication Systems .

  R A Scantlebury. Oct 1969. A Model for the Local Area of a Data Communication Network Objectives and Hardware Organization

  P T Wilkinson. Oct. 1969. A Model for the Local Area of a Data Communication Network Software Organization. Com Sci TM 29.

5.36 D L A Barber. Jan 1970. Some Observations on Store-and-forward and Circuit-switched Data Networks. Com Sci TM 36.

5.38 A R Meetham. Mar 1970. Performance of a Simulated Multiplexer for Use in a Data Network. Com Sci TM 38.

5.47   D L A Barber and D W Davies. Oct 1970. The NPL Data Network . Com Sci TM 47.

5.51   D L A Barber. Nov 1970. The Choice of Packet Parameters for Packet Switched Networks. Com Sci TM 51.

5.52   D L A Barber. Mar 1971. Easing the Introduction of a Packet Switching Service. Com Sci TM 52.

5.56   D W Davies. Sept 1971. The Control of Congestion in Packet Switched Networks. Com Sci TM 56.

5.57   R A Scantlebury and P T Wilkinson. Sept 1971. The Design of a Switching System to Allow Remote Access to Computer Services by Other Computers and Terminal Devices. Com Sci TM 57.

5.58   Anon. Sept 1971. NPL Data Communication Network: User Operating Instructions. Com Sci TM 58.

5.59   W L Price and C O Baillie. Mar 1972. Simulation of an Isarithmic Data Transit Network. Com Sci TM 59.

5.61   I G Dewis. June 1972. NPL Data Communications Network: Hardware Facilities. Issue 2. Com Sci TM 61.

5.65   W L Price. June 1972. Logical Description of a Program for the Simulation of Computer Networks. Com Sci TM 65. (Reprinted as Report Com Sci 62).

5.69   D W Davies. Aug 1972. Calculation of the Spectral Density of HDB 3. Com Sci TM 69.

5.83   K A Bartlett. Feb 1974. Data Transfer Rates Attainable on the NPL Data Communications Network. Com Sci TM 83.

5.87   K A Bartlett and L A Pink. Nov 1974. Error Analysis of a Datel 48k Link Between NPL Teddington and CAD Centre, Cambridge . Com Sci TM 87.

5.90   P E Carter. July 1975. A Line Protocol Unit for the Post Office Experimental Packet Switched Service. Com Sci TM 90.

NAHC/NRD

NATIONAL RESEARCH DEVELOPMENT CORPORATION (NRDC)

This collection originated from the National Research Development Corporation (NRDC). Among the aims of the NRDC, which was a government body set up in 1949, was to encourage and stimulate the development of a successful British computer industry. All the papers in this collection refer to the computing side of the NRDC's activities.

The Corporation was headed by the Managing Director, the Rt Hon The Earl of Halsbury. Dr Dennis Hennessey and H J Crawley were employees of the NRDC, which also retained a number of computer experts, the most outstanding of whom was Christopher Strachey. The NRDC became directly involved with computer industry by placing contracts. The first was in 1951 between Ferranti and the University of Manchester, when the NRDC invested £400,000. The second was in 1953 with Elliott Bros (401) later transferred to Ferranti which cost a total of £500,000 and resulted in Pegasus. The next contract (£620,000) went to EMI for its 1100 and 2400 computers. Attempts to catch up with the US also led to the NRDC supporting the ATLAS project, based at the University of Manchester. Besides these activities the Corporation also underwrote unsuccessful attempts to develop magnetic tape storage devices with Pye Ltd and Epsylon Ltd. In computer applications, it rented an Elliott 401 to Rothamsted Experimental Station; and purchased an Elliott 405 for installation at Siemens Ltd telephone works at Woolwich for production control. In 1959-60 it also launched a third initiative in production control the ARCH project. A prototype EMI computer was also installed at Austin's Longbridge works in 1958 as part of Corporation's funding of the EMIDEC 2400 development, while a short study of the possible uses of computers in the shipbuilding industry was also funded by the NRDC.

Small-scale but important attempts were also made to establish a British computer community. In 1953-9 the NRDC made computer science studentships available at Cambridge and Manchester, although the response was said to be "small" in 1955. It provided temporary premises and support for the birth of the British Computer Society 1957-8; and helped in the organisation of the 1958 computer exhibition at Olympia. The NRDC also exploited its patent holdings. By 1956 it administered 733 computer patents resulting from 201 inventions. The sale of the Manchester patents to IBM, for example, had netted £125,712 by end of 1956, a sum well in excess of £101,000 paid out in patent fees by 1957. In 1957 the Corporation created a Patents Pool for the common use of the British computer industry, though some firms such as BTM stayed aloof.

During the 1950s computer development was the single most important aspect of the NRDC's activities from £928,000 expenditure in 1954, £325,000 was for computers. Around 1960, after advice from the Government, the Corporation decided to withdraw from mainstream computer activity. But after the return of the Labour Government in 1965 it provided £5 million to finance the further development of the ICT 1900 series. The Corporation's main involvement in the 1970s was in supporting developments in software, such as its whollyowned subsidiary Genesys Ltd and Compeda Ltd.

The papers in this collection cover the years 1949-71. The papers have been kept in the boxes in which they arrived from the NRDC. The loose files have been placed in boxes.

Provenance: Institution of Electrical Engineers, London. Original IEE references for this collection have been retained.

References: John Hendry, *Innovating for Failure: Government Policy and the Early British Computer Industry* (Cambridge, Mass.: MIT Press, 1990).

The collection comprises 49 boxes of archival material. NB: boxes formerly classified as 86/1, 86/2… and individual files formerly classified 86/1/1, 86/1/2… were reclassified in line with other NAHC holdings in July 2005, and should now be cited as NAHC/NRD/C1…, NAHC/NRD/C1/1… Many items additionally bear defunct NRDC classification codes which were used at the IEE; these have been retained for ease of reference, but should not be cited – JS 2005-08-08

Box C1 : NRDC No C5/71/6

C1/1   "Minutes and reports NRDC Sub-Committee on Electronic Computers" 1954-56

C1/2   "Minutes and reports NRDC Sub-Committee on Electronic Computers" 1956-57

Box C2 : NRDC No C5/7.1/6 C5/7.1/11.1

C2/1   "Patents Provisional Specifications" 1949-50

C2/2   Minutes and Reports NRDC Sub-Committee on Electronic Computers" 1957-59

C2/3   "Reports" 1952-59

Box C3 : NRDC No C5/7.1/11.2 C5/7.1/12.5

C3/1   "Computers: Electronic, Manchester University Patent Prosecution". Patent applications, correspondence. 1949-51

C3/2   "Computers Electronic, Manchester University Conveyances in". Correspondence 1950-51.

C3/3   "Electronic Computers, Manchester University Assignment". Correspondence 1952-71.

C3/4   "Electronic Computers, Manchester University Conveyances Out". Correspondence 1951.

C3/5   "Computers, Manchester University, Patent Search". Correspondence 1953

C3/6   "Electronic Computers, Manchester University, Technical Notes". Chapters from Faster Than Thought, B V Bowden. Reports 1951.

C3/7   "Computers, Technical Reports". Reports, Correspondence 1952-55

C3/8   "Computers, Technical Notes". Correspondence, reports 1951-52

C3/9   "Computers Electronic, Manchester University, Technical Notes". Ferranti Mark I 1949-51

C3/10   "Computers Electronic, Technical Nomenclature". Correspondence 1952-53.

Box C4 : NRDC No C5/7.1/13.4 C5/7.1/13.9

C4/1   "Computers, Manchester University, Development". Correspondence 1949-61

C4/2   "Computers, Manchester University, Development". Draft reports 1956

C4/3   "Computers Electronic, Manchester University Related Projects, Vol I". Correspondence, Reports 1950-51

C4/4   "Computers, Related Projects, Vol 2". Correspondence 1952

C4/5   "Computers, Related Projects, Vol 3". Correspondence 1952-54

C4/6   "Computers, Related Projects, Vol 4". Correspondence 1954

C4/7   "Computers, Related Projects, Vol 5". Correspondence 1954-58

C4/8   "Electronic Computers, Manchester University Exploitation". Correspondence 1952-64

C4/9   "Computers: Manchester University Research (for Development)". Correspondence 1951-52

C4/10   "Computers, Manchester University, Research Grants". Correspondence 1951-54

Box C5 : NRDC No C5/7.1/13.11 C5/7.1/17

C5/1   "Computers, Manchester University, User Enquiries etc." Correspondence 1952.

