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Sources for the History of Science in Oxford

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1. Introduction

It has long been held that acceptance of science as an academic subject in Oxford came about slowly, generally lagging far behind events in Cambridge and London. As recently as 1993 Paul Hoch wrote: 'Despite the occasional presence of many interesting and creative characters, Oxford was scarcely to be reckoned a major centre in the physical sciences until well into the present century'.¹ It is in some respects accurate to say that 'with few exceptions Oxford was late, slow and niggardly in taking up the modern physical sciences'.² But it would be a mistake to infer from this that there was no concern for science in Oxford during the nineteenth and early twentieth centuries. There was in fact a great deal of interest among the science professors of the University, although the interest was commonly of a didactic rather than an investigative nature. It is possibly as a result of this perception of Oxford science that the history of it has generally tended to be written by its practitioners, when it is written at all. Only recently have historians taken up the challenge of seeking to dig beneath the supposition to discover what precisely was going on, most notably in the series of lectures held each Trinity Term since 1989 on 'The Recent History of the Oxford Science Area'. This of course has entailed talking to the scientists themselves, in an effort to record much information that would otherwise have been lost. The limiting factor here has been the period of time that such reminiscences can cover, being at the most about 50 years. For information about earlier times we must look to evidence of a different sort, an effort forming the basis of the present project.

The attempt to locate sources for the history of science in Oxford since the mid-nineteenth century has been fruitful, and points out how manuscripts, recordings, photographs, printed materials and apparatus can survive unnoticed in departments and colleges for decades. In this case, the most profitable place to look has been the Clarendon Laboratory, which retains material of all kinds dating back to the 1850s. The Reader in Experimental Philosophy, the Reverend Robert Walker, and his successor, Professor Robert Clifton, were both avid collectors of scientific instruments, many of which survive in the Clarendon together with the instructions for use provided by the instrument makers. Representative of more recent times is the material relating to work carried out on radar and related technology by physicists working in the Clarendon during the second world war, as well as on low temperature physics and magnetism. Much of this material was gathered by Dr A.J. Croft (1925–88), a physicist who built his career in the Clarendon and became its unofficial historian.

In the case of other science departments, and some colleges, much material has already been deposited in the Museum of the History of Science³ or the University Museum,⁴ where it is available for consultation upon request. This project has uncovered new material in the Department of Physiology, the Forestry Institute, Christ Church and Wolfson College. For those interested in existing listings of archival material in Oxford, the first place to look is Cordeaux and Merry's Bibliography of Printed Works relating to the University of Oxford.⁵ Another source of primary material is the evidence given by Oxford scientists to the various commissions which investigated Oxford (and Oxford within wider inquiries of science education), since each commission took verbatim notes of oral evidence.⁶

There are several secondary sources which give useful introductions to the history of various departments and disciplines in Oxford. Work has been done on the medical school,⁷ chemistry laboratories,⁸ geology,⁹ astronomy,¹⁰ physics¹¹ and physiology.¹² For more general discussions on the teaching of science in Oxford, see F.S. Taylor¹³ and the more recent article by Janet Howarth.¹⁴ Finally, for an overview of the history of science in Oxford since 1850, see the relevant volumes and chapters of *The History of the University of Oxford*,¹⁵ a project which the present study complements.

Katherine D. Watson, Wolfson College

2. Clarendon Laboratory Archives: Library Stack

2.1. Box containing notes on lectures and on research carried out by Dr A.H. Cooke

- (1) notes taken by A.H. Cooke of Professor Lindemann's lectures, 1933–34
- (2) special problems in thermodynamics
- (3) research notes, January–April 1940
- (4) research notes, March 1940–November 1945
- (5) research notes, pre-1958/59
- (6) 1958: notes on conference at Moscow; lecture notes; research notes
- (7) about 1960: notes on various physicists' research
- (8) up to 1964: notes on research
- (9) up to November 1963: notes on research
- (10) notes taken at talks and discussions, 1962, 1965, 1966
- (11) notes of papers on magnetic transitions; calculations on antiferromagnets; about 1967. Book I
- (12) calculations on antiferromagnets. Book II
- (13) calculations on antiferromagnetism. Book III. 1970–75
- (14) rare earth aluminates and ferrites, 1969–75
- (15) research notes 1961–63
- (16) Wolf Lectures 1–8: notes taken and homework
- (17) notes for lectures given in 1968 and 1969
- (18) notes for lectures given in 1974
- (19) magneto-electric effect on GdAlO_3 and GdVO_4
- (20) magneto-electric effect: notes, papers, etc.
- (21) paper on semiconductors and semiconducting devices

Detailed description of contents:

- (1) Professor F.A. Lindemann's lectures on the Kinetic Theory (3 lectures per week to the second year class: 1933–34)
- (2) Lecture notes; no formal title page; no date, but notebook is the same type as in (1)
- (3) Research notes
electric lines (Jeans, para. 504. 562)
circle diagram for impedances
A type of electrical Resonator. W.W. Hansen, *J. App. Phys.*, 9 (1938), 654; 4 pages of discussion of this paper
– research notes begin here –
 - (a) measurements on 600 mc oscillator; oscillator coupled to [lecter] system; 2 wires 2.5cm apart, 0.1cm diameter
 - (b) January 8: test of insulating materials
 - (c) January 15: diode voltmeter
 - (d) January 16, 1940: test of voltmeter against thermo-junction
 - (e) January 22: effect of leakage
 - (f) January 29–February 1: measurements on Bleaney's resonator
 - (g) February 1940 includes some notes in a different hand

¹ P. Hoch, 'The University's Contribution to the Modern Physical Sciences', in J. Prest, ed., *The Illustrated History of Oxford University* (Oxford: Oxford University Press, 1993), pp. 301–5; p. 301.

² *Ibid.*, p. 334.

³ A. V. Simcock, 'An Ark for the History of Science', *IATUL Quarterly*, 1 (1987), 196–215.

⁴ K. C. Davies and J. Hull, *The Zoological Collections of the Oxford University Museum: a historical review and general account, with comprehensive donor index to the year 1975* (Oxford: Oxford University Museum, 1976); A.Z. Smith, *A History of the Hope Entomological Collections in the University Museum, Oxford: with lists of archives and collections* (Oxford: Clarendon Press, 1986). Revised and expanded in 1993.

⁵ E. H. Cordeaux and D.H. Merry, *A Bibliography of Printed Works relating to the University of Oxford* (Oxford: Oxford University Press, 1968).

⁶ For example, the 1852 Royal Commission on Oxford University; the 1867 Select Committee on the Oxford Universities Education Bill; the Oxford University Commission, 1878; the Royal Commission on Oxford and Cambridge Universities, 1919. With thanks to Dr Mark Curthoys for this information.

⁷ K. J. Franklin, 'A Short Sketch of the History of the Oxford Medical School', *Annals of Science*, 1 (1936), 431–46.

⁸ R. T. Gunther, *The Daubeny Laboratory Register, 1849–1923* (Oxford: Oxford University Press, 1904–24); E. J. Bowen, 'The Balliol–Trinity Laboratories, Oxford, 1853–1940', *Notes and Records of the Royal Society of London*, 25 (1970), 227–36; K. J. Laidler, 'Chemical Kinetics and the Oxford College Laboratories', *Archives for the History of the Exact Sciences*, 38 (1988), 197–283.

⁹ J.M. Edmonds and J.A. Douglas, 'William Buckland FRS (1784–1856) and an Oxford Geological Lecture, 1823', *Notes and Records of the Royal Society of London*, 30 (1976), 141–67; J.M. Edmonds, 'The Founding of the Oxford Readership in Geology, 1818', *Notes and Records of the Royal Society of London*, 34 (1979), 33–51; E. A. Vincent, *Geology and Mineralogy at Oxford 1860–1986: Record and Reminiscence* (Oxford: privately printed, 1994).

¹⁰ H. Knox–Shaw, 'The Radcliffe Observatory', *Vistas in Astronomy*, 1 (1955), 144–9.

¹¹ J. B. Morrell, 'Research in Physics at the Clarendon Laboratory, Oxford, 1919–1939', *Historical Studies in the Physical and Biological Sciences*, 22 (1992), 263–307. See also a number of historical articles written by Professor B. Bleaney of the Clarendon Laboratory, especially 'The Physical Sciences in Oxford, 1918–1939 and Earlier', *Notes and Records of the Royal Society of London*, 48 (1994), 247–61.

¹² E. G. T. Liddell, 'Physiology in Oxford', *Oxford Medical School Gazette*, 5 (1953); D. Whitteridge, 'The Apparatus Used by Sherrington and his Pupils', *Trends in NeuroSciences*, 5 (1982), 420–5; J.C. Eccles, 'The Oxford Laboratory of Sherrington's Time', *Proceedings of the Australian Physiological and Pharmacological Society*, 9 (1978), 69–72.

¹³ F.S. Taylor, 'The Teaching of Science at Oxford in the Nineteenth Century', *Annals of Science*, 8 (1952), 82–112.

¹⁴ J. Howarth, 'Science Education in late–Victorian Oxford: a Curious Case of Failure?', *English Historical Review*, 102 (1987), 334–71.

¹⁵ See in particular J.B. Morrell, 'The Non-medical Sciences, 1914–1939' and J. Roche, 'The Non-medical Sciences, 1939–1970', in B. Harrison, ed., *The History of the University of Oxford. Volume VIII. The Twentieth Century* (Oxford: Clarendon Press, 1994), pp. 139–63 and 251–89. Two volumes covering the nineteenth century have not yet been published.

- (h) Feb. 29: calibration of tuning scale of oscillator, against Bleaney's resonator (more figures in another hand – Bleaney?)
- (i) March 1,7,11 (pages of numbers do not appear to be in Cooke's hand)
- (j) March 14, 18–22, 26–27: experiment in progress
- (k) March 27: the above experiment was unsatisfactory, partly from the variations in the apparatus, which made the results uncertain, and partly because the wavelength was changed. What we want is to measure the e.m.f. on a short probe placed below the plunger, for different distances between plunger and base at constant wavelength, the resonance being obtained by varying the plunger length.
- (l) March 29, 30, April 9: test of Roaf's detector
- (4) A.H. Beck, Research Department, Henry Hughes and Sons Ltd., New North Road, Barking, Ilford, Essex (instrument maker? electron gun? 15/8/1945)
- (5) From inside covers of notebook:
 - (a) Kip's work on tin
 - (b) Jeffries' work (one of his graduate students, Mervyn Abraham, would like to spend 1958–9 in Oxford)
 - (c) notes on conference talks
 - (d) Bleaney: MnF_2
 - (e) Dransfeld: excitation of phonons at vhf [very high frequency]
 - (f) talk on low temperatures to MCS Nov. 1962
 - (g) talk on research work: (1) have studied rare earths; (2) general form of results
 - (h) notes for talk at IBM; first visit since war to a lab of a great US company – impressive to see how much of country's research, especially in solid state physics, is being carried [out] in such labs.
 - (i) Bleaney has already talked
- (6) Dated 1958, with a list of contents on cover:
 - (a) notes on He3 cryostats
 - (b) notes on papers at Moscow conference (no date)
 - (c) notes on MnF_2
 - (d) lecture notes: R.J. Elliott, Solid state physics, Hilary Term 1958; W.P. Wolf, summer talk on ferromagnetism
 - (e) Heine: non-localised wave functions, 13/2/1958
 - (f) Elliott: excitors, 28/2/1958
 - (g) Wolf: talk on ferromagnetism to magnetism class, 10/2/1959
 - (h) A.F. Kip: colloquium talk on cyclotron resonance in metals, 13/2/1959
 - (i) Young: summer talk on work at IBM on superconductors at Poughkeepsie
 - (j) D.M.S. Bagguley: talk on ferromagnetic resonance to magnetism class, 23/2/1959
 - (k) A.B. Pippard: methods of investigating Fermi surfaces of metals, 13/3/1959
 - (l) magnetic anisotropy of NiF_2
 - (m) ferromagnetism of antiferromagnetics; references
 - (n) Stevens: coupling of spin systems to resonant cavities, 21/5/1959
 - (o) Challis: the Kapitza boundary resistances for heat flow from metals to liquid helium
 - (p) h.f.s. in antiferromagnetic CoF_2 (high frequency spins; observations of V. Jacovino, *Phys. Rev. Letters*, 15/2/1959, vol.2, #4)