C5/2   "Computers, Manchester University, User Enquiries etc." Correspondence 1954-56

C5/3   "Computers, Manchester University, Users". Correspondence 1955-57

C5/4   "Computers, Manchester University, Scholarships". Correspondence 1953-59

C5/5   "Computers, Manchester University, Sales and Purchase Agreements". Correspondence 1954-57

C5/6   "Computers, Manchester University, Accounts". Correspondence 1950-57

C5/7   "Manchester University Computer, Charges (fees) for Use". Correspondence 1952-58.

C5/8   "Computers Electronic, Manchester University, Publicity". Correspondence 1951

C5/9   "Computers, Publicity". Correspondence 1951-52

C5/10   "Computers, Manchester University, Publicity". Correspondence 1953-55

C5/11   "Computers Electronic, Manchester University". Photographs. N.d.

Box C6 : NRDC No C5/7.1:2/2 C5/7.1:6/11.6

C6/1   "Computers, NRDC, Organisation and Procedure". Correspondence 1952

C6/2   "Computers, Mechanical Engineering Research Laboratory". Correspondence 1954

C6/3   "Computers, Leeds University". Correspondence 1955

C6/4   "Computers, Liverpool University". Correspondence 1954-55

C6/5   "Computers, Birmingham University". Correspondence 1954-55

C6/6   "Computers, Birmingham University". Correspondence 1955-56

C6/7   "Computers, Glasgow University". Correspondence 1954

C6/8   "Computer MOS/DSIR Development Contract. Correspondence 1952-54

C6/9   "Electronic Computers, Manchester University GEC". Correspondence 1952

C6/10   "Computers, General Electric Company, Development". Correspondence 1949

C6/11   "Computers, British Tabulating Machines & Ferranti Development". Correspondence 1949-54

Box C7 : NRDC No C5/7.1:6/11.6 C5/7.1:29/13.4

C7/1   "Electronic Computers, Manchester University Ferranti, Conveyances In". Assignment 1951

C7/2   "Computer, Ferranti, Patent Study". Correspondence, reports 1952-55.

C7/3   "Computer, Ferranti, Miscellaneous". Correspondence 1950

C7/4   "Computers, Manchester University/Ferranti, Technical Notes". Copy of Specification for Ferranti Computers. N.d.

C7/5   "Computers, Manchester University/Ferranti Development, Vol I". Reports, etc, 1951-52

Box C8 : NRDC No C5

C8/1   "Computers Electronic, Manchester University: IBM Miscellaneous". Correspondence 1951

C8/2   "Computers, International Business Machinery, Conveyances Out, Licence". Licence Agreement 1950

C8/3   "Computers, International Business Machines, Licence". Draft Licences, correspondence 1950

C8/4   "Computers, International Business Machines, Licence". Correspondence, reports 1950-51

C8/5   "Correspondence, copies of agreement". 1950-51

Box C9 : NRDC No C5/7.1:29/13.4

C9/1   "Computers, Manchester University/Ferranti, Development, Vol 2". Correspondence 1952-67

C9/2   "Computers, Manchester University/Ferranti, Development, Vol 3". Correspondence, report 1956-64

C9/3   "Computers, Manchester University/Ferranti, Development". Reports, Agreements 1952-54

Box C10 : NRDC No 181

C10/1   "Computers, Ferranti Ltd, Functional Description MKI". Report 1953

C10/2   "Computers, Ferranti, Accountancy". Correspondence 1952

C10/3   "Computers, Ferranti Ltd, Accounts". Correspondence 1954-56

C10/4 "Computer, Ferranti Publicity Literature". Brochures, photographs 1952-53

C10/5 "Computers FPCI Ferranti Publicity". Correspondence 1954-55.

C10/6 "Electronic Computers, Manchester University/ Ferranti Progress reports, File No 1". Correspondence 1952-54

C10/7 "Computers, Manchester University/Ferranti Progress Reports, File No 2". Correspondence 1955

C10/8 "Computers, Agricultural Research Council, Vol 1". Correspondence 1953-64

C10/9 "Computers, Agricultural Research Council, Vol 2". Correspondence 1965

Box C11 : NRDC No C5/7.1:35/1 C5/7.1:117/1

C11/1 "Computers, Agricultural Research Council, Pocket". Agreements 1954-55

C11/2 "Computers, Rothamsted, Research for Development (BTM)". Correspondence 1954

C11/3 "Transfer of Elliot 401 Computer to the Science Museum". Correspondence 1965

C11/4 "Computers, Peat, Marwick, Mitchell & Co". Correspondence 1954

C11/5 "Computers, US Government". Correspondence 1950- 51

C11/6 "Computers, US National Bureau of Standards, Conveyances In Correspondence". 1950

C11/7 "Computers (405) Elliott Bros, Vol 1". Correspondence 1956-58

C11/8 "Computers (405) Elliott Bros, Vol 2". Correspondence 1958-59

C11/9 "Computers (405) Elliott Bros, Vol 3". Correspondence 1960-66

C11/10 "Computers (405) Elliott Bros, Pocket". Report, drawings 1959

Box C12 : NRDC No C5/7.1:117/1 C5/7.1:117/11.10

C12/1 "Computer, Elliott Bros, Reports". Correspondence 1953

C12/2 "Computer, Elliott Bros, Opposition (BTM Co). Correspondence 1953-54

C12/3 "Users' Association 405, File 1". Correspondence, Minutes 1957.

C12/4 "Users' 405 Association, File 2". Correspondence, Minutes 1957-59

C12/5 "Users' 405 Association, File 3". Correspondence, Minutes 1959-61

Box C13 : NRDC No C5/7.1:117/13.4

C13/1 "Computers Electronic, Elliott Bros Development, File 1". Correspondence 1950-52

C13/2 "Electronic Computers, Elliott Bros Ltd, Development, Vol 2". Correspondence 1952

C13/3 "Electronic Computers, Elliott Bros Ltd, Development, File No 3". Correspondence 1952-53

C13/4 "Electronic Computers, Elliott Bros Ltd, Development, File No 4". Correspondence 1953

C13/5 "Electronic Computers, Elliott Bros Ltd, Development, File No 5. Correspondence 1953-54

C13/6 "Computers, Elliott Bros, Development, Vol 6". Correspondence 1955-59

C13/7 "Computer, Elliott Bros, Contract No 2, Vol 7". Correspondence 1953-55

C13/8 "Computers, Elliott Bros, Manufacturing Programme Contract No 3". Correspondence 1953-65

Box C14 : NRDC C5/7.1:117/13.4

C14/1 "Elliott Bros Specifications". 1949-53

Box C15 : NRDC No C5./7.1:117/13.4 C5/7.1:194/1

C15/1 "Electronic Computers, Elliott Bros (London) Ltd". Draft agreements 1952

C15/2 "Computers, Elliott 401, User Enquiries". Correspondence 1952-56

C15/3 "Computer, Elliott Bros, Specification (Design)". Correspondence 1952

C15/4 "Computers, Elliott Bros Sales". Correspondence 1953-57

C15/5 "Computers Electronic, Manchester University, Elliott Bros, Financial matters". Correspondence 1951

C15/6 "Electronic Computers, Manchester University, Elliott Bros, Finance". Correspondence 1952

C15/7 "Elliott Computer, Accounts". Correspondence 1953

C15/8 "Computer 401 Elliott Bros, Publicity". Correspondence 1953-55

C15/9 "Computers, Manchester University, Elliott Bros, Trials". Correspondence, reports 1953-54

C15/10 "Computers, Norwegian Physical Institute A". Correspondence 1950

C15/11 "Computers, Air Ministry". Correspondence 1955

C15/12 "Computers Electronic, Dr Frankel, Research for Development". Correspondence 1950-51

C15/13 "Computers, RollsRoyce Ltd". Correspondence 1955

Box C16 : NRDC No C5/7.1:221/11.6 C5/7.1:336/1

C16/1 Computers Electronic, Manchester University: Computer Research Corporation". Correspondence 1951

C16/2 "Computers Electronic, Manchester University: Burroughs Adding Machine Co". Correspondence 1951

C16/3 "Computers Electronic, Manchester University: Bendix Ltd". Correspondence 1951

C16/4 "Computers, Intelectron, De Florez". Correspondence 1951

C16/5 "Electronic Computers, Manchester University, Plessey Ltd". Correspondence 1951

C16/6 "Computer, Mullard Ltd." Correspondence 1953

C16/7 "Computers, Epsylon Development Magnetic Tape, File No 1". Correspondence 1955

C16/8 "Computers, Epsylon Development Magnetic Tape, File No 2". Correspondence, specifications 1956-58

C16/9 "Computers, Epsylon Development Magnetic Tape, File No 3". Correspondence 1958-68

C16/10 "Electronic Computers: Manchester University, Ridenour Ltd, Patent Option". Correspondence 1952

C16/11 "Manchester Computer, Manchester University (Halcrow & Partners) User Enquiries". Correspondence 1952

C16/12 "Manchester Computer, Manchester University: Head Wrightson Ltd, User Enquiries". Correspondence 1952

C16/13 "Computer, British Electricity Authority". Correspondence 1953

C16/14 "Electronic Computers, Manchester University: MIT, Related Projects". Correspondence 1952

C16/15 "Electronic Computers, Manchester University: MIT Related Projects". Copy of Scientific American, September 1952

C16/16 "Electronic Computers, Manchester University: Toronto University Development". Correspondence 1952-53

C16/17 "Computers, A C Nielson Corporation". Correspondence 1952

Box C17 : NRDC C5/7.1:342/1 C5/7.1:378/13.6

C17/1 "Computers, Consolidated Engineering Corporation". Correspondence 1952-53

C17/2   "Computers Interference, Bell Telephones/ Holden". Correspondence 1953

C17/3   "Computers, Brush Electrical Engineering Co Ltd, User Enquiries". Correspondence 1954-55

C17/4   "Computers, Matematikmaskinnamndens Sweden Related Projects". Correspondence 1953

C17/5   "Computers, PowersSamas Accounting Machines Ltd". Correspondence 1953-56

C17/6   "Computers, BBC". Correspondence 1953-55

C17/7   "Computers, Related Projects, International Standards Electric Corporation (ISEC)". Correspondence 1953-54

C17/8   "Computers, Related Projects, ISEC". Patent Specifications 1948-53

C17/9   "Computers, Mellon Institute Reports". Correspondence, reports 1953-54

C17/10   "Computers, Mellon Institute Reports". Correspondence 1955-57

C17/11   "Computers, Mellon Institute Reports". Reports 1953-56

C17/12   "Computers, Mellon Institute Reports". Reports 1953-56

C17/13   "Computers, Mellon Institute, Specification". Correspondence 1954

Box C18 : NRDC No C5/7.1:379/13.6

C18/1   "Mellon Institute Reports". 1952-56

Box C19 : NRDC No C5/7.1:387/13.8 C5/7.1:408/13.4

C19/1   "Computers, Research for Development (Magnetic Tape), Pye Ltd, File No 1". Correspondence 1953-54

C19/2   "Computers, Research for Development (Magnetic Tape) Pye Ltd, File No 2". 1954-60

C19/3   "Computers, Research for Development (Magnetic Tape) Pye Ltd". Reports 1952-54

C19/4   "Computers, Remington Rand Ltd, General". Correspondence 1952-53

C19/5   "Computers, Industrial Management Research Association". Correspondence 1954-56

Box C20 : NRDC No C5/7.1:408/13.4

C20/1   "Computers, Electric and Musical Industries Ltd, Development". Technical Reports 1958-60

C20/2   "Computers, Electric and Musical Industries Ltd, Development". Technical Reports 1958-59

C20/3   "EMI Technical Reports". 1962

Box C21 : NRDC No C5/7.1:408/13.4

C21/1   "The Logical Design of the Search Unit". EMI Technical report 1958

C21/2   "Arithmetic Unit". EMI Technical Report N.d.

C21/3   "Input Multiplexer Unit, Circuit Diagrams". EMI Technical Report. N.d.

C21/4   "Search Unit, Circuit Diagrams". EMI Technical Report. N.d.

C21/5   "Development of Magnetic Film as Computer Elements". EMI Technical Report 1958

C21/6   "Programming and Data Processing". EMI Technical Report 1958

C21/7   "Magnetic Thin Film Stores". EMI Technical Report 1963

Box C22 : NRDC No C5/7.1:408/13.4

C22/1   "The NRDC Project, Progress Report No 2, Vol 1". EMI Report 1956

C22/2   "The NRDC Project, Progress Report No 2, Vol II". EMI Report 1956

Box C23 : NRDC No C5/7.1:408/13.4

C23/1   "The NRDC Project, Subject Report No 3". EMI Report 1955

C23/2   "Progress Report No 1 for the NRDC Project". EMI Report 1956

C23/3   "NRDC Progress Report". EMI Report 1957

C23/4   "Development of Evaporated Magnetic Film as Computer Elements". EMI Technical Reports 1957-58

C23/5   "NRDC Progress Report and Financial Summary" 1958

C23/6   "Proposals for Work on Components for Digital Machines". EMI Report N.d.

Box C24 : NRDC No C5/7.1:408/21 C5/7.1:484/1

C24/1   "Computers, Manchester University: EMI Engineering Development Ltd, Development Reports". Correspondence 1956

C24/2   "Computers, Society of British Aircraft Constructors, User Enquiries". Letter 1954

C24/3   "Computers, Banks". Correspondence 1954-57

C24/4   "Computers, Redifon Ltd". Reports, correspondence 1954

C24/5   "Computers, User Enquiries, Vickers Armstrongs Ltd". Correspondence 1954

C24/6   "Computers, Northampton Polytechnic, Vol 1". Correspondence 1955-58

C24/7   "Computers, Northampton Polytechnic, Vol 2". Correspondence 1959-69

C24/8   "Computers, Northampton Polytechnic". Technical Reports 1957-63

C24/9   "Computers, Harris-Lebus Ltd". Correspondence 1955

C24/10   "Computers, Mercantile Credit Co Ltd". Correspondence 1955

C24/11   "Computers, Adrema". Correspondence 1955

Box C25 : NRDC No C5/7.2/12.2 C5/32/1

C25/1   "Licensing of Ferranti Ltd and RCA Inc". Correspondence 1951-52

C25/2   "Computer Programmes Copyright". Correspondence 1955

C25/3   "Strachey Scientific Computer NRDC/Elliott Bros Development". Correspondence 1956

C25/4   "Computers, Bristol University". Correspondence 1956

C25/5   "Computers, Radar Research Establishment, Dr. Barnett, User". Correspondence 1955

C25/6   "Computers, UK Atomic Energy Authority". Correspondence 1956-57

C25/7   "Computers, UK Atomic Energy Authority, Pocket". Catalogues 1954-57

C25/8   "Electronic Computers, RAE Farnborough". Correspondence, report 1952

C25/9   "Computers, Admiralty, User Enquiries & Users". Correspondence 1955

C25/10   "File on IBM". Pamphlets, brochures 1948-50

C25/11   "Computers, University College, (Professor Massey)". Correspondence 1953

C25/12   "Computers, Imperial College". Correspondence 1954-55

C25/13   "Computer, Imperial Chemical Industries". Correspondence 1953-56

C25/14   "Computers, Imperial Chemical Industries". Reports 1954

C25/15   "Computers Electronic, Ferranti, Miscellaneous". Letter 1951

C25/16   "Computers, Ferranti Sales, Contacts". Correspondence, report 1955

C25/17   "Computers Electronic, Ferranti, Publications". Report 1950

C25/18 "Computers, Unilever Ltd". Correspondence 1954- 55

Box C26 : NRDC No C5/262/ C5/436/1

C26/1 "Electronic Computers, Armco Corporation, Trials (permalloy)". Correspondence 1952-54

C26/2 "Digital Write-Out System, MRC Assignment". Correspondence

C26/3 "Single Wire Multi-Track Magnetic Head, The Northern Polytechnic, Assignment". Assignment, correspondence 1959

C26/4 "Electronic Computers, Telecomputing Corporation, Related Projects". Report, correspondence 1952

C26/5 "Computers, A D Little Inc, Research for Development". Correspondence 1952

C26/6 "Computers, Magnetic Tape Transport, Decca Radar Ltd, General". Correspondence, reports 1960-61

C26/7 "File of Decca Radar Technical Reports" 1960

C26/8 "Computers, Related Projects, Institut fur Praktische Mathematik (Darmstadt)". Correspondence 1953

C26/9 "Computers, Technical Matters, Johns Hopkins University". Report, correspondence 1953

C26/10 "Computers, EMI Institutes, Education/Training Courses". Correspondence 1956

C26/11 "Computers, Siemens Brothers". Correspondence 1955-58

Box C27 : NRDC No C5/436/1 C5/522/1

C27/1 "Computers, Siemens Brothers, Vol II". Correspondence 1959-61

C27/2 "Computers, Siemens Brothers, Vol III". Correspondence 1962-63

C27/3 "Computer Equipment (High Speed Printers), Solartron Ltd Patent Search". Correspondence, reports `1960

C27/4 "Computer Equipment, Solartron Electronic Business Machines, Development Proposals". Correspondence, reports 1959-60

C27/5 "Computer Equipment, Solartron, Development Proposals". Technical reports 1959