- (7) Pages are numbered; list of contents written on cover
 - (1) Stoner, thermodynamics of magnetization
 - (7) Suhl, nuclear hfs in ferromagnetics, 17/6/1958
 - (10) Mims, paramagnetic relaxation in nickel fluosilicate, $NiSiF_6 \cdot 6H_2O$, 19/6/1958
 - (17) visit to Newport Instruments 23 July 1958 (magnet controller)
 - (19) work of magnetization – equations/descriptions of theory
 - (25) W.P. Wolf, *J. App. Phys.*, 28 (1957), 780
 - (27) Owen: effect of crystal fields on energy levels of d-electrons, 4/11/1958
 - (32) Owen: magnetic properties of Cu^{2+} ion in a crystal field, 18/11/1958
 - (41) M. Abrahams: hfs in electron spin resonances
 - (43) notes on antiferromagnetism
 - (66) C. Kittel: dipolar domains in paramagnetic crystals at low temperatures, *Phys. Rev.*, 82 (1951), 965
 - (68) Elliott: transition group metals, 15/10/1959
 - (73) D.F. Braner: recent work on 3He , 29/10/1959
 - (77) Marshall: exchange interactions, 13/11/1959
 - (83) P. Franken: optical pumping, 20/11/1959
 - (87) Neville Robinson's transition smoothing circuits for magnets, 17/12/1959
 - (90) Raines: plasma oscillations, 18/12/1959
 - (92) Galvanometer amplifiers with feedback
 - (97) Bagguley: cyclotron resonance over a wide temperature range, 9/6/1960
 - (99) references on rare earth compounds (*Physics Abstracts* 1957–59)
 - (102) notes on Orbach's spin-lattice relocating process
 - (106) notes on measurement of spin-lattice relocation times using a Q-meter
 - (108) references on ferromagnetic rare earth metals
 - (110) O. Lourasmaa: s[pecific] h[eat]s of rare earth metals, 22/6/1962
 - (113) references on paramagnetic susceptibilities, to illustrate the Curie–Weiss Law
- (8) Pages are numbered; list of contents written on cover
 - (1) chapter headings on paramagnetism
 - (20) Donald's measurements of nuclear spin relaxation times in MnF_2
 - (21) sensitivity of Farer-type apparatus, 28/6/1958
 - (23) bibliography on magnetism, especially paramagnetism
 - (33) experimental methods in paramagnetism
 - (38) feedback current in phase-sensitive detection circuits
 - (44) tests on magnet power supply, 24/7/1959
 - (46) J. Owen: talk on interactions between Mn ions in MgO , (p. 18/9/1959)
 - (48) W.B. Mims: talk on spin relaxation, 18/9/1959
 - (51) W. Marshall: Coralerey effects in Mn compounds, 18/9/1959
 - (52) G. Benedek & Kushida: effect of pressure on ^{19}F resonance in MnF_2 , 18/9/1959
 - (53) R.G. Shulman (Bell Labs): nuclear resonance in NiF_2
 - (55) I.E. Dzialoshinskii: thermodynamic theory of weak ferromagnetism in anti-ferromagnetic substances
 - (61) A.S. Borodik-Romanov: weak ferromagnetism in $MnCO_3$ single crystals
 - (62) D.T. Edmonds: spin waves
 - (66) references on spin waves

- (68) notes on paramagnetic saturation, 1/2/1960
 - (70) Kimts & Marshall: hyperfine coupling in ferromagnetic materials, 16/2/1961
 - (74) G. Teaney: properties of KMnF_3 , 3/3/1961
 - (77) Kittel: spin waves and ferromagnetic resonance, 17/3/1961
 - (82) E. Jacobson (GE): microwave electronics
 - (85) Prof. Dieks, 23/11/1961: spectra of solids
 - (86) De Gennes: nuclear magnetic resonance in rare earth garnets, 15/1/1962
 - (88) R.J. Elliott: excitors, 15/10/1962
 - (93) Abragam: dynamic nuclear polarization, 25/10/1962
 - (95) address of Howe & Co. (import agents)
 - (96) summary of papers: W.P. Wolf: force on an anisotropic crystal
 - (99) Meeting on spin waves, Phys. Soc. L.T. Group, 21/1/1964
 - (105) McLean, RRE, 4/6/1964: non-linear optical effects
 - (110) Leask: spectra of rare earth compounds, 11/6/1964
- Loose sheets at end: Baker, interactions between magnetic ions, 26/11/1964
- (9) Pages are numbered; list of contents written on cover
 - (1) the Faraday effect
 - (5) R. Orbach: spin-lattice relocation in ferromagnetics
 - (13) Elliott & Stevens: calculations of the energy levels of trivalent rare earth ions in the ethyl sulphates
 - (17) notes on Orbach's statistical process for spin-lattice relaxation
 - (22) R.A. Kamper: spectroscopic work in the far IR, 10/11/1960
 - (25) notes on Charters: the Fermi surface (*Can. J. Phys.*, 34 (1956), 1395)
 - (34) references on interactions in rare earth metals – theory
 - (36) references on optical work on rare earth compounds
 - (38) Spedding: Faraday Society discussion (7 (1949), 214) – separation of rare earth salts and preparation of pure metals
 - (40) Horst Meyer: condensed He^3 , 1/6/1961
 - (43) the specific heat apparatus
 - (45) time tables of a specific heat run
 - (55) dipole interaction in CeCl_3
 - (57) diagram of magnetic power pack
 - (58) LT group meeting on high magnetic fields, 14/2/1962
 - (67) R.J. Elliott: magnetic ordering in rare earth metals, 22/2/1962
 - (79) T.G. Phillips: spin wave resonance in iron group metals, 14/11/1963
 - (85) R.A. Stradling: the de Haas–Shutrekov effect, 17/2/1966
 - (10) Pages are numbered
 - (1) Prof. A. Abragam, MT 1962: Resonance in Semi-conductors
 - (5) discussion on 3/6/1965: Sub-lattice magnetization in antiferromagnetics – notes from 'Bleaney's talk'
 - (7) notes on transistor noise 1966
 - (12) transistor equivalent circuits 1966
 - (15) insert: xeroxed article, Edward G. Nielsen, 'Behavior of Noise Figure in Junction Transistors', *Proc. IRE*, July 1957, 957–63.
 - (18) Josephson, Critical Phenomena, 8/6/1967
 - (22) W. P. Wolf, Magnetic Rare Earth Compounds, 15/5/1969

- (11) 'Notes of papers... etc.'
 - (1) dysprosium trichloride
 - (3) I.S. Jacobs: Pulsed Field Measurements, 26/5/1966
 - (7) references on transition from antiferromagnetic state – 'spin-flop'
 - (8) C. Kittel: Theory of antiferromagnetic resonance, *Phys. Rev.*, 82 (1951), 565
 - (10) F. Kopper, Anisotropy in antiferromagnetic MnF_2 , *Phys. Rev.*, 87 (1952), 608
 - (14) L.R. Maxwell, Microwave resonance absorption in antiferromagnetic molecules, *Am. J. of Physics*, 21 (1952), 80
 - (16) M.E. Fisher, Relation between the specific heat and susceptibility of an antiferromagnet, *Phil. Mag.*, 7 (1962), 1731

NB: a list of contents was made in about June 1968. The notebook has about 115 pages, and is full of references of about 2pp length – summaries of published works. At the back of the notebook are 3 letters:

 - (a) Dr A.H. Cooke to Professor C. Domb, 4/8/1967
 - (b) Domb to Cooke, 2/8/1967 (in reply to letter of 24/7/1967)
 - (c) Domb to Cooke, 4/9/1967

C. Domb, Professor of Theoretical Physics, Department of Theoretical Physics, King's College, London. The letters concern calculations for the Heisenberg model of an antiferromagnet.
- (12) The example used to show antiferromagnetism is GdAlO_3
 - (16) comment by Cooke: 'this is wrong: took the same Θ for both classes of ion; valid for $\Theta_1 = \Theta_2 = 0$ '
 - (23) references on GdFeO_3
 - (25) spin-flop in an antiferromagnet
 - (32) interactions in TbAlO_3
 - (37) GdFeO_3 references and calculations for GdAlO_3
 - (70) m.e. lines: sensitivity of [curve] temperature to crystal field anisotropy
 - (82) dipole fields for the DyAlO_3 lattice
- (13) Pages are numbered; list of contents written on cover
 - (1) Van Vleck's calculation of dipole term in 'tail' of S.H. anomaly (due to dipole-dipole coupling)
 - (6) indexing DyVO_4 back reflection picture, 28/7/1970
 - (12) dipole sums for DyVO_4 , 29/7/1970
 - (22) dipole sums for DyPO_4
 - (24) s.h. of DyPO_4 – low temperature side
 - (26) splitting of levels in DyVO_4
 - (31) M.C.M. O'Brien: The dynamic Jahn-Teller effect
 - (35) flipping field in DyVO_4
 - (39) more on the specific heat test for an Ising system
 - (47) magnetic susceptibilities of rare earth vanadates, 8/10/1971
 - (51) notes on properties of TmVO_4
 - (68) note on structure of Langbeinite
 - (68A) Ham: talk on Jahn-Teller effect, 3/3/1972
 - (70) TmVO_4 , continued from p. 66
 - (74) internal fields in GdFeO_3
 - (78) seminar talk: G. Gehring on TmVO_4
 - (82) definition of magneto-electric coefficient, 11/4/1973

- (85) simple considerations on M–E effect, 12/4/1973
- (91) J.H. Colwell, B.W. Mangam and D.D. Thornton on GdAsO₄, *Phys. Rev. B*, 3 (1971), 3855, 6/7/1973
- (93) thoughts on anisotropy due to dipole interaction, 11/7/1973
- (98) Gillian Gehring, 31/10/1974
- (100) 8/5/1975: some data on HoLiF₄
– offprint: A.H. Cooke, S.J. Swithenby and M.R. Wells, ‘Magnetic Interactions in Holmium Phosphate, HoPO₄’, *J. Phys. C: Solid State Phys.*, 6 (1973), 2209–16
- (14) Pages are numbered
 - (1) some data on GdAlO₃ (from previous book)
 - (4) effect of crystalline electric field on magnetic properties of GdAlO₃
 - (9) effect of crystalline field on ordered state
 - (13) R. Wheeler, talk on phase transition in K₂ReCl₆, 25/3/1969
 - (14) GdFeO₃, 19/7/1969
 - (18) allowed ordering in ABO₃ system (Bestaut), c. December 1970
 - (22) behaviour of GdCrO₃, 27/3/1970 with comments of December 1970
 - (32) more comments on above, 18/12/1970
 - (33) 18/12/1970: discussion of rotation of ferromagnetic moment
 - (36) 31/12/1970: further thoughts on interactions in GdCrO₃
 - (38) R. Hornreich, 2/8/1972: magnetic–electric effect
 - (41) 14/8/1972: GdCrO₃
 - (43) magnetic susceptibility of a 4-lattice system
 - (54) dipole sums for GdCrO₃ (from MJW, 18/10/1972) [Mike Wells?]
 - (56) Gd–Gd interactions in GdCrO₃
 - (59) 23/6/1975, Hornreich’s letter about Cr–Gd interaction in GdCrO₃
 - (65) design of modulation coils for enhanced nmr (17/9/1975) from Montgomery and Terrell
 - (67) references (2 pages on symmetry, 3 references)
- (15) Pages are numbered
 - (1) dysprosium ethyl sulphate: summary of interaction calculations
 - (19) chain calculations on dysprosium ethyl sulphate
 - (31) summary of numbers for dysprosium ethyl sulphate
 - (33) values of SH and g-values for the ethyl sulphate
 - (35) rare earth trichlorides – hexagonal Y(OH)₃ structure
 - (37) note on relaxation processes
 - (43) Sendai, 5/10/1961
 - (45) notes on talks at Spin and Phonons Conference, April 1962
 - (a) Van Vleck, 17/4/62: elementary account of direct process for spin–lattice relaxation
 - (b) [Chislin]: [exftic] techniques
 - (c) Scott: phonon bottleneck
 - (d) M.H.L. Pryce: cross relaxation in systems with hfs
- (50) Bloembergen et. al., *Phys. Rev.*, 114 (1959), 445: cross relaxation in spin systems (summary)

- (52) notes on visit to MIT, National Magnets Lab, 8/4/1963, saw:
 - (a) Dr. Stevenson – general [] of installation
 - (b) Dr. Alan Runciman and Dr. Stagen – optical spectroscopy
 - (c) Dr. Simon Farer – himself
 - (d) installation
- (53) coils
- (54) optical work
- (58) visit to USAF Cambridge Research Center, Bedford, Mass.
- (60) visit to Ford Research Lab
- (61) talk by Dr. John Hougan (NRC, Ottawa)
- (62) more from Ford Lab
- (63) discussion with Horst at Duke: points on his He³ cryostat
- (65) some firms supplying equipment (USA)
- (67) M.I. bridge used at Duke (from John E. Rims thesis)
- (71) notes on grant applications
- (75) Mme. Cortier: 5/7/1963, Bellevue Lab., optical work on single crystals of iron group
- (16) Wolf Lectures and homework; c.1963
 - (1) Lecture 1: Operators, Eigenfunctions, Eigenvalues (we deal with angular momentum operators)
 - (8) Lecture 2: Spin matrices
 - (14) Lecture 3: Perturbation Method continued
 - (22) Lecture 4: Units
 - (29) Lecture 5: Magnetization and Susceptibility
 - (42) Lecture 6: The High Temperature Series Expansion
 - (51) Lecture 7: continued from Lecture 6 (Spin Hamiltonian, Transition Probabilities)
- (17) Notes for lectures, 1968–69
Final year reading list, Christmas vacation 1968
Magnetic Properties of Solids, Dr. A.H. Cooke, Hilary Term 1969
– reading list; problems on lectures 1 and 2; comparison of cgs and MKS units
 - (I.1) Lecture 1: force on a dipole in a non–uniform field; diamagnetism and paramagnetism [14pp]
 - (II.1) Lecture 2: diamagnetism and paramagnetism due to electrons in an atomic system (13pp plus problems)
 - (III.1) Lecture 3: paramagnetism of ionic compounds (11pp)
 - (IV.1) Lecture 4: paramagnetism of rare earth compounds (11pp)
followed by Problems for week 3: ferromagnetism and spin waves; (magnetic properties of solids (III), AHC/HT68)
 - (V.1) Lecture 5: ferromagnetism (10pp)
 - (6.1) Lecture 6: domains, spin waves (10pp)
followed by Problems for week 4: antiferromagnetism; (magnetic properties of solids (III), AHC/HT69); note change in pagination from Roman to Arabic numerals
 - (7.1) Lecture 7: antiferromagnetism (10pp)
 - (8.1) Lecture 8: various topics, including anisotropy in antiferromagnets, spin flop, parasitic ferromagnetism, ferromagnetism (9pp)

- (18) Notes for lectures, 1974
 Vacation reading: Easter 1974
 Introduction to Solid State Physics, 2nd year, AHC/TT/74
 Introduction to Magnetism and Magnetic Resonance, 2nd year, DTE, 1971
- I. Magnetism of Isolated Ions
 - II. Paramagnetism in Crystals
 - III. Mean Field Theory of Magnetic Interactions and Ferromagnetism
 - IV. Magnetic Resonance
 Synopses of Second Year Lectures in Physics, TT 1973
 Introduction to Solid State Physics, AHC/TT/73
 - (a) comparison of c.g.s. and S.I. units
 - (b) magnetic energy
 - (c) reading list
 - (d) problems on lectures 1,2,3,4
- (I.1) Introduction to Solid State Physics, 2nd year. Magnetic Properties of Solids, TT1973. Six lectures. Synopsis already issued; problem sheets to be issued weekly.
- Lecture 1: the force on a dipole in a non-uniform field – diamagnetism and paramagnetism (11pp)
- Lecture 2: diamagnetism and paramagnetism due to electrons in an atomic system
 (begins lecture again; 7pp)
- Lecture 3: rare earth compounds (9pp)
- Lecture 4: domains (7pp)
- Lecture 5: magnetic resonance (10pp plus 9pp from HT72)
- Lecture 6: summary of main points on resonance (9pp)
- (19) Envelope labelled ‘M–E effect in GdAlO₃ and GdVO₄’
 Handwritten draft of a paper: ‘A Study of Magneto-Electric Effects in GdAlO₃ and GdVO₄’, 26pp
 At the end is appended a handwritten note to Dr. Cooke from Nick [England?], dated 15 August 1978, from Rose Cottage, Wellington College, Crowthorne, Berks.; mentions rough draft of the promised paper and that much of the material is from his thesis
 5pp of notes and comments by AHC
- (20) Wallet, labelled ‘Magneto–electric effect’; no page numbering
- (a) 2pp calculations (symmetry operations)
 - (b) 3pp photocopy: symmetry in space–time, magnetoelectric effect
 - (c) 1pp photocopied calculations. On the back are references to Daniels, Richardson, Orbach and Rohrer on their interest in an unnamed phenomenon
 - (d) 15pp typescript with corrections for an untitled talk on the magneto–electric effect
 - (e) 2pp typed, 3pp handwritten, drafted for the same talk
 - (f) 4 overhead acetates for talk
 - (g) 4pp typed on recognition of m–e effect
 - (h) 1pp rough sketches of molecules
 - (i) 7pp typescript, ‘Simple consideration of the magneto–electric effect’
- (j) 3pp photocopy, G. Velleaud and M. Mercier, ‘A new Magnetoelectric Compound: DyCoO₃’, *Solid State Communications*, 17 (1975), 237–9.
 - (k) 9pp typescript draft of a talk on m–e effect; does not say to which Society it is to be given
 - (l) 3pp typed, ‘The magneto–electric effect (a shot in the dark)’. Contains many equations
 - (m) 2pp handwritten calculations for Cr₂O₃
 - (n) offprint: George T. Rado, ‘Magnetoelectric evidence for the attainability of time-reversed antiferromagnetic configurations by metamagnetic transitions in DyPO₄’, *Physical Review Letters*, 23 (1969), 644–7.
 - (o) photocopy: R. Hornreich and S. Shtrikman, ‘Statistical mechanics and origin of the magnetoelectric effect in Cr₂O₃’, *Physical Review*, 161 (1967), 506–12.
 - (p) photocopy: G.T. Rado and V.J. Folen, ‘Magnetoelectric effects in antiferromagnetics’, *J. of Applied Physics*, 33 (Supp.) (1962), 1126–32.
 - (q) photocopy: M. Mercier and G. Velleaud, ‘Détermination de l’ordre magnétique de GdAlO₃ par l’effet magnétoélectrique’, *J. de Physique*, 32 (1971), C1 499–500.
 - (r) photocopy: G.T. Rado, ‘Statistical theory of magnetoelectric effects in antiferromagnetics’, *Phys. Rev.*, 128 (1962), 2546–56.
 - (s) offprint: G.T. Rado, ‘Magnetoelectric studies of critical behaviour in the Ising–like antiferromagnet DyPO₄’, *Solid State Communications*, 8 (1970), 1349–52. (Presented at the 1970 International Conference on Magnetism)
 - (t) 19pp photocopy of typescript: R.M. Hornreich, ‘The magnetoelectric effect – materials, physical aspects, and applications’. (Invited paper for Japan)
 - (u) one slide
 - (v) 5pp handwritten notes with references to slides on m–e effect
 - (w) 18pp typescript: G. Gorodetsky, R.M. Hornreich and B.M. Wanklyn, ‘Statistical mechanics and critical behavior of the magneto–electric effect in GdVO₄’. (Submitted to *Physical Review B*)
 - (x) photocopy: S. Alexander and S. Shtrikman, ‘On the origin of the axial magnetoelectric effect of Cr₂O₃’, *Solid State Communications*, 4 (1966), 115–17.
 - (y) 4 pages of Cooke’s notes and calculations
 - (z) photocopy: I.E. Dzyaloshinskii, ‘On the magneto–electrical effect in antiferromagnets’, *J. Experimental Theoretical Physics* (USSR), 37 (1959), 881–2.
- (21) Paper on semiconductors
 14-page photocopied typescript: ‘Semiconductors and Semiconducting Devices’; no indication of authorship

2.2 Materials collected by Dr A.J. Croft

Box A:

- (1) photographs for Croft’s 1986 typescript (see separate listing)
- (2) three copies of an unidentified photograph (apparatus)
- (3) offprint: J.T. Houghton and C.D. Walshaw, ‘G.M.B. Dobson (1889–1976)’, *Biographical Memoirs of Fellows of the Royal Society*, 23 (1977), 41–57

- (4) envelope of papers including: typed page of comments by Croft on Janet Howarth's essay for *English Historical Review*; two pages of comments by Croft on a typescript, 'Natural Scientists and the 'Genius Loci' in Late-Victorian Oxford', by Michael Brock (?); a copy of the typescript (58pp plus endnotes)
- (5) envelope containing correspondence between Croft and C.H. Collie, 1983–84; typescript by Collie (copy) on 'Oxford Physics 1870–1970'; questions and written comments/answers by Croft in 1981 (based on talks with Collie?); information sent from Collie to N. Kurti, n.d.
- (6) file folders, each with a label:
 - (a) 'miscellaneous': notes taken by Croft on 28/7/1976 plus a few pages from his biography of Lindemann (see Box B)
 - (b) 'xerox MS': unpaginated word processed part of Croft's 1986 typescript, chapters 14 to 24
 - (c) 'history: G.L'E. Turner, C18': miscellaneous correspondence from R.V. Jones, 1986; H.M.C. Ionides, 1984; J. Howarth, 1985; J.L. Olsen, 1983; Giuseppe Menegazzoli, 1971, about Zamboni piles; Brian Gee of the College of St Mark and St John Foundation, 1983; booklet (July 1982) printed for an exhibition of Cambridge University Archives, 'Science in Cambridge Before 1800'; information relating to the publication of volumes 6 and 7 of the History of the University of Oxford, 1984; pamphlet, 'The Oxford Historical Gallery'
 - (d) 'MS': two pages of notes for Part 2, Chapter 10 of Croft's 1986 typescript
 - (e) 'early radio': typed and handwritten notes; photocopy of excerpt from J. A. Fleming, *The Principles of Electric Wave Telegraphy and Telephony*, 4th edition, 1919
 - (f) 'nuclear physics': typescript, 'Development of Nuclear Physics in Oxford. I. General Considerations', by D.H. Wilkinson, 9/11/1959
 - (g) 'low temp. and solid state – Hoch': correspondence with Paul Hoch, 1981–2; notes by Croft
 - (h) 'Price': correspondence with Francis Price, 1984; Douglas (Roaf?), 1983; note from department of astrophysics about 12 inch refractor, 1983
 - (i) 'archaeology': thermoluminescence – progress at Oxford
 - (j) 'history subjects – astronomy': obituaries of Professor Robert Atkinson and Sir Martin Ryle
 - (k) 'history subjects – atmospheric physics': pamphlet, 'Atmospheric Physics 1926–1976', Clarendon Laboratory; offprint, G.M.B. Dobson, 'Forty Years Research on Atmospheric Ozone at Oxford: a History', *Applied Optics*, 7 (1968), 387–405; J.T. Houghton, 'Space Research in Oxford', *Oxford Magazine*, 30 Oct. 1970
 - (l) 'history subjects – non-academic staff': information on some Clarendon technicians
 - (m) 'visitors 1971–72': visiting academics
 - (n) 'history filing': letter from S. Chandrasekhar to K. Mendelssohn, handwritten, 14/11/1952
 - (o) 'MC notes': letter from Ian Green of Queen's University of Belfast to Croft, 14/9/1982, about the Clarendon Trust, with five-page xeroxed typescript by Croft on the emergence of physics in Oxford; this does not come from either of his large typescripts