C27/6 "Computers, Leo Computers Ltd (J Lyons Ltd)". Correspondence 1955-58

C27/7 "Computers, J Lyons Ltd, Components". Correspondence 1955-64

C27/8 "Computers, Ultra Electric Ltd, Advisory Service". Correspondence 1959

C27/9 "Computers, EPA Mission to USA". Correspondence 1959-60

Box C28 : NRDC No C5/522/1 C5/669/1 + C5/708

C28/1 "File of Reports on Integrated Data Processing". 1959-60

C28/2 "Computers, Short Brothers & Harland Ltd, Development". Correspondence 1958-62

C28/3 "Proposed pneumatic computer development, Sperry Gyroscope Co Ltd". Reports 1961

C28/4 "Reports, Sperry "Pneumatic Digital Computers"". 1961

C28/5 "Computer Equipment W S Elliott, General Liaison". Correspondence 1963-64

C28/6 "Ministry of Technology, Computer Technical Policy Working Party". Correspondence 1965-69

C28/7 "Ministry of Technology, Computer Steering Group". Supporting Papers 1965

C28/8 "Ministry of Technology, Computer Steering Group". Minutes, Agendas 1965

C28/9 "Computers, Consultations, NRDC/Ministry of Technology". Correspondence, Minutes 1966-68

Box C29 : NRDC No C5.1/7.1/1 C5.3/7.1/13.4

C29/1 "Computer Components, Manchester University". Correspondence, reports 1952-55

C29/2 "Computer Components, Manchester University". Correspondence 1955-57

C29/3 "Computers, Accessories (Magnetic Recording Heads) Research and Development". Correspondence 1955

C29/4 "Computers Mark II, Manchester University/ Ferranti". Correspondence 1953-55

C29/5 "Computers Mark II, Ferranti Specification". Correspondence 1955

C29/6 "Computers Mark 2, Manchester University: Ferranti Sales". Correspondence 1954-55

C29/7 "Computers, Research Development Contract, Ferranti Ltd". Correspondence 1954-55

C29/8 "Computers FPCI, Sales". Correspondence 1954-58

C29/9 "Computers, Accessories, Epsylon Research Development Co". Correspondence 1954-55.

C29/10 "Computers Accessories, MSS Recording Co, Development, Tape". Correspondence 1953-54

Box C30 : NRDC No C5.3/7.1:29/13.4 C5.3/7.1:29/13.13

C30/1 "Computer FPCI, NRDC/Ferranti Ltd, Development Contract, Vol No 1". Correspondence 1953 56

C30/2 "Computer FPCI, NRDC/Ferranti Ltd, Development Contract, Vol No 2". Correspondence 1957

C30/3 "FPCI, NRDC/Ferranti Ltd, Development Contract, Vol No 3". Correspondence 1958-62

C30/4 "Computers, FPCI Ferranti Development". Agreements 1954

C30/5 "Computers, Business Machine FPCI Ferranti, DesignDevelopment, File No 1". Correspondence 1954

C30/6 "Computers, Ferranti FPCI Specification, File No 2". Correspondence, reports 1954-56

C30/7 "Computers, Business Machine FPCI Ferranti, Design Development". Agreements, reports 1954-56

Box C31 : NRDC C5.3/7.1:29/13.13 C5.6/7.1:29/13.4

C31/1 "Computers, Ferranti FPCI Specification". Reports 1954-56

C31/2 "Pegasus, Manchester University Ferranti, Finance and Accountancy". Correspondence 1957

C31/3 "Computers, FPCI, Ferranti, Publicity". Brochures 1955

C31/4 "Computers FPCI, Ferranti Progress Reports". Correspondence 1955-57

C31/5 "Computers, Ferranti ltd, FPCI Progress Reports" 1954

C31/6 "Computers, Magnetic Tape Equipment, Ferranti Ltd, Development". Correspondence 1954

C31/7 "Computers, Magnetic Drums, Ferranti Ltd, Development". Correspondence 1954

Box C32 : NRDC No C5/7/2:117/13.4 C5.9/29/13.4

C32/1 "Computers, Data Logging Equipment, EMI Ltd". Correspondence 1958

C32/2 "High Speed Computers, Ferranti, Atlas Project Contract". Reports 1959-60

Box C33 : NRDC No C5.9/29/13.4

C33/1 File of Ferranti Reports 1961

C33/2 File of Ferranti Reports 1959-63

C33/3   File of Ferranti Reports 1962

Box C34 : NRDC No A32.2/2/1 A32/2/6

C34/1   "Pools Computer NRDC". Correspondence 1956-58

C34/2   "Pools Computer NRDC, File No 4. Correspondence 1958-60

C34/3   "Pools Computer, NRDC, Vol 5". Correspondence 1960-63

C34/4   "Pools Computer, NRDC, Vol.6". Correspondence 1963-69

C34/5   "Computer Patent Pool, NRDC Minutes & Agenda, Management Board, Vol 3". 1962-69

Box C35 : (No NRDC Number)

C35/1   "NRDC Computer Panel, Early and Significant Reports" 1949-50

C35/2   "Mr. Crawley"s folder on Visit to Manchester on Pegasus Costs". Reports, notes 1956

C35/3   "Elliott Automation, Arch Project". Reports 1959-62

C35/4   "UK Computer Industry Debate". Correspondence, reports 1964-5

C35/5   "ICT Computer Papers". Reports 1965

Box C36 : NRDC No C5

C36/1   "Computers, Disposal of Patent Rights to IBM, 1958 Negotiations". Correspondence, agreements 1958

C36/2   "Computers, Disposal of Patent Rights to IBM, 1959 Negotiations, Vol 2". Correspondence 1959

C36/3   "Computers, Disposal of Patent Rights to IBM, 1959-60, Negotiations, Vol 3". Correspondence 1959-62

C36/4   "Computers, Disposal of, Patent Rights to IBM, 1959- 60, Negotiations, Vol 4". Correspondence 1963-67.

Box C37 : NRDC EMIDEC Project Papers

C37/1   "SemiDigital Computing". EMI Technical Report 1952

C37/2   "The NRDC Project". EMI Technical Report 1955

C37/3   "The NRDC Project", Vol 1. EMI Report 1957

C37/4   "The NRDC Project", Vol II, Drawings EMI Report 1957

C37/5   "The EMIDEC Computer", General Description EMI Report 1958

C37/6   "Magnetic Thin Film Stores. EMI Report 1964

C37/7   "The High Speed Series Magnetic Thin Film Store System. EMI Instruction Manual 1964

C37/8   "EMI 2400 and 3400 Project". Reports 1954-63

Box C38 : NRDC No C5/92/ C5/261/13.4

C38/1   "Brush Electrical Engineering Co Ltd". Correspondence 1957-58

C38/2   "Computers Electronic, American Embassy Publications". Newsletter 1951-59

C38/3   "Computer, Patent Searches, Moore & Hall". Correspondence, Patents 1952

C38/4   "Position Control Servo Systems". Correspondence 1952-61

C38/5   File of correspondence and newsletters, American Office of Naval Research 1953-60

C38/6   "Computers Electronic, Science Museum". Correspondence 1951

C38/7   "Computers, Related Projects, BAOR Scientific Research Branch". Correspondence 1951-60

C38/8 "Computers, Related Projects, BAOR Scientific Research Branch". Counsel's opinion re patent, Journal (German) 1949-58

C38/9 "Computers, High Frequency Recording on Magnetic Tape, Epsylon Ltd, Development". Reports, correspondence 1959

Box C39 : NRDC 401 at Rothamsted

C39/1 "Rothamsted Experimental Station". Correspondence 1954-56

C39/2 "Punched Paper Tape, Working Party". Reports 1954-58

C39/3 "401 Computer, Programmers Notes, Order Code". Reports 1956-58

C39/4 "Project to install an Elliott 405 Computer for dataprocessing at Siemens Bros, Woolwich". Book 1956-61

C39/5 "NRDC/Siemens (AEI) 405 Project". Reports 1956-62

C39/6 "Siemens Progress Meetings". Reports 1958-59

Box C40 : NRDC Ferranti and IBM Agreement

C40/1 "IBM Agreement". Licence agreements 1951-63

C40/2 "Ferranti Licence" 1952

C40/3 "Ferranti Agreements". Correspondence 1954-61

C40/4 "Computer Patent Pool Agreement and Licence". 1955-56

C40/5 "British Computer Society, Scientific Committee". Minutes 1957-60

C40/6 "High Speed Computer Projects". Correspondence, reports 1957-60

C40/7 "Atlas Project (Ferranti)". Reports, minutes 1958-63

C40/8 "Computer Project General". Correspondence 1964- 65

Box C41 (no known NRDC marking)

C41/1 "Computers Subcommittee". Minutes 1952-53

C41/2 "Computers Subcommittee". Minutes 1953-54

C41/3 "Computers Subcommittee". Minutes 1955

C41/4 "Computers Subcommittee". Minutes 1956-57

C41/5 "Computers Subcommittee". Minutes 1957-59

Box C42 (no known NRDC marking)

C42/1 "High Speed Computers, Ferranti, Atlas Project Contract". Correspondence 1959-62

C42/2 "High Speed Computers, Ferranti, Atlas Project Contract, Vol 2". Correspondence 1963

C42/3 "Computers, NRDC Subcommittee, Correspondence Vol 1" 1952-54

C42/4 "Computers, NRDC Subcommittee, Correspondence, Vol 2" 1955-58

C42/5 "Computers, NRDC Subcommittee, Correspondence Vol 3" 1958-67

Box C43 (no known NRDC marking)

C43/1 Surveys of computers facilities worldwide 1948-62

C43/2 File of Reports and brochures (USA and UK) 1948-65

C43/3 Reports of Mellon Institute of Industrial Research 1950-54

Box C44 (no known NRDC marking)

C44/1 "Ultra High Speed Computer, Research and Development, Vol 5". Correspondence, reports 1959-60

C44/2 "Ultra High Speed Computer, Research and Development". Reports 1957-59

C44/3 "Electronic Computers, General Development". Correspondence 1952-56

Box C45 (no known NRDC marking)

C45/1 "USA Visits, H J Crawley (Mainly Computers)". Correspondence 1950-55

C45/2 "Computer Project General". Minutes, reports 1949-62

C45/3 "Computer Subcommittee, Circulated papers". 1952-59

C45/4 "High Speed Computer Project, DSIR Proposal". Correspondence 1959

Box C46 (no known NRDC marking)

C46/1 "Computer Association". Correspondence 1956

C46/2 "British Computer Association Ltd". Correspondence 1957-58.

C46/3 "Liaison British Computer Society". Correspondence 1956-69

C46/4 "British Computer Society Ltd, Vol 3". Correspondence 1958

C46/5 "Liaison British Computer Society". Details of 1st Conference 1959

Box C47 (no known NRDC marking)

C47/1 "NRDC Subcommittee on Electronic Computers". Minutes (155) 1952-57

C47/2 "Computer Subcommittee". Minutes and agendas 1958-59

C47/3 "NRDC Computer Subcommittee". Minutes (569) 1953-59

Box C48 (no known NRDC marking)

C48/1 "Computer Patent Pool, NRDC Management Board". Minutes and agenda 1957-69

C48/2 "Computer Patent Pool NRDC Management Board". Minutes and agenda 1960-63

C48/3 "Patent Pools, Computers, NRDC". Correspondence 1951-55

C48/4 "Pools Computer, NRDC". Correspondence, agreement 1955-56

Box C49 (no known NRDC marking)

NRDC duplicates and ephemera, various dates.

NAHC/OSI

OPEN SYSTEMS INTERCONNECTION (OSI) STANDARDIZED ARCHIVES

These BSI (British Standards Institution) files concern national and international committees dealing with Open Systems Interconnection (OSI) for the period 1978-1987. They deal with the OSI Reference Model, formal description techniques, conformance testing methodology and framework, registration authorities, OSI management, the Application, Presentation, Session and (up to 1984) Transport Layers.

The ISO (International Organisation for Standardization) work on OSI was the first large-scale standardization programme in Information Technology to have a significant impact on both suppliers and users. It developed the concept of prospective standardization (in which the work was carried out before the availability of products) in an area of fast-moving technology. An important aspect of the work was the development of a Reference Model which provided a framework for future standards, enabling work on those standards to proceed independently. The correspondence in the DPS/20 files relating to the formation of the committees and background work on the Reference Model provides an insight into the work of the committees which will not be apparent from the formal records.

The files represent an important record of the history of OSI. The development in this area took place in ISO committees and the records of the work were until now not available publicly. The BSI records are unique within the UK and it is not certain how far equivalent records exist internationally. Because of the limitations on storage space within BSI, these records were donated to the NAHC.

The collection is broadly divided into correspondence files (containing letters and BSI forms) and document files (containing documents circulated to committees). The many committees involved were as follows:

ISO = International Organization for Standardization

IEC = International Electrotechnical Commission

JTC 1 = Joint Technical Committee 1

TC 97 = Technical Committee 97

SC 16 = Subcommittee 16

SC 21 = Subcommittee 21

DPS/20, OIS/16, OIS/121, IST/21 = BSI Technical Committees.

The OSI collection consists of 217 box files. The material is organised as follows:

Series 1 Boxes 1-4. Detailed description of OSI committees and material in the files; various BSI publications on standards; the personal notebooks re. the committees of M.J. Purton.

Series 2 Boxes 5-16. DPS/20 files.

Series 3 Boxes 17-67. OIS/16 files.

Series 4 Boxes 68-85. ISO/TC/97/SC16.

Series 5 Boxes 86-141. ISO/TC/97/SC21.

Series 6 Boxes 142-156. OIS/121.

Series 7 Boxes 157-168. IST/21.

Series 8 Boxes 169-204. ISO/TC.97/SC21.

Series 9 Boxes 205-214. ISO/TC/97/SC16/WG-.

Series 10 Boxes 215-217. Miscellaneous documents, e.g. document index.

Series 11 Correspondence

[To the best of my knowledge, the material is otherwise unexamined – JS 2005-08-05]

NAHC/PRI

DR DIETRICH G PRINZ

Dr Dietrich G Prinz was born on 29 March 1903, of German-Jewish parentage. He was educated at Berlin University, where his teachers included Planck and Einstein, graduating with a D.Phil. He left Germany in 1935 with the rise of Nazism and settled in England. From 1936 he joined the Research Laboratories of the GEC Co., Wembley, where he worked in the valve development laboratory. He was interned and sent to Canada during the Second World War, before returning to work in Leeds for the Bowen Instrument Co.

Prinz joined Ferranti's instrument department in about 1947 and became involved in the firm's work in computers. In 1948 he visited the USA to assess computer developments on behalf of Ferranti. He was closely involved in pioneering programming work on the Manchester Mark I and the early Ferranti computers. Swann [1975] described Prinz as a mainstay of the Ferranti Computer Department; to Lord Bowden he was talented and extremely modest. Most of the documents relate to Prinz's linear programming routines, ca.1960- 70.

Provenance: Mrs B Jaffe (formerly Prinz), Manchester.

References: Martin Campbell-Kelly, "Programming the Mark I", *Annals of the History of Computing* (1980); Paul Drath, "The Relationship between Science and Technology: University Research and the Computer Industry 1945-1962", (Manchester University Ph.D, 1973); Simon Lavington, *Early British Computers* (1980); B B Swann, "The Ferranti Computer Department", confidential typescript history, 1975. Copy in NAHC, Ferranti papers.

See also: NAHC/FER; NAHC/MUC.

The collection comprises five boxes of archival material.

NAHC/PRI/A Biographical and Personal Papers

A1 File of miscellaneous correspondence, accounts, poetry and cuttings relating, inter alia to Prinz's family background, his internment in Canada, and his early years in England (1918 50s).

A2 Shorthand notebook, 1920.

A3 Algebra notebook, 1922.

A4 Photocopy of Berlin University class report with signature of Albert Einstein, 1923.

A5 Shorthnd notebook, n.d.

A6 Notebook, with shorthand notes and poetry, 1940.

A7 Notebook, marked "Diary", but containing notes, 1941.

A8 Notebook, with notes from Library of Central Radio Bureau, 1946.

A9 File of miscellaneous cuttings, typescripts, graphs, ephemera, relating, inter alia, to Prinz's work in 1950s.

NAHC/PRI/B. Correspondence

B1 Letter to Prinz from GEC Wembley, 16 January 1936, offering him a post in the Valve Development Laboratory.

B2 Correspondence with Professor M.V. Wilkes re. visit to see EDSAC at Cambridge University; and subsequent notes on EDSAC, OctoberNovember 1948.

B3 Copies of letters re. Ministry of Supply Technical Committee on ServoMechanisms, 21 July 1948; and Ferranti and Manchester University Computer, 13, 14, 23 December 1948.

NAHC/PRI/C. Unpublished drafts, reports, etc.

C1a   Report of a visit made by Prinz to USA in September 1948, on behalf of Ferranti.

C1b   Memos and notes relating to Manchester University Mark I, 1948-9, including notation, coding, and Laguerre functions.