Box B

- (1) typescript by A.J. Croft, 'Lindemann and Oxford Science', n.d., pp. 1–262, 400–412, plus loose sheets at the end and between pages 220–221
- (2) incomplete copy of Croft's 1986 typescript, 'Oxford's Clarendon Laboratory'; labelled as 'not final version'
NB: a nearly-complete copy of the typescript is available in the Radcliffe Science Library; a complete copy is held in the History of Science research area at the Faculty of History in George Street and in the Library of the Clarendon Laboratory (see Librarian)
- (3) file folders, each with a label:
 - (a) 'typed book – xeroxes': contains photocopy of part of Croft's typescript on Lindemann; no consecutive pagination
 - (b) 'further information for book': miscellaneous notes by Croft and related correspondence for book on Lindemann, with copies of pages of the typescript

Box C

- (1) Kirwan Bruce Angwin, 'A Century of Oxford Physics, 1865–1965'. 2 vols. Handwritten in large notebooks, with an index at the beginning of volume 1. Pages 1–373. The work was done with Croft, n.d., and there are many loose slips of paper between the pages
NB: Angwin photocopied the minutes of the Museum Delegates (see below), judging by the handwriting. There is no record of him as a formal member of the Clarendon Laboratory
- (2) notebook with dates from 14/6/1958 to 20/12/1960 in the handwriting of Croft. Miscellaneous information: room plans, vacations, notes of meetings
- (3) notebook, handwritten notes for a history of the Clarendon, compiled from 1969–1984, with many loose papers. Handwriting is that of Margaret Croft

3. Clarendon Laboratory: Archive Room (Room 158)

3.1 Photographs

- (1) Clarendon departmental photograph 1962, 1983
- (2) Clarendon departmental photograph 1967; glued to card
- (3) Clarendon Laboratory, 1967 (with each individual named); framed
- (4) Clarendon Laboratory, 1975 (with each individual named); framed
- (5) The Clarendon Laboratory; the Electrical Laboratory; the Old Clarendon Laboratory, 1872–1939; all in one frame
- (6) in a large manila envelope:
 - (a) Conseil de Physique Solvay, Bruxelles, 1911
 - (b) Institut International de Physique Solvay – deuxième conseil de physique – Bruxelles, 1913
 - (c) Institut International de Physique Solvay – quatrième conseil de physique – Bruxelles, 24–29 Avril 1924(all labelled with the name of each individual)
- (d) British Association meeting, Liverpool, September 1923: Some Members of Section A, unlabelled
- (7) British Association, Liverpool, September 1923: Some Members of Section A, framed
- (8) four photographs (glued to card) of a sphere of diameter 100 microns
- (9) photographed spheres glued to large piece of card: labelled “‘a’, GH2. White light; 1cm = 97 microns on sample”
- (10) another, similar card: “GH2; ‘b’ surface. 365nm stimulation, unfiltered. Wavelength > 400nm. 1cm = 154.6 microns on scale”
- (11) another, similar card: “GH2; ‘b’ surface. 365nm stimulation, filtered. 1cm = 154.6 microns on sample. Wavelength > 500nm”
- (12) another, similar card: “GH2; ‘b’ surface. White light illumination. 1cm = 154.6 microns on sample”. Note says ‘not wanted in [room] 118
- (13) a larger card with glued photographs of spheres: “GH2, ‘a’; 365nm uv filtered. Wavelength > 500nm”
- (14) a similar, larger card: “GH2; ‘a’; 365nm uv unfiltered. 1cm = 97 microns on sample. Wavelength > 400nm”

3.2 Books

- (1) Joshua Rose, *Modern Machine-Shop Practice*, volume 1 of 2 (London: J.S. Virtue & Co., n.d.)
- (2) laboratory class lists and fees, entered in a ledger book for Hilary Term 1868 to Trinity Term 1934; lectures attended by each student are detailed; at the front of the book is a typewritten sheet of information on James Walker (1857–?1929), Clarendon demonstrator 1883–1919
- (3) Sir Isaac Newton, *The Mathematical Principles of Natural Philosophy*. Translated into English by Andrew Motte: to which are added Newton’s System of the World; a short comment on, and defence of, The Principia, by William Emerson; with the Laws of the Moon’s Motion according to Gravity, by John Machin, Astronomical Professor at Gresham College, and Secretary to the Royal Society. A new edition revised and corrected by William Davis in 3 volumes. Volume 2. (London: 1819)

- (4) Euclide’s Elements and Euclide’s Data and a brief treatise on regular solids by Isaac Barrow. With Appendix on logarithms by J. Barrow (London: 1751)
- (5) *Physical Memoirs*, selected and translated from foreign sources under the direction of the Physical Society of London, volume 1, part 1 (London: Taylor and Francis, 1888); papers of Professor H. von Helmholtz
- (6) R. Weiss and G. Foëx, *Le Magnétisme* (Paris: Librairie Armand Colin, 1926)
- (7) large, flat, bound book: F. Engel and K. Schellbach, *Darstellende Optik: 21 Kupfertafeln zur Darstellenden Optik* (Halle: H.W. Schmidt, 1856)
- (8) another copy of the same book (blue cover), containing a slim pamphlet inside the front cover which gives descriptions (in German) of each figure. The watermark on the pamphlet is 13 Mai 1846; English and French editions were available

3.3 Manila envelope, ‘J. Timms, correspondence’, containing two folders:

- (1) Liquefier Explosion (1953)
 - (a) envelope containing notes to accompany photographs of the explosion, by A.J. Croft, 27/9/1954; letter to Croft from University Registry Office, 2/10/1954; 13 photographs of the accident site (many duplicates)
 - (b) two copies of typescript, 30/4/1953, by Croft (1 page) of 1953 accident to the Oxford Hydrogen Liquefier
 - (c) 5–page report by Croft, 3/5/1953: ‘Report on the accident to the hydrogen liquefier of April 30th, 1953’; stapled in covers
 - (d) another copy, loose sheets
 - (e) three copies of 1–page ‘Addenda to Report on Accident to Hydrogen Liquefier’, 6/5/1953
 - (f) three pages handwritten in pencil, ‘Notes of interview with Mr Bright’; probably by Croft
 - (g) letter, A.C.L. Houlton to A.J. Croft, 30/5/1953 re. Mr Hazel’s eyesight, which was damaged in the explosion
 - (h) photocopy on yellow paper of notes in envelope (see above, (1)(a))
 - (i) letter, Dr J.T.G. Watts of the Explosives Branch, Home Office to A.J. Croft, 12/5/1953; about suggestions for safety features; attached is a copy of a reply from Croft to Watts, 13/5/1953
 - (j) copy of letter from Croft to Mr Moody, 9/5/1953 on what material to put in the doors of the hydrogen liquefier room. Moody appears to be a Fire Officer.
 - (k) letter, A.M. Clark (employee of British Oxygen Co. Ltd.) to Croft, 14/5/1953 and copy of reply of 16/5/1953
 - (l) letter, Lilian Hazel to Croft, 10/5/1953
 - (m) one page of notes on what technicians Eric and Roy saw of the explosion
 - (n) copy of letter from Croft to Clark, 4/5/1953, about combustible impurities in liquid oxygen systems
 - (o) letter, Croft to Mrs Hazel, 4/5/1953
 - (p) letter, Clark of BOC to Professor Simon, 15/5/1953, on liquid gas mixtures. Appended is report “Examination of the Expansion Valve Assembly of a Liquid Hydrogen Plant”, by E.C. Sykes, Metallurgy Division, AERE Harwell, 12/5/1953, with 2 photographs of the valve
- (2) Correspondence of Prof. Simon with University Registry and Chest Office, December 1941 to August 1948: concerning a variety of financial and administrative points; much to do with Clarendon work for Department of Scientific and Industrial Research and the Ministry of Supply

3.4 Folder of material relating to the Oxford Dry Pile, selective listing

- (1) seven copies of a photograph of the pile
- (2) photocopies of articles about dry piles
- (3) photocopied letter, Francis Watkin to Rev. R. Walker, 1/4/1841 (from 5 Charing Cross): 6 pages of the letter obviously belong together, but the first two pages have been photocopied on to one sheet of A4 (1/4/1841 and 8/4/1844); neither appears to belong to the other 6 pages
- (4) booklet by Charles E. Benham, *The Electric Dry Pile* (London: Percival Marshall and Co., c.1920)
- (5) offprint: A.J. Croft, 'The Oxford Electric Bell', *European Journal of Physics*, (1984), 193–4.
- (6) correspondence between Croft and several individuals and journals re. the Oxford dry pile (1980s) [Croft had hoped to write a definitive history of the dry pile]
- (7) three copies of a photograph of an 1815 engraving of parts of dry pile (?); German
- (8) three photographs (French) of parts of dry pile
- (9) lengthy letter of 4/3/1974 in answer to queries on dry pile by Joan V. Jensen of the Department of Natural Philosophy, Aberdeen University
- (10) correspondence dating back to the early 1970s

NB: the Oxford dry pile was featured in a Horizon documentary on BBC TV, 27/12/1971, repeated in early 1973; it was also included in the Guinness Book of Records in 1972

- (11) article on the dry pile in the *Oxford Mail*, 29/9/1967, p. 9
- (12) two photographs of a clock in Italy run by a dry pile
- (13) correspondence dating back to late 1950s
- (14) handwritten notes by Croft on references to dry piles, several translations from German articles of early 19th century (*Gilberts Annalen*)