C2   Folder marked "POLYGON PAPER".

Inc. draft notes for "A Process for Finding the "Polygon" in the Stepping Stone Method of the Transportation Problem". 1959.

C3   Folder marked "LP Theory".

Inc. inter alia, notes and typescripts on TRANS DUAL transportation problem; Langrange multipliers; cattle feed DUAL solution; visit to Shell; LP Duality; LP Theory Post OptimizationRanges; Product Form Method. 1960-9.

C4   Folder marked LP LISTS.

Inc. typescripts in linear programs for Atlas, Ferranti, Pegasus, ca. 1960-8.

"Summary List. Ferranti Programmes for Continuous and Discrete Linear Programming, Quadratic Programming, and Transportation Problems", 1961 Typescript by DGP.

Provisional LP Routines for Atlas, 1963. Typescript by DGP.

"Provisional Specification. Autosimmer C", 1963. Typescript by DGP.

"Response of Negative Feedback Systems", Typescript anon., 1945.

Atlas Fortran Handbook 1963.

"Notes on Linear Programming: Part XXIX of Simple Algorithm for Finding Maximal Network Flows and an Application to the Hitchcock Problem", by L R Ford and D R Fulkerson, 1955.

JEAN printout and catalogue.

"ABLEX" Atlas program description, 1968 (2 copies).

"TRANSATLANTIC" specification and printout for Version CO5/L100, 1964.

QUANDARY: A Program for Quadratic Programming, 1960.

C5   Folder marked "QP".

Inc. Typescript notes, correspondence re. Quadratic Programming, ca 1961.

C6   Folder marked "Shortest Path. Location".

Inc. inter alia, notes and correspondence re ATLAS program description for "Locatable", for optimising location of depots, ca 1963-5.

C7   Envelope marked "Atlas Plan".

Inc. plan and instruction sheet for Atlas, ca 1964.

C8   Folder marked "Fortran 4 ASA, FOR 2 SENSICLE ATLAS FORTRAN".

Inc. typescript "Introduction to Fortran for the Atlas Computer", pp 34.

Inc. copy of article "Fortran vs Basic Fortran", Communications of the ACM, vol.7, No.10, Oct. 1964, pp.591- 625.

C9   Envelope marked "LOADAL 01".

Contains program sheet dated 23/6/64.

C10   Folder marked TRANSIT/COVENTRY.

Inc. letters, prog. notes, Fortran coding sheets re. "TRANSIT" optimization of location of a depot/factory serving several customers ca 1965.

Inc. correspondence, data, etc. re Prinz's work as consultant for Coventry Council re STAMINA program to solve bus scheduling problems, ca 1970.

C11   File marked "Stamina" [STanding time MINimisation on Atlas]

Inc. reprints from Bus and Coach, Dec. 1966, re Prinz prog. for bus service in Manchester.

Inc. STAMINA typescripts, ca 1965.

C12   Envelope "LP Lecture. SIMTRAN 5 Results. Problems".

Inc. printouts of data re Simtran 5, ca 1966.

C13   Envelope marked "Photostats".

Inc. copies of articles on Ferranti and vehicle scheduling 1966 and n.d.

C14   Envelope marked "SIMTRANS", Nov. 1966.

Inc. computer printouts.

C15   Envelope marked "PAIRSORT".

Inc. Fortran compilation 18/10/66.

C16   Envelope of offprints from Bus and Coach, 1966, re STAMINA program.

C17   Folder marked "Miscellaneous Problems".

Inc. inter alia:

Notes on a Problem Associated with Place Betting", Jan. 1966, re possibility of computing odds for place betting for BPA.

Computer Application to Produce [Hospital] Rotas for the 40hour week", 1966.

Pollastra Packers Ltd. re ideal poultry killing to maximise net profits. 1967.

C18   File marked "TRUDI. VANTRAN".

Inc. prog. notes on "TRUDI. VANTRAN" routines re transport/depot problems, etc. 1967.

C19   Folder marked "LINK".

Inc. typescript notes on Lnear Programming Theory, 1967, re. bus scheduling

typescript notes on Matching (in bipartite graphs), 1968-71.

lecture notes, 1971.

C20   Folder marked "Enquiries".

Inc. notes on Special LP Problem, 1969.

C21   Folder marked "Brown Problems".

Inc. J M Brown, "Intermediate Difficulty Programming Problems for High Level Languages". Typescript, Sept.1969.

C22   Folder labelled "Random Numbers. Statistics". 1969.

C23   Folder marked "ROTA".

Inc. correspondence, notes on Court Rota problems (for magistrates' court). 1970.

C24   Folder marked "LP Program Specifications".

Inc. ICSL published literature on stock control; typescript notes on Intex, Trudi, Locatable programs, ca 1970.

C25   Folder marked "Lloyd House".

   Contains computer printouts on LIMX (LIMA); QAEE; LITA. 1970- 1.

C26   Folder marked "LIMA". [LIMA (Link Maximisation), a simplified version of MILO, a prog. to maximise number of links between journeys].

   Inc. material relating to Prinz prog. to improve efficiency of bus service. 1970-2.

C27   File marked "SUBSIMA. SUBLEX".

   Inc. notes and coding sheets for Subsima, Sublex, Umiplex progs. 1971.

C28   Envelope marked "Sublex. Intex".

   Inc. printouts on Sublex, Intex, Ablex routines for Atlas, ca 1971.

C29   Folder marked "Farming. Harrogate".

   Inc. letters, notes, re LP optimization of farming operations for Ministry of Agriculture, 1971.

C30   Folder marked "TRANSTRAM".

   Inc. ICSL leaflets; offprints and cuttings of articles.

C31   Incomplete typescript marked "Matrix Methods", n.d.

C32a,b Miscellaneous offprints and magazines collected by Prinz: File includes articles mentioning Prinz e.g. Process Control and Automation 6 (April 1959).

NAHC/PRI/D. Published Items

D1   File of Prinz's German and British patents. British patents 1937-45, cover, inter alia, improvements in mercury arc electric converters; improvements in electric voltage measuring instruments. German patents are dated 1932-4 and a list of Prinz's German patents is appended.

D2a,b   Offprints of articles authored by Prinz, ca 1939-50s. These include, inter alia:

   "Class C Telegraphy", Wireless Engineer 19 (September 1942).

   "Contributions to the Theory of Automatic Controllers and Followers", Journal of Scientific Instruments, 21, (April 1944).

   (with W. Mays) "A Relay Machine for the Demonstration of Symbolic Logic", Nature (1950).

   "Robot Chess", Research 6 (1952).

NAHC/RAE

ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH

The RAE was the only government establishment, apart from the NPL, to develop an important computing centre during the late 1940s. Hollerith machines were installed in 1944 as the basis for a Computing Laboratory, which was under the direction of R.A. Fairthorne. A Mathematical Services Department was soon set up, and by taking on outside work it became a wellknown and influential computing centre in the late 1940s and early 1950s.

References: M. Croarken, *Early Scientific Computing in Britain* (Oxford: OUP, 1990).

Collection comprises one box of archive material.

D1	R.A.Fairthorne, "Some Mathematical Aspects of Punched Card Accounting Machinery and Methods", Technical Note SME.333, October 1945.
D2	W.Hoppe, "New Simple Electrical Calculating Machines for the Automatic Solution of Complicated Calculations", Library Translation No.149, January 1947.
D3	W.Elfers, J.Gait and W.R.Thomas, "An AC/DC Method of Electronic Integration with Respect to Time," Tech.Note GW15, April 1948.
D4	"RASCAL": "Notes on the Royal Aircraft Establishment Sequence Controlled Calculator", 1950? (2page typescript).
D5	S.H.Hollingdale, "The RAE Sequence Controlled Calculator: Programming of Some Algebraic Problems", Report MS.50, February 1950.
D6	J.A.Roberts and D.C.Pressey, "A CrossedFields Multiplier", Tech.Note ARM.516, April 1954.
D7	E.R.de Bourcier, "Subtabulation on a High Speed Computer", Technical Note No.MS.24, January 1956.
D8	J.M.Watt, "The Assembly of Large Programmes for the Automatic Computer Deuce," Technical Note No. MS.31, July 1956.
D9	D.G.Burnett Hall and P.A.Samet, "A Programming Handbook for the Computer Deuce", Tech.Note MS.38, April 1959.
D10	Diana Raynor, "An Introduction to Autocode Programming for the Mercury Computer", Tech.Note MS.68, June 1960.
D11	Marjorie M. Barritt, "Manchester Mercury Autocode: Glossary of Terms for Use with the London CHLF3 Compiler," Tech.Note Math.92, November 1962.

NAHC/RRE

ROYAL RADAR ESTABLISHMENT

Collection comprises one box of archive material.

D1 E.S.Shire and S.K.Runcorn, "An Apparatus for the Computation of Serial Correlations and its Use in Frequency Analysis", Research Report No.262, January 1945.

D2 P.M.Woodward and G.G.Sutton, "RREAC. The RRE Automatic Computer: General Description", Technical Note No.691, July 1962. (2 copies).

D3 D.A.H.Brown and T.R.Berry, "RREAC. The REE Automatic Computer: Main and Modifier Store", Technical Note No.694, July 1963. (2 copies).

D4 A.K.Jonscher, "Semiconductor Radiation Detectors Depending on Direct Heating of Carriers", Memo. No.2139, November 1964.

D5 T.P.McLean, "Coherence and Fluctuations in Light Beams", Memorandum No.2149, December 1964.

D6 J.E.Midwinter, "The Theory of Q Switching Applied to Slow Switching and Pulse Shaping for Solid State Lasers", Memorandum No.2147, February 1965.

D7 D.Griffiths and R.Watton, "Properties of Superconducting Thin Tin Films", Memorandum No.2154, February 1965.

D8 J.E.Midwinter, "Notes on Alignment Techniques for Optical Systems with Particular Reference to Lasers", Memorandum No.2148, February 1965.

D9 D.Griffiths, "Switching Transients in a Small Cryotron Selection Network for the Store of a Cryogenic Computer", Memorandum No.2169, April 1965.

D10 T.P. Pulford and G.R.Toull, "A 35 MMFilm Reader with Digital PrintOut", Memorandum No. 2182, November 1965.

D11 T.P.Pulford, "A High Speed Electronic Camera", Memorandum No. 2185, January 1966.

D12 J. Wood, "Integrated MOS Transistor Arrays for Computer Peripheral Equipment", Memorandum No. 2273, March 1966.

D13 S.Howle, "Military Package Engineering Techniques Applicable to Commercial Electronic Equipment", Memorandum No.2280, April 1966.

D14 C.S.E. Phillips, "Networks for Real Time Programming", Memorandum No.2275, April 1966.

D15 P.J.Tufton, "Comparison Between the Elastic Properties of the Bulk and Thin Film Forms of Permalloy", Memorandum No.2271, May 1966.

D16 J.Wood, "Joint Industry/Government Research Project on Design of Digital Integrated Circuits", Memorandum No.2295, May 1966.

D17 M.P.Warden, "ElectroOptical Light Modulation", Memorandum No.2287, May 1966.

D18 M.Griffiths, "Anatomy of a Compiler", Memorandum No.2296, June 1966.

NAHC/SCS

SCIENTIFIC COMPUTING SERVICE LTD

The Scientific Computing Service was founded as a private venture in 1936, becoming a limited company in the following year. It specialised in scientific calculations generally, and particularly those where mechanical computation and mass production methods were employed. The managing director was Dr. Leslie J. Comrie (1893-1950), English astronomer and pioneer in mechanical computation, who was born in Pukekohe, New Zealand, and educated at Auckland University College and Cambridge University. After teaching in the USA, he joined HM Nautical Alamanac Office in 1926, becoming superintendent 1930-6. Comrie greatly influenced the development of scientific computation in the interwar period, and was elected FRS shortly before his death.

The following collection includes a selection of working papers from the SCS: most are undated, some are unsortable, but a few include handwritten notes and comments by Comrie.

Provenance: Institution of Electrical Engineers (the SCS papers were amongst a large body of material collected by the Library of the British Computer Society). Miss Sheila M. Burrough, former employee of SCS, also donated some material.

References: Comrie s.v., *Dictionary of National Biography*; Obituary Notices of Fellows of the Royal Society; Mary Croarken, *Early Scientific Computing in Britain* (Oxford: OUP, 1990). Croarken refers to a few primary sources on Comrie at the Nautical Almanac Office and the SCS.

The collection comprises three boxes of archival material.

NAHC/SCS/A. Biographical and Historical

A1   Illustrated newspaper cutting re. SCS: "Girls Do World's Hardest Sums", n.d.

NAHC/SCS/C. Working Papers and Reports

C1   Folder containing miscellaneous typescripts: e.g. "Demonstration of Special Hollerith Rolling Total Tabulator"; "National Machine"; "Brunsviga Twin 13Z"; "Mercedes 38MS"; "Demonstration of the Hollerith PunchedCard System Description of the Machines Used"; "Demonstration of the Hollerith PunchedCard System Analysis of Lines in Spectra"; "The MADAS Calculating Machine"; "The Continental Adding Machine"; "The Brunsviga Model B.20"; "A New 135Character Typewriter"; "Inverse Interpolation".

C2   Folder of notes and typescripts on various calculations and methods: e.g. "Hollerith Summary Multiplication"; "Notes on Triangulation". S.M. Burrough, 1939.

C3a   Pocket memo book with handwritten notes.

C3b   Handwritten notes and typescripts re. Hollerith punchedcard calculations.

C4   "Power Series", typescript.

C5   "Derivatives in Terms of Differences or Numerical Differentiation", typescript.

C6   "The Evaluation of Determinants on "Hollerith", typescript.

C7   "Mercedes 38 MS", typescript.

C8   "Calculation of Intersection with the help of the "Brunsviga Double Nova 13Z", booklet, and typescript notes.

C9   "Memorandum on the Utility of a Special Computer Machine", typescript. (2 copies).

C10   "Brunsviga 20", typescript.

C11   "Signs of Products formed with the Multiplying Punch", typescript.

C12 "Vortrag des Herrn Dr. Comrie, London, gehalten am 14. September 1928 beim BrunsvigaKongress. Die Brunsviga Dupla", typescript.

C13a "Remarks on Demeulenaere Cash Register", typescript.

C13b "Report on Demeulenaere Cash Register", typescript by L.J. Comrie and T.W. Chick, 1938.

C14 "Integration from Differentials and their Central Differences", MS.

C15 "HEC.2 Hollerith Programmer's Guide", typescript.

C16 "The Solution of Simultaneous Equations on Hollerith Machines", typescript.

C17 "The GauseDoolittle Method for Symmetrical Equations on Hollerith", typescript.

C18 "An Unusual Plugging of the Senior Rolling Total Tabulator and its Application to Decile Loading", typescript.

C19 "Notes on the Solution and Checking of a Set of Simultaneous Equations, etc.", typescript.

C20 "Special AllUnit Tabulator", typescript.

C21 "On the Averageing of Times and Angles in the Sexagesimal System", typescript.

C22 "Solution of Simultaneous Equations and the Normalising of a Set of Error Equations on Hollerith Machines", typescript.

C23 "Involute Functions", typescript.

C24 Subtabulation of an Integral Given a Difference Table of the Integrand at the Pivotal Interval", handwritten notes.

C25 "The Field of Application of Table of 1/Vn", typescript.

C26 "Mathematical Computing", typescript.

C27 "Repayments of Loans", typescript.

C28 "The Continental Adding Machine", typescript.

C29 "Variance", typescript.

C30 "The Evaluation of Determinants on "Hollerith", typescript.

C31 "A Method of Dealing with Two Quantities on Each Counter When Subcontracting", typescript.

C32 "'Build up' Method for Determination of Interatomic Distances in Crystals", typescript.

C33 "Demonstration of the Hollerith PunchedCard System Description of the Machines Used", typescript.

C34 "Demonstration of Special Hollerith Rolling Total Tabulator", typescript.

C35 File on Continental Class 800 Machine, 1938.

C36 "Continental Class 800 Machine" typescript (2 copies).

C37 "Continental Class 800 Machine" handwritten manuscript.

C38 "Report on the Milne Method, 1945", handwritten manuscript.

C39 Miscellaneous SCS notes and documents, mostly n.d.

C40 Miscellaneous SCS notes and documents, mostly n.d.

NAHC/SCS/D. Publications

D1a "Computing by Calculating Machines", lecture to Office Machinery Users's Assoc., 1927.

D1b   L.J. Comrie, "On the Application of the Brunsviga-Dupla Calculating Machine to Double Summation with Finite Differences", Monthly Notices of R.A.S. (1928).

D2   L J Comrie, "Recent Developments in Calculating Machines", Office Machinery Users' Association Transactions (1927-28), (2 copies).

D3   L J Comrie, "German Calculating Machine Enterprise", The Transactions of the Office Machinery Users Association (1928-29).

D4   L J Comrie, "The Hollerith and Powers Tabulating Machines", Office Machinery Users' Association Transactions (1929-30).

D5   L J Comrie, "Professional Work in Departments of State, His Majesty's Nautical Almanac Office", "State Service" n.d. (1932?). (3 copies).