3.5 Low-temperature work; A.J. Croft

- (1) folder marked 'Croft' containing copies of Appreciation of AJC
- (2) offprints of a paper by Croft and R.H.B. Exell, 'The direct measurement of the magnetization entropy of a paramagnetic substance: thermal and magnetic properties of ferric methylammonium alum at low temperatures', *Proceedings of the Royal Society*, 262A (1961), 110–19
- (3) assorted offprints by members of the Clarendon, 1967–76
- (4) folder: 21 offprints on helium liquefiers, from Clarendon and other universities, 1936–68
- (5) folder: 28 offprints on low temperature work, including offprint (1901) and note from M.W. Travers to Prof. Simon, 24/4/1949
- (6) folder: 2 papers by N. Kurti on absolute temperature scale, 1957–8
- (7) more offprints of paper by Croft on a line carrying liquid hydrogen; offprint of paper by B. Bleaney and Ingram, 1949, on paramagnetic resonance structure of divalent cobalt
- (8) envelope with offprints by Croft on Clarendon's helium liquefier, 1961
- (9) another envelope with copies of Croft article on helium liquefiers, 1961
- (10) envelope with offprints by Croft and J. Cosier, 1970, on heat-exchangers
- (11) envelope with offprints by Croft and C.W. Robertson, 1969, on hydrogen refrigerator
- (12) envelope with offprints, Croft and Tebby, Croft and Cosier, on heat exchangers, 1970

- (13) envelope with offprints, Croft and Thomas, on liquid helium cryostat, 1969
- (14) envelope with offprints, Croft and Tebby, cryogenic heat exchangers, 1970
- (15) folder: Croft offprints pre-1960
- (16) folder: offprints by B. Bleaney, n.d., 'Magnetic properties of some cubic lanthanon laves compounds'; the author was in Pittsburgh
- (17) folder: offprint by B. Bleaney, 1963, 'Crystal field effects in metallic cerium, praseodymium and neodymium'
- (18) more offprints on low temperature work; obituary of Lord Cherwell
- (19) folder: offprints, Croft and Smith (1973); Croft and Exell (1961)

4. Clarendon Laboratory: Landing Cupboard

4.1 Top shelf

- (1) Clarendon Laboratory, group photographs: 1945, 1948, 1952, 1962, 1967, 1975, 1986
- (2) photograph: 1.2 MV Cockcroft-Walton generator, 1950
- (3) photograph: Microwave Spectrometer for Ammonia Gas, 1944–45
- (4) photograph: the original Clarendon Laboratory, 1872
- (5) photograph: Solvay conference, 1911

4.2 Second shelf

- (1) eight photographs glued on card, of a spherical object. Note says ‘diamond, ambient, PL (UV stimulation 365 nm)’. The pictures are at different enlargements, as scale showing 100 microns indicates
- (2) photograph: aerial view of Clarendon, b/w, n.d. but probably 1970s
- (3) another copy of laboratory group photograph, 1986
- (4) 5 photograph negative albums belonging to T.C. Keeley, numbered 3–7
 - (3) Germany, August 1937, Austria, Switzerland, France; spring 1938 building of new Clarendon laboratory; ends in April 1939, Switzerland
 - (4) April 1939 Switzerland; Wadham College; Collie’s house; Old Clarendon Laboratory in 1940; new Clarendon workshop in 1940
 - (5) Michaelmas Term 1938, Wadham, photographs of students to Trinity Term 1942
 - (6) Trinity Term 1942, Wadham, photographs of students and of the Clarendon, to July 1945
 - (7) July 1945, Clarendon and photographs of Wadham students to Michaelmas Term 1947
- (5) book by two Oxford lecturers: A.F. Walden and B. Lambert, *A Systematic Introduction to Analytical Chemistry: an Elementary Class-book* (Oxford: Joseph Thornton and Son, 1908). Owned by E.F.R. Yeatman

4.3 Third shelf

- (1) envelope: operating instructions for Avometer Model 8, Mark 5, made by Avo Ltd.
- (2) envelope: Megger pocket book on insulation testing (London: Evershed & Vignoles Ltd., November 1941)
 - (a) working instructions for Avometer Model 9, Mark 2
 - (b) working instructions for Model 8 Universal Avometer Mark 3(NB: the Avometer was invented in 1923)
- (3) architectural drawings: ‘Oxford University Physics Development’ – Plans A–F by Ove Arup & Partners, June 1960 (1/16 scale plan)
- (4) box of museum labels: ‘presented by the Clarendon Laboratory, University of Oxford’, ‘Ozone Spectrometer Photo-Cell Amplifier, 1926’
- (5) ‘Unique’ electrical slide rule (made in England)
- (6) slide rule by A.W. Faber–Castell (made in Germany at Stein, near Nuremberg)
- (7) orange folder marked ‘Archives’:
 - (a) envelope: 2 b/w photographs, ‘large lathe arriving for Lindemann workshop, summer 1967’

- (b) photocopied newspaper clipping and cartoon, *The Times* of 5/3/1963 and the *Evening Standard* of 2/3/1963, on the emigration of scientists
 - (c) assorted letters on departmental business
 - (d) letter from Assistant Keeper, Ashmolean Museum, 30/7/1956 with photograph, re. potsherds found under the Clarendon
 - (e) staff holidays
 - (f) scale of pay and wages of university employees, c.1950; 5 pages
 - (g) pay of cleaners, c.1951
 - (h) letter from Bursar of Keble College to T.C. Keeley, 7/12/1951 about a college servant taking a job at the Clarendon without first discussing it with Keble
 - (i) F.M. Brewer (Inorganic Chemistry Laboratory) to Lord Cherwell, 21/5/1951 re. proposed course for technicians: City and Guilds of London Institute – Laboratory Technicians’ Intermediate Certificate Examination
 - (j) staff holidays 1946–7, 1949–50, 1952
 - (k) notice on staff absences, 28/2/1947 by Y.H. Hall, Maintenance Officer
 - (l) notes on the new pension scheme for employees, c.1948
 - (m) another copy, plus note from University Chest office, 2/3/1949 on admission to the F.S.S.U.
 - (n) working of overtime, c.1938
 - (o) number of rooms in electrical laboratory and extension, with floorplans, by Y.H. Hall, n.d.
 - (p) the use of electricity for uncontrolled room–heating, 3/1/1945
 - (q) envelope with photograph of Sergeant Robert Spencer who helped to recover some of the money fraudulently spent by a Persian on phone calls from the Clarendon. His wife Gwen was a telephone operator at the Clarendon from September 1968 to September 1975
 - (r) Christmas card, 1955, Edwards High Vacuum Ltd. with cover showing Joseph Wright’s painting ‘A Philosopher Showing an Experiment on the Air Pump’
- (8) envelope containing a reel tape: ‘T.C. Keeley – Reminiscences, summer 1968’
 - (9) envelope containing: *Catalogue of Books, Pamphlets, etc. in the Library of the Ashmolean Society* (Oxford: The Ashmolean Society, 1848)
 - (10) photograph of main entrance to Clarendon Laboratory
 - (11) envelope with 2 photographs: Crane removing high temperature room hoist, summer 1965
 - (12) photograph by A.H. Bodle, Oxford, 24/3/1940 of a man standing outside the main entrance to the Clarendon, holding a piece of glass apparatus
 - (13) blue folder: ‘history: archaic technical literature and drawings’
 - (a) letter from A.K. Longair (DSIR) to K. Fuchs at Clarendon, 18/8/1943
 - (b) letter, Henry Cox of Islington to Robert Walker, 16/5/1844; mentions casting by electro–galvanism and its applicability to the formation of statues, etc.
 - (c) handwritten discussion of ‘the philosophical phial’, a small vessel of thick glass suddenly cooled by exposure to air; n.d., Walker?
 - (d) letter, J.L. Richards to R. Walker, 18/2/18?, from Exeter College: the Misses Jones would like their brother’s name inscribed on the pedestal of the clock
 - (e) memorandum, February 1833, by S.P. Rigaud: £15 given to him by the Rector of Exeter (Dr Jones) to buy books for needy attendants of the lectures in experimental philosophy
 - (f) large address label for box of glass wares to be delivered to the Chancellor of the University of Oxford, Charles Arbuthnot, 12 June 18?

- (g) drawing with explanation of a clutch shaft, with news of a compatible saw mill, by Alexander Galloway, n.d.
- (h) booklet, *Sir William Thomson's New Standard Electric Instruments*, 3rd edition, March 1889 (2 copies)
- (i) certificate of examination for a Standard Barometer #1246, April 1900, by Kew Observatory, Richmond, Surrey (note: original lent to Science Museum, January 1974)
- (j) memorandum to R.B. Clifton from James White of Glasgow, 11/4/1889: certificate for an electric balance
- (k) handwritten booklet on 'Thomson and Varley's Slide Resistance Bridge' (n.d. or name)
- (l) 'Notes with regard to the use of Infra-red Spectrometer', Adam Hilger Ltd., May 1914
- (m) booklets on Amsler's Planimeter and Diagrammeter, sold by Elliott Brothers, Opticians, of 449 Strand, London
- (n) two handwritten cards from Fuess, Berlin:
 - Groth's Polariscopes, showing the rings produced by [illegible] in plane polarised and plane analysed light
 - Groth's Goniometer for measurement of the angles of crystals
- (o) tiny old envelope: Mr Selby's notes as to the resistances of the coils in Helmholtz's recoil apparatus
- (p) tiny old envelope: printed descriptions by Moore and Moore of Alexander Ellis' Harmonical, with handwritten scrap of comments
- (q) handwritten pamphlet on 'Microscopic Objects' for the Lucerna Microscope by George Adams, n.d.
- (r) blue envelope: October 1880 from Siemens & Halske, description of Electrodynamometer, 2 copies in German
- (s) small note (by Clifton?) of the #3 Platinoid Coil
- (t) Reduction Table for Potential Galvanometer #1431, Siemens
- (u) Electrodynamometer #1893 – currents; Siemens Bros.
- (v) 'Short Description of the Equatorial Mounting of Mr Edward Cooper's great Achromatic Telescope, n.d. (cost was £47-1-26)
- (w) plans for a clock case of height 6'1½"
- (x) photograph of a spectroscope presented to Oxford University by Mr Gassiot. Enclosed in a letter from Frederick Barry, 19/1/1929, of the Department of History at Columbia University
- (y) instructions for working the Geryk Vacuum Pump
- (z) envelope: instructions for using instruments sent to J.S. Townsend from the Cambridge Scientific Instrument Company, 23/2/1910: Geryk Vacuum Pump (1919), Duddell Patent Thermogalvanometer, Ayrton-Perry Duddell Twisted Strip Ammeter
- (aa) description and instructions for Lord Kelvin's Multicellular Electrostatic Voltmeters (1911 pattern) with multipliers. August 1911. By Lord Kelvin and James White, Ltd. of Glasgow
- (bb) Special Price List No. VI of Dr Gaede's Molecular Air Pumps. By E. Leybold's Nachfolger, Cologne. n.d. In English with prices in \$ and £ (£1=\$5)
- (cc) Electricitätsgesellschaft 'Sanitas' of Berlin, specialising in Röntgen apparatus, with affiliates in Düsseldorf and London: Gebrauchs-Anweisung für den 'Röntax' – Unterbrecher. In German. n.d.