D6   L J Comrie, "The Nautical Almanac Office Burroughs Machine", Monthly Notices of R.A.S. (1932).

D7   L J Comrie, "The Application of the Hollerith Tabulating Machine to Brown's Tables of the Moon", Monthly Notices of R.A.S. (1932).

D8a   L J Comrie, "The Hollerith and Powers Tabulating Machines", printed for private circulation (1933). (2 copies).

D8b   L.J. Comrie, "Computing the 'Nautical Alamanac'", Nautical Magazine (1933).

D9   L J Comrie, "Inverse Interpolation and Scientific Applications of the National Accounting Machine" (1936). (4 copies)

D10   L J Comrie, "Calculating Machines" (1938 and various editions). 6 copies.

D11   L J Comrie, "Mechanical Computing" (1943).

D12   L J Comrie, "Careers for Girls", Mathematical Gazette (1944).

D13   L J Comrie, "Recent Progress in Scientific Computing", Journal of Scientific Instruments 21 (1944).

D14   L J Comrie, "The Twin Marchant Calculating Machine and its Application to Survey Problems", Scientific Computing Service Limited (1942).

D15   L J Comrie, "Mathematical Tables and Selected Works on Calculating Machines and Computing", Scientific Computing Services (1945).

D16   J.R.Womersley, "Scientific Computing in Great Britain", and L J Comrie, "The Application of Commercial Calculating Machines to Scientific Computing", Mathematical Tables and Other Aids to Computation (1946).

D17   "Scientific Computing Service Ltd. A Description of its Activities, Equipment and Staff" (1946).

D18   L J Comrie, "Calculating Past, Present and Future", Future, Overseas No.6169 (1947). (2 copies).

D19   L J Comrie, "Mechanical Computing", Plane and Geodetic Surveying: Vol.II (1950).

D20   L J Comrie, "Scientific Applications of the National Accounting Machine" (1951).

D21   L J Comrie, "Modern Babbage Machines", Office Machinery Users' Assoc., typescript, pp. 29, n.d.

NAHC/TUR

ALAN TURING

Alan Turing made two outstandingly original contributions to the development of computer science: his paper "On Computable Numbers" (1936) outlined a theoretical "universal" machine (or "Turing machine), an idea which was more fully developed in his brilliant design for the Automatic Computing Engine (ACE), built after the Second World War at the National Physical Laboratory. He was also an important figure in the Colossus codebreaking operations at Bletchley Park during the War; made contributions to programming the Manchester University Mark I computer in the early 1950s; researched the subject of morphogenesis in plants at Manchester University; and from time to time explored the problem of machine "intelligence". His impact on computer science, however, remains controversial. Turing's unorthodox personality and the brilliance of his ideas have many admirers; yet some computer scientists are sceptical about the actual impact of his ideas which, partly due to Turing's personality and social factors, were not widely disseminated.

Provenance: Manchester University Computer Science Department, courtesy Professor D B G Edwards. Material collected by Professor Simon H Lavington.

References: King's College, Cambridge has the main collection of Turing's papers. See catalogues of Contemporary Scientific Archives Centre (CSAC 53/7/77; CSAC 104/1/85). Copy of catalogues in NAHC; B.E.W. Carpenter and R.W. Doran (eds.), A.M. Turing's ACE Report of 1946 and Other Papers (Cambridge, Mass.: MIT Press, 1986); Andrew Hodges, *Alan Turing: The Enigma of Intelligence* (London: Burnett Books/Hutchinson Publishing Group, 1983).

See also: NAHC/MUC; NAHC/NPL .

The collection comprises two boxes of archive material.

NAHC/TUR/A. Biographical and Personal Papers

A1   Reprint of papers on "Damped Langrian Frequency Equations" and "An Escalator Process for the Solution of Linear Simultaneous Equations" "To A.M. Turing from J. Morris 3/12/48."

A2   M H A Newman, "Alan Mathison Turing 1912-1954", *Biographical Memoirs of Fellows of the Royal Society*, 1 (1955).

A3   Sara Turing, *Alan M Turing* (Cambridge: Heffer, 1959), pp.157. Inscribed inside: "C.W. Wardlaw (who, alas! wrote his obit. for "Nature")."

A4   B.E. Carpenter and R.W. Doran, "The Other Turing Machine", Massey University Computer Unit Report No 23, typescript, pp. 41, 1975.

NAHC/TUR/B. Correspondence

B1   Photocopy of letter, 12 April 1950, from Turing to Rainford at Manchester University, requesting a duplicating machine and a desk calculating machine. "We are starting a small information service, partly internal and partly external to the university, for the purpose of letting potential users of the machine know what processes have been programmed for the machine and how to take advantage of the programmes ... The desk calculator is necessary because it is not always desirable to do every calculation on the electronic computer..."

NAHC/TUR/C. Drafts, Working Papers, Reports

C1   A.M. Turing, "Mark I Programming Manual" (ca.1950). Typescript, pp.110.

C2,3   Two files of rough notes, working drafts, concerning inter alia, programming the Manchester Mark I and morphogenesis theory. The material includes typescripts and offprints from C.M. Wardlaw, the Manchester botanist.

C4   A.M. Turing, "Proposed Electronic Calculator". Typescript of Turing's proposal for the ACE, from the files of the Scientific Computing Service Ltd. Probably L J Comrie's copy.

NAHC/TUR/D. Publications

Offprints

"Equivalence of Left and Right Almost Periodicity", *Journal of London Mathematical Society* 10 (1935).

"On Computable Numbers", *Proc. of London Mathematical Society* 42 (1937).

"On Computable Numbers ... A Correction", *Proc. of London Mathematical Society* 43 (1937).

"Computability and /Definability", *Journal of Symbolic Logic* 2 (1937).

"The Extensions of a Group", *Compositio Mathematica* 5 (1938).

"Systems of Logic Based on Ordinals", *Proc. of London Mathematical Society* 45 (1939).

"The Use of Dots as Brackets in Church's System", *Journal of Symbolic Logic* 7 (1942).

"Finite Approximations to Lie Groups", *Annals of Mathematics* 39 (1938).

"Practical Forms of Type Theory", *Journal of Symbolic Logic* 13 (1948).

"The Word Problem in SemiGroups with Cancellation", *Annals of Mathematics* 52 (1950).

"Some Calculations of the Riemann ZetaFunction", *Proc. of London Mathematical Society* 3 (1953).

"The Chemical Basis of Morphogenesis", *Philosophical Transactions of the Royal Society of London* 1952 (237).

"Computing Machinery and Intelligence", *Mind* 59 (1950).

NAHC/WRE

WEAPONS RESEARCH ESTABLISHMENT (AUSTRALIA)

Typescript papers from WRE (Australia) Conference on Data Processing and Automatic Computing, Salisbury, Australia, June 1957.

Collection comprises one box of archive material.

D1   L. Betheras, W.D.Scott Pty Ltd, "Management Faces the Electronic Future".

D2   W.C.J. White, "Introduction to the WRE Data Processing System.

D3   P.R. Benyon, "Some New Components for Analogue Computers".

D4   J.P. Lonergan, "Flexibility in Analogue Computers".

D5   J.A.B. Cartmel, "The Development of a Roll Control System".

D6   P.M. Twiss, "The Use of AGWAC in the Analysis of Nonlinear Pitching Oscillation of a Supersonic Missile.

D7   L.C. Witchard, "The Use of Analogue Computers in Theoretical Studies of Guided Missiles".

D8   T. Kilburn, "A Review of Computer Developments at Manchester University".

D9   J.G.Thomason, "A Proposed Automatic Analogue Computer".

D10   C.P. Gilbert, "The New South Wales University of Technology Analogue Computer (UTAC).

D11   D.L. Touzel, "Hollerith Electronic Equipment for Use in Government and Industry".

D12   (Author unspecified) "Some Industrial Applications of Electronic Digital Computers".

D13   C. L. Wilson, "The Application of a PowersSamas Programme Controlled Computer to the problem of Material Control".

D14   J.G.Thompson, "A White Noise Generator for the Band 020 c/s".

D15   K.D. Broadfoot, "An Automatic Frequency Tracking Filter".

D16   G.E.Barlow, "The Telemetry and Doppler Data Converters".

D17   (Author unspecified), "A.D.A. A Transistor Decimal Digital Differential Analyser".

D18   (Author unspecified), "Some UK Data Processing Systems".

D19   J.A. Ovenstone, "Demonstration Problems on the WREDAC System".

D20   R. H. Barker, "The Reconstruction of Sampled Data".

D21   J.H.L. Cohen, "Data Acquisition".