- (dd) an older copy, n.d., of instructions for using the Geryk Vacuum Pump
- (ee) E. Leybold's Nachfolger, sole British agents W. Edwards & Co. of Camberwell: Rotary Oil Air Pumps – descriptions and directions for use. n.d.
- (ff) Arthur Pfeiffer, Wetzlar: manual on high-vacuum pumps. In English
- (gg) Berliner Elektros-Gesellschaft: Die Wommelsdorfsche Kondensatormaschine und ihre Anwendung. In German with some prices in Marks. n.d. Name of F.B. Prebduch written at top of front page
- (14) folder labelled 'other magnets', containing plans, calculations, one photograph of a magnet
- (15) folder with papers referring to grants in aid of instrument purchase, c.1935–60
- (16) two copies of a Christmas card with a drawing of part of the Clarendon; drawn by 'J.M.G.'
- (17) plastic bag containing documents prepared for the University Grants Committee: Assessors Reports for Technical Equipment Applications for new physics buildings
 - (a) King's College, Newcastle Upon Tyne, by Prof. Flint and Prof. Jones (1962)
 - (b) University of Leicester, by Prof. Mott (1961)
 - (c) University of Liverpool, by Prof. Massey and Prof. Vick (1958)
 - (d) University of Southampton, by Prof. Jones (1960)
 - (e) University of Reading, by Prof. Powell (1960)
 - (f) University of Durham, by Prof. Stoner (1960)
- (18) manila envelope labelled '2MW Archives, correspondence Cherwell etc., 1939 →'
- (19) folder marked '1948 – main gen.': much correspondence from Metropolitan Vickers Electrical Co. 1945–57, with some drawings of equipment to be purchased (motor generator set and additions)
- (20) folder marked 'Motor generator – Manchester Corporation': much correspondence between Clarendon and Metropolitan Vickers about purchase of a generator [the machine is still in the Clarendon, on the ground floor; built in 1919] c.1939–48, plus some other company correspondence
- (21) photograph of R.J. Van de Graaff, with some information about what he studied at Oxford (electricity laboratory, 1925–28)
- (22) framed certificate of constant for an electric balance, 11/4/1889, signed by Sir William Thomson

4.4 Fourth shelf

- (1) cash book, 1957–69
- (2) students' fee book, honour moderations, MT 1955 – HT 1971
- (3) students' fee book, MT 1934 – TT 1955 (there is a lecture list for physical sciences, MT 1934, at the front)
- (4) bound collection of offprints by Lindemann (lectures and papers) 1910–55, with typed list of all publications (? complete)
- (5) envelope marked 'Putley' containing: authors and titles of papers of reports of work carried out at Clarendon 1940–49, in date and alphabetical order; copy of paper by F.L. Warner (1980) on 'Early work at TRE and RRE on millimetre wave radar and radiometer systems'; another copy of same plus correspondence of author (April 1980) with B. Bleaney [author is at Royal Signals and Radar Establishment]; also correspondence (1981) between Bleaney and E.H. Putley of RS and RE on magnetron work of Dr Rollin during second world war and including a letter from Prof. Margaret Gowing to Bleaney about Contemporary Archives Centre

- (6) envelope labelled 'Moseley and Tizard', contains framed photographs of H.G.J. Moseley and H.J. Tizard, with the dates of their tenure in Oxford
- (7) seismograph of earthquake recorded upon masonry pier in Cavendish Laboratory, Cambridge, 13/10/1925; reference to letter from J.J. Shaw of 1/7/1945
- (8) large envelope addressed to B. Bleaney
 - (a) many short reports, often marked 'secret', dating from war years, with some notes on dates and writers by Bleaney (?): on the research that Clarendon personnel were doing (Admiralty Research Group) – Clarendon Laboratory Monthly Progress Reports – and some official communications from and to the Admiralty
 - (b) reports were sent to the Air Ministry Research Establishment, Worth Matravers, Swanage, Dorset, which then passed them on to the Admiralty
 - (c) about 90 reports, all typed; c. January 1940–June 1945
- (9) accounts book for research equipment, divided by individual scientists and by types of expenses (eg. furniture), 1965–68
- (10) loose sheet: list of galvanometers December 1915, December 1925, with case # and resistance in ohms
- (11) book: James Walker, *The Theory and Use of a Physical Balance* (Oxford: Clarendon Press, 1887)
- (12) lectures by the Reader in Experimental Philosophy, October 1849 to October 1861, with students and fees; also, advertisements of each course of lectures are pasted into the book
- (13) seven copies of a photograph of an unidentified man, c.1920
- (14) *Recommendations of the British X-ray and Radium Protection Committee*, 6th revised report, February 1943
- (15) brown file folder on synchrotrons and cyclotron, c.1946–7, mainly concerning the work of C.H. Collie
- (16) photographs:
 - (a) the Old Clarendon (5 copies)
 - (b) the contractors involved in building the new Clarendon, plus Simon and Keeley, 1940
 - (c) three photographs of building in progress, about 1940
 - (d) two photographs of the New Bodleian Library
 - (e) building work, March 1954
- (17) paper sleeve marked 'Abstracts 1889–1915', containing photocopies of extracts relating to physics from the Minute Books of the Hebdomadal Council 1894–1905 (eg. electric supply and lighting); other correspondence re. Townsend, printed, c.1909
- (18) pink folder: *Country Life*, 3/7/1986 photo of Clarendon Park; photocopy of Rollin report on ultra short waves; original lecture list in experimental philosophy dated as 1839 (all reproduced as photographs; see List of Photographs, item 26)
- (19) envelope containing a mounted copy of the 1839 lecture list
- (20) payments book for tuition in radio classes, 1941–42, paid to faculty/staff
- (21) Minutes of the Delegates of the University Museum, 1853–1889

– this is a complete set of photocopies from the originals, which are in the University Archive; loose sheets have also been copied; an index listing the date of each meeting has been compiled by K.B. Angwin
- (22) bound copy of a report marked 'Most Secret', 29/11/1943: 'Noise Frequency Modulated Oscillator'. From the Research Laboratories of the General Electric Company, C.C. Paterson, Director to Dr C.H. Collie

4.5 Fifth shelf

- (1) envelope marked 'T.C. Keeley, 35mm photographic negs. 1936f'

– negative album containing about 200 negatives; most are holiday snaps; Keeley has written descriptions of each; only a very few are of the Clarendon; dates are spring 1936 – February 1937
- (2) laboratory notebook of C.H. Collie, October 1925 to August 1927, Christ Church Laboratory; at the back are some notes on work on radioactive samples, June 1926 to January 1927
- (3) book of handwritten lecture notes taken by Collie at Lindemann's lectures in 1926
- (4) reel tape labelled as 'C.H. Collie, September 1981'
- (5) copy of Christ Church College Record, 1957
- (6) school notes of C.H. Collie, Warwick School, physics, October 1918 to March 1921, with corrections by the teacher
- (7) student book: Mechanics and Physics Results MT 1894 – TT 1905

– each student's results are listed by his name for all experiments and calibrations done; includes some women
- (8) similar book: Mechanics and Physics Results HT 1886 – TT 1894
- (9) blue folder, 'Planning Committee Data': student and lecturer numbers in physics c.1960–65, also other sciences and other universities, technical staff; individual faculty listed with their positions
- (10) white envelope marked 'Callan stuff from TCK': photographs
 - (a) Dr Callan's large induction coil of c.1837, with description
 - (b) Rev. Dr Nicholas J. Callan (1799–1864), Professor of Natural Philosophy, Maynooth College, 1826–64, with small biography
 - (c) Callan's Repeater (or Interrupter) of c.1836
 - (d) an Improved Callan Induction Coil of c.1854
 - (e) Callan's large coil of c.1858
- (11) folder containing two copies of a report on flat lapping of glass plates, by C.R. Burch, FRS (died about July 1983); written December 1931, 37 pages
- (12) more records of students' results, in same hand as other books, c.1911–12; in an old Rotax file
- (13) envelope: 'Dr E.J. Bowen's materials for 19th century science at Oxford', dated 16/4/1979; items numbered 2–8
 - (2) offprint of Sir Harold Hartley's article on Oxford in the Schools of Chemistry in Great Britain and Ireland series in the *Journal of the Royal Institute of Chemistry*, 79 (1955), 118–27 & 176–84
 - (3) offprint by E.J. Bowen, 'The Development of the University Laboratories', *Chemistry in Britain*, November 1965

– offprint: J.M. Edmonds and J.A. Douglas, 'William Buckland FRS (1784–1856) and an Oxford Geological Lecture, 1823', *Notes and Records of the Royal Society*, 30 (1976), 141–67

– copy of Mary W. Porter, *The Diary of Henry Alexander Miers, 1858–1942* (Oxford: Oxford University Press, 1973)

– two pages of handwritten notes on William Odling and Charles Daubeny
 - (4) offprint: E.J. Bowen, 'The Balliol–Trinity Laboratories, Oxford 1853–1940', *Notes and Records of the Royal Society*, 25 (1970), 227–36

– photocopy: F. Sherwood Taylor writing in *Annals of Science* on 'The Teaching of Science at Oxford in the Nineteenth Century'

- letter from Archivist of Balliol College, 26/11/1981, as to what they have. A student named T.W.M. Smith wrote a Chemistry Part II thesis on the Balliol–Trinity laboratory
- (5) purchase form for biography of R.T. Gunther, written by A.E. Gunther c.1966
- (6) typescript by Bowen, ‘Oxford Physical Science from 1850’
 - typescript, ‘Thomas Beddoes MD, 1760–1808 – Some Midland Connections’. 1976. No author
- (7) letter, A.J. Croft to E.J. Bowen, 26/1/1973 about R.B. Clifton
 - Croft’s summary of the information contained in Hartley’s paper
- (8) typescript: ‘Chemistry at Oxford, with special reference to the emergence of physical chemical studies’, 127 pages (? by Bowen)
- (14) folder: four copies of Clarendon staff photograph of June 1948 with six copies of identification of each individual; photograph of unidentified building; three photographs of related instruments
- (15) reel tape in envelope: ‘B. Bleaney and R. Peierls, 1982’
- (16) folder: correspondence and summary of dispute between Kurt Mendelssohn and Professor Macintosh (Anaesthetics) over the Oxford Vaporiser, c.1942
- (17) folder: accounts of Clarendon 1952 are in arrears and Price Waterhouse are called in to bring them up-to-date; Clarendon funding c.1952
- (18) folder: booklets produced in 1954 and 1960 for open days about the work of the Clarendon
- (19) folder: laboratory data: 6 photographs of interior and exterior; 10 photographs of architects’ plans for a new physics block 1938; data on size of rooms and building standards
- (20) folder: ‘future of physics’
 - (a) typescript: ‘The present state of planning for the Nuclear Physics Laboratory’, by D.H. Wilkinson, 17/2/1961
 - (b) expected science entry 1963 arranged by college and science
 - (c) papers relating to meetings about conversion of high tension room 1963
 - (d) discussions of expansion of Nuclear Physics 1961
 - (e) statement of proposed new developments 1962–67
 - (f) letters from architects Ove Arup and Partners, 1960
 - (g) architects’ plans for the Keble Road Triangle 1956
- (21) letter to Lord Cherwell from Robert Barklie, Admiralty Research Laboratory, Teddington, Middlesex, 31/3/1954 (marked secret) – statement concerning the programme of work suggested for Oxford postgraduates who take up the study of Atmospheric Ionisation
- (22) small address book of J.O. Griffith, used to keep notes on department-related things like staff wages c.1926–37, with photograph in front of 5 men and a trolley train (taken by Publicity Department of Metropolitan Vickers); mostly empty
- (23) book: for use in the Electrical Laboratory, W. Marshall Watts, *An Introduction to the Study of Spectrum Analysis* (London: Longmans, Green & Co., 1904), with inserted offprint by G.F.C. Searle, ‘The determination of the focal length of a thick mirror’, *Proceedings of the Cambridge Philosophical Society*, 18 (1915), 115–26
- (24) book: J.A. Fleming, *The Principles of Electric Wave Telegraphy* (London: Longmans, Green & Co., 1906). Belonged to Lieutenant W.B. Gill, Army Wireless Station, Slough
- (25) book: A.M. Nell, *Fünfstellige Logarithmen der zahlen Trigonometrischen functionen* (Darmstadt: Arnold Bergsträsser, 1901)
- (26) instructions for the use and care of the Lindemann–Keeley electrometer of 1924
- (27) yellowed pages of handwritten notes (made by N. Kurti?), may be photocopies, from lectures at the Faculté des Sciences de Paris, Laboratoire de Physique, in French, on optics, n.d. (the notes are in a folder marked ‘Huyghens Eyepiece – not to be taken from the laboratory’)
- (28) envelope addressed to T.C. Keeley, containing notes and letters regarding equipment costs in physics teaching labs, c.1964
- (29) envelope marked ‘Benchmarks and barometer (N & Z)papers, TCK’
 - (a) Negretti & Zambra of 103 Hatton Garden – letter and certificate for their standard barometer, 1867
 - (b) three letters re. bench mark in Clarendon, 1872: 1) from Ordnance Survey Office, Guildford, giving altitude in feet above mean sea level, 2) from Ordnance Survey Office in Oxford enclosing 1), and 3) from John Phillips to R. Clifton about bench mark of Museum steps, 24/2/1872
- (30) folder, Oxford entry for the Institute of Physics and the Physical Society’s Supplement to Research Fields in Physics, 1969
- (31) envelope containing letters to T.C. Keeley on receipt of cheques for Cherwell bequest, 1958
 - Jennifer McGilliam; H.S. Lock; J.C. Humphreys; C.J. Floyd; H.L. Richmond; Brian Timms; Sybil ?; J.J. Milligan; F.W. Etheridge; C. Little; F. Mitchell; Wilfred E. Rhymes; G.M. Chapman; J. Hulkin (Christ Church messenger); Gilbert Frater; Stuart Wilkins; W.W. Stonard; G.E. Topp; A. Gardner (Christ Church porter); Dorothy M. Bodle (she has two large portraits of Lord Cherwell); B.H.E. Coates; E. Danbury (Christ Church porter); Douglas Saxton; J.R.N. Lee (15); Mrs E. Davis; G.H. Carr; K. Bowry (20)
- (32) photograph of architects’ plan for development of Oxford science buildings; late 1930s (Lanchester & Lodge of 19 Bedford Square, London)
- (33) full-sized architect’s plan for development of science buildings, incomplete and not the same as the photographs listed in (19)
- (34) drawing of an unidentified machine
- (35) folder on ‘Grocer’, which was the wartime codename for radar that jammed enemy air interception aircraft
 - (a) airborne grocer, carpet II
 - (b) the enemy’s night defences
 - (c) TRE Report on theory of circle diagrams and for finding the input impedance of a cable
 - (d) report by L.B. Turner, May 1942, Admiralty Signal Establishment, on ‘Air Impedance Meter and a Feed-through Wattmeter for Wavelengths near 10cm’
 - (e) report by L.B. Turner, 18/5/1941 on ‘RDF range factors, with special reference to floating targets and wavelength 10cm’
 - (f) report by Mathematics Group, TRE, Malvern, on ‘Echoing Properties of Long Strips and Separate and Tied Resonant Strips’
 - (g) Keeley’s copy of a report by same group on ‘Elementary Survey of Scattering and Echoing by Elevated Targets’, 1942
 - (h) minutes of the RCM Liaison Meeting held at GEC Research Laboratories, Wembley on 20/4/1943
 - (i) TRE Report, ‘Theory of airborne jamming of radar’, July 1943
 - (j) TRE Report, ‘Final Report on the Investigation of Enemy Air Interception Signals’, March 1943

4.6 Bottom shelf

- (1) Box labelled 'Cherwell-Simon'
 - (a) correspondence from University Grants Committee, 1965, on grants for equipment, especially to T.C. Keeley. Includes comparative studies of Durham, Leicester, Liverpool, Newcastle, Reading, Southampton, and Oxford; formulae to derive funding levels for undergraduate teaching equipment needs
 - (b) Keeley wrote a report in April 1964 on equipment costs in new physics teaching labs for the University Grants Committee, concluding that there was a reasonably simple relationship between costs and numbers of students
 - (c) papers include a draft of Keeley's report, plus notes and graphs used to derive relationship
 - (d) financial notes, 18/6/1965, on the conversion of the High Tension Room at the Clarendon
 - (e) photocopy: Thomas Grubb, 'On a New Compound Microscope', Journal of the Royal Dublin Society, July/October 1860
 - (f) two sketches of the Clarendon
 - (g) photograph of a model of Wadham College
 - (h) three booklets (stapled) of specifications for semiconductors, transistors, electronic valves, with index, c.1964-67
 - (i) copy of *Zeitschrift für physikalische Chemie*, June 1958
- (1.1) In a green folder are the following:
 - (a) taped to inside cover is a list by Oxford and Cambridge Schools Examination Board of a panel of examiners approved in physics, February 1957 to February 1958
 - (b) a copy of the *Saturday Review*, 4/3/1961, containing an article by Sir Robert Watson-Watt, "inventor of radar", 'The Truth About Churchill's Wartime Science Advice', pp. 49-53 (published in USA). This is a rebuttal to the Godkin Lectures by C.P. Snow at Harvard, which raised the question: Did a jealous scientist risk England's fall to Hitler?
 - (c) *Sunday Times* articles, March 1961, by C.P. Snow, on Lindemann and science policy
 - (d) a copy of the *Daily Telegraph*, 4/7/1957, on the death of Lord Cherwell
 - (e) article by A.J.P. Taylor, *The Observer Weekend Review*, 9/4/1961: 'Lindemann and Tizard: More Luck than Judgment?', a review of Snow's *Science and Government*
 - (f) copy of *The Times*, 8/4/1961: letter from C.P. Snow in reply to Professor R.V. Jones' articles
 - (g) copy of *The Times*, 7/4/1961, p. 15 has article by R.V. Jones, 'Scientists at War - Lindemann v. Tizard - II: Fruitless Attempts to Patch Quarrel'
 - (h) copy of *The Times*, 6/4/1961, p. 13 has Part I: 'Air Defence Clash in the Thirties'
- (1.2) envelope marked 'Hydrogen Liquefier Explosion 1948'
- contains Croft's report of 3/5/1953 and seven photographs

- (2) Green box labelled 'Lab building file'

Papers clipped together:

- (a) note of the meeting of the Building Committee of the new Physics Building, held on 8 March 1938
- present: the Vice-Chancellor, Professor Lindemann, Mr Griffith and Mr Gill. Mr Lodge (architect) and Mr Stinton Jones (consulting engineer) attended; also (by invitation) Mr Moullin and Mr Keeley
- (b) correspondence (originals and copies), 17/11/1936 - 30/10/1937 between University Chest Office and Lindemann concerning building costs

Folder marked 'Lanchester, Lodge and Davis'

NB: these were the architects who built the New Clarendon

- (c) contains correspondence between the firm and Clarendon faculty, plus an enquiry about their work from outside Oxford, 1936-44. Correspondence is to do with various aspects of the building specifications, mainly dealt with by H.R. Lanchester (killed in 1943) who had designed the internal arrangements; he was generally writing to Keeley or Lindemann. (It is not clear whether Robert Lanchester, mentioned frequently in the correspondence, drew up the designs. He is not H.R. Lanchester, whose name is crossed off the letterhead by June 1943)
- (d) also some correspondence with University Chest Office

Folder marked '129/2'

- (e) correspondence between the Clarendon and J. Stinton Jones and Partners, consulting engineers contracted to design electrical and mechanical services for the new building, 1937-42
- (f) correspondence between other contractors and the Clarendon; some correspondence between contractors and the engineers
- (g) estimates of costs, 1938
- (h) a few letters from Lanchester and Lodge, 1938

Folder marked 'misc. requirements for new building'

- (i) correspondence to/from contractors supplying lifts, blinds, locks, switches, scientific apparatus, heating, ventilation, rubber items, 1938-44

Wallet marked 'Lindemann Bld. 1938 - services specification'

- (j) printed and bound specifications, June 1938, for lift and lift machinery; water, gas, compressed air and ventilation services; complete direct electric heating, electric water heating, electric lighting, power, signals, etc.
- (k) revisions to the electric lighting, heating and power installations (October 1938)

5. Clarendon Laboratory: Well Cupboard

Holds mainly apparatus – see separate listing. Papers are on the top shelf, right side of cupboard.

- (1) plastic bag containing 25 cassettes, mostly labelled with names and dates; some recorded at half speed
- (2) file folders, each labelled:
 - (a) ‘patent agent; liquefier’: Gill, Jennings & Every, chartered patent agents; correspondence with A.J. Croft, 1968–70, about the Continuous Simon Liquefier
 - (b) ‘Simon 1968, PBT and JC’: John Cosier, admitted Michaelmas Term 1969 to read for B.Sc., working on a new form of Simon helium liquefier with Croft, with whom he had been working since 1966; he is replacing Peter B. Tebby, who has decided to leave
 - (c) ‘Simon 1968, order copies’: 1969–70, order forms for parts for building Croft’s liquefier
 - (d) ‘Simon 1968, corresp. clients’: 1968–69, about the liquefier and some work of Peter Hudson on superconducting magnets in conventional sector type mass spectrometers
 - (e) ‘Science Museum’: about donations of apparatus to the Museum, 1973–88; curators are mainly corresponding with Croft
 - (f) ‘display cases’: museum exhibit set up by Croft in August 1967 in the front entrance and at other locations in the Clarendon; includes list of items (dated August 1967; this has been referred to in the listing of apparatus below), negatives of photographs of apparatus, and 41 tiny photographs on negative strips; three old photographs: staff of physics department, University of Bristol, 1921; unidentified man (W. Nernst?); Clarendon lab group c.1940s
 - (g) ‘Old Ashmolean’: loan of eight galvanometers from Clarendon to the Museum of the History of Science, Oxford, July 1986; correspondence about balances, 1976
- (3) large purple laboratory notebook, 1961–62, no name but one page is initialled AJC, 9/1961
- (4) Leave Register, Clarendon, for faculty, staff and graduate students, 1945–46
- (5) two pencilled notes about unidentified apparatus
- (6) typed note on a water dropper attributed to Lord Kelvin
- (7) diagram of ‘String’ electrometer, probably made by father of Lord Cherwell
- (8) diagram of a discharge tube electrode, 15/6/1941, by N.V. Philips of Eindhoven
- (9) Leave Register, 1948–51

6. Photographs held in the Clarendon Laboratory

(All photographs are black and white unless otherwise stated)

6.1 In the Landing Cupboard, labelled in envelopes and one small box

- (1) cooling tower for magnet, late 1950s; viewed from above
- (2) cooling tower for magnet, late 1950s; viewed from ground level
- (3) cryostat
- (4) Brown magnet, 23/4/1970
PTFE glass spacer, unsuccessful
- (5) unknown
- (6) schematic diagram of part of a magnet, connected with work of Peter Hudson
- (7) five photographs of parts of magnets, related to work of P. Hudson
- (8) deionised water tank, 22/4/1968; area shown is near the present Library
- (9) workshop yard of the Simon Building, 22/4/1968
- (10) deionised water tank being cleaned by 2 unidentified men
- (11) early magnet cases, pre–1960; constructed with fibreglass mat
- (12) crushed spacers, with view of completed apparatus, c.1958; early work of Martin Wood
- (13) early filament–wound spacer, 4 inches, pre–1960; with object crushed by the pressure of the spacer
- (14) special machine for coiling polyhelixes
- (15) early polyhelix, late 1960s; work of John Law
- (16) Blue magnet, 1961+; possibly related to a power station
- (17) ion magnet, low field; work of Dr Hodby
- (18) magnet that has been shorted out by water
- (19) superconducting magnet and conventional magnet, with an unidentified metal object
- (20) low temperature work
 - (a) cryostat; cooled outside without cooling inside
 - (b) cryostat, pre–1960
 - (c) early helium jar (Professor Simon, 1940s)
 - (d) experiment of Dr N. Kurti, c.1955
 - (e) cryostat, N. Kurti
- (21) photographs relating to magnets
 - (a) 2 copies of a block diagram of an apparatus related to magnets
 - (b) mercury rectifiers (12 phase)
 - (c) diafloat tank for the preservation of pure water
 - (d) magnet for steady field (diagram)
 - (e) transformers for voltage regulation, and mercury rectifiers
 - (f) water purifier (ion exchanger)
 - (g) control board
 - (h) filter for magnet (4 copies)
 - (i) Roy Kibblewhite, c.1960, with coil for magnet (4 copies)
 - (j) 2 photographs taken in the same laboratory; 2 different men in foreground
 - (k) experiment in progress and unidentified operator

- (22) photographs relating to magnets
- (a) magnet for steady field (Professor Bitter's type)
 - (b) unidentified
 - (c) solenoid
 - (d) filament-wound fibreglass magnet, pre-1960; probably not made at Clarendon
 - (e) Bitter coil; not made at Clarendon
 - (f) outer case of a superconducting coil
 - (g) two-inch diameter solenoid, 1965
 - (h) section of a Bitter coil (2 copies)
 - (i) nylon monofilament construction
 - (j) casing of a Bitter coil
 - (k) casing of a Bitter coil, late 1950s
 - (l) late 1950s construction
 - (m) pre-1960 solenoid (3 copies)
 - (n) pre-1960; part of polyhelix design
 - (o) polyhelix design, 1961-68
 - (p) another view of the polyhelix design, 1961-68
- (23) miscellaneous
- (a) three photographs taken in a laboratory in Poland or Hungary (?)
 - (b) postcard: homopolar generator
 - (c) arc exciter cubicle for magnetic resonance
 - (d) magnet for short period
 - (e) unidentified mould for something (3 copies)
 - (f) roof of Simon Building, c.1950, with three unidentified men (2 copies)
 - (g) Clarendon Laboratory, 1940s (2 different views)
 - (h) addition to Simon Building being built; figures unidentified
 - (i) magnet; work of P. Hudson (?)
 - (j) unidentified object
- (24) photographs relating to magnets, c.1960s
- (a) winding of a coil (2 copies)
 - (b) side and top view of a three-inch inside diameter superconducting quadrupole
 - (c) deionised water tank, 1968
 - (d) part of a helium liquefier
 - (e) scene taken in Nuclear Physics, c.1960s; individual unidentified
 - (f) two stages in construction of a magnet, 10/12/1968; related to work of P. Hudson
 - (g) magnetic coil, 18/7/1969
 - (h) three colour photographs of magnets related to the work of P. Hudson [note that Peter Hudson worked with Harry Jones and Martin (now Sir Martin) Wood]
- (25) photographs relating primarily to work on magnets
- (a) swash plate construction
 - (b) Klaus von Klitzing (?), Nobel laureate
 - (c) tsai coil, nylon monofilament (Nigel Brett and Jim Sherratt, c.1969)
 - (d) polyhelix construction, post-1962
 - (e) cooling tower/heat exchanger

- (f) hybrid magnet, with P. Hudson at right, Jim Ramage in centre
 - (g) water-cooled 50mL bore solenoid, nylon monofilament construction
 - (h) 2000kW motor-generator (built 1919) with Tommy Carr at right
 - (i) water-cooled solenoid, c.1963, with Jim Sherratt at right
 - (j) early water-cooled solenoid, pre-1960; first fibreglass construction
 - (k) replacement of deionised water tank
 - (l) unidentified Dutch (?) woman, c.1972
 - (m) P. Hudson and the building housing his apparatus, November 1974
- (26) box of photographs
- (a) A.C.G. Egerton
 - (b) Professor F. Simon
 - (c) Professor R.J. Elliott
 - (d) Professor Derek Jackson
 - (e) Hans Halban
 - (f) Professor G.M.B. Dobson
 - (g) Dr J.H.E. Griffiths
 - (h) Professor R. Peierls
 - (i) Mr T.C. Keeley
 - (j) Dr Kuhn
 - (k) Professor George Series
 - (l) Professor M.H. Pryce
 - (m) high tension room doughnuts, Van de Graaff
 - (n) ? medieval document
 - (o) Tommy Carr and electro-generator
 - (p) first page of a report by B.V. Rollin, 30/1/1940, on production of ultra short waves
 - (q) lecture list, c.1839
 - (r) Clarendon Place
 - (s) Solvay conference, 1911

6.2 In the Library stack, Box A:

*Photographs to be used as Figures 1-56 in A.J. Croft, 'Oxford's Clarendon Laboratory' (1986) (Missing photographs are marked with a *)*

Frontispiece (1st Earl Clarendon)

- (1) Grosseteste
- (2) Roger Bacon
- (3) Stephen Peter Rigaud
- (4) Syllabus for experimental philosophy, 1839
- (5) Clarendon Building
- (6) Robert Walker
- (7) University Museum
- (8) R.B. Clifton
- (9) Clarendon Laboratory, 1870
- (10) J.S.E. Townsend
- (11) Electrical Laboratory, 1910
- (12) F.A. Lindemann*

- (13) Sidholme*
- (14) Solvay conference, 1911
- (15) Lindemann–Keeley electrometer*
- (16) A.C.G. Egerton
- (17) G.M.B. Dobson
- (18) T.R. Merton
- (19) D. Jackson
- (20) Kuhn
- (21) G. Series
- (22) Alexander Smith Russell
- (23) C.H. Collie
- (24) J.H.E. Griffiths
- (25) Claude Hurst
- (26) Group photograph at Metropolitan–Vickers Ltd., 1928
- (27) Hans Halban
- (28) Denys Haigh Wilkinson
- (29) Model of Keble Road physics buildings
- (30) T.C. Keeley
- (31) Mendelssohn and Simon
- (32) N. Kurti
- (33) Simon in a deckchair*
- (34) New Clarendon Laboratory
- (35) Bus–bar chambers in 1939*
- (36) Sir H. Tizard with General Sir B. Montgomery, 1945
- (37) 10cm reflex klystron (Rollin’s drawing)*
- (38) 10cm radar
- (39) B.V. Rollin
- (40) Michael Anthony Grace
- (41) 2MW DC generator set*
- (42) M.H.L. Pryce
- (43) Roger Elliott
- (44) R. Peierls
- (45) Bleaney and Bleaney*
- (46) A.H. Cooke
- (47) Torus*
- (48) Copper toroidal discharge apparatus
- (49) Hydrogen liquefier explosion, 1953
- (50) Lord Cherwell with Keeley, 1953
- (51) Tony Croxon and Pat Taafe, 1953
- (52) Graph*
- (53) Oxford dry pile
- (54) Lord Clarendon’s portable writing desk
- (55) Sheldonian imprint from 1st edition of Edward Hyde’s *The True Historical Narrative of the Rebellion*
- (56) Graph*

7. Apparatus of historical interest held in the Clarendon Laboratory

(Each instrument is identified by a number; numbers in brackets refer to the list compiled by A.J. Croft in August 1967)

7.1 Well Cupboard, ground floor

- (1) reflex klystron, wavelength 9.8cm, c.1940–41
- (2) 8.55mm reflex klystron, 1951
- (3) TR cell: transmit–receive switch invented by Arthur Cooke; deadens transmitted radar signal returning to receiver; with radioactive starter; 10cm device, c.1943
- (4) 2K33 commercial klystron by Raytheon, c.1944
- (5) reflex klystron, wavelength 10cm; made at Clarendon
- (6) commercial TR switch, 10cm; 1940s
- (7) 10cm reflex klystron, CV67, made commercially for wartime radar, 2/11/1944 (CV numbers, given by the Admiralty, are listed in specification catalogues)
- (8) 3cm commercial reflex klystron
- (9) 3cm reflex klystron, CV87
- (10) 10cm klystron, lacks cathode
- (11) 10cm two–cavity amplifier; wartime
- (12) experimental 10cm reflex klystron made by B. Rollin in 1940; secondary emission oscillator with nickel target
- (13) 10cm secondary emission klystron with no heater, so must have been for experimental purposes; dated 28/7/1940
- (14) three commercial and two experimental crystal diodes used in receivers; plus a miniature diode
- (15) water-cooled 5mm klystron lacking cathode; Q–band or 5mm anode block
- (16) complete version of (15)
- (17) commercial TR cell, made by Westinghouse; CV725; c.July 1944
- (18) post–war magnetron (?); CV2190
- (19) X–band (3cm) bolometer, a device for measuring the power of a klystron; 1942
- (20) TR switch made by A.H. Cooke
- (21) commercial magnetron for a diathermy unit; ordered by H.G. Kuhn in 1961 (35), so used for exciting lamps for spectroscopy
- (22) K–band klystron oscillator, made by J. Sanders in 1943
- (23) unused 3cm reflex klystron, CV129; early 1940s
- (24) 8mm drift tube klystron, water–cooled; designed by Tom Bridges and made at SRDE at Baldock in the late 1940s; this represented a breakthrough in glassblowing techniques
- (25) Pulvemacher’s patented medical hydroelectric chains
- (26) 10cm magnetron, CV192; early wartime
- (27) possible 10cm klystron; has 2 cavities, so used as an amplifier or oscillator; made at Clarendon
- (28) commercial (Raytheon) 3cm magnetron cut open to show innards; with strapped electrodes
- (29) galvanometer (#177)

- (30) Townsend wavemeter, 1916; measures low frequency wavelengths of 800–3200m and 3000–12000m, the sort of frequencies used by radio transmitters in the first world war
- (31) labelled as ‘ophthalmic cryoprobes, Croft and Tilbury, 1970’. Tilbury was the head of the low–temperature workshop; these may have been cold probes for freezing parts of the eye; cooled by carbon dioxide under high pressure
- (32) labelled as ‘taken from experiment 3.1’; unknown
- (33) refractometer, labelled 3.1, made in early part of twentieth century by Carl Zeiss of Jena, No. 1549; toluene is used as a standard; this type of apparatus was in use up until the beginning of the second world war
- (34) Cambridge Instruments flux meter
- (35) galvanometer, used for teaching until about 1960
- (36) compass, probably from a tangent galvanometer
- (37) Crookes–type spinthariscopes (or scintilloscopes) for measuring the presence of α –particles in early experiments on radioactivity; this instrument probably used for demonstrations only
- (38) box containing a wrist stopwatch, a weather forecaster, and a Clew’s scintilloscope with radium screen
- (39) primitive electron gun with water cooling; possibly a klystron
- (40) direct vision spectroscopy made by Dr A.C. Hofmann of Paris
- (41) and (42) the same as (40)
- (43) direct vision spectroscopy missing its slit; made by Adam Hilger
- (44) electrometer of some sort, or the first stage of something else; made by G.M.B. Dobson in 1926 (given to Atmospheric Physics)
- (45) box of 3 Lummer plates, high resolution interferometers; pre–first world war
- (46) piece of electrostatic equipment
- (47) microscope on adjustable stand; not complete or clear what it was used for
- (48) homemade gold–leaf electroscope, c.1910
- (49) box containing two 60 μ m prisms, a glass sphere, calcite blocks, uranium glass; made by W. Ladd, 1870s, 1882; belonged to Lord Cherwell
- (50) siren for producing sounds of known frequency; Harvey & Peak of London
- (51) mounted diffraction grating
- (52) diffraction grating in a wooden case; blazed grating, so probably postwar
- (53) gold–plated mirror
- (54) transmission grating
- (55) calcite block giving large optical shift effect
- (56) very small transmission grating in a circular mount
- (57) box containing 3 microscope objectives, one telescope eyepiece, three odd lenses taken out of eyepieces [items (50)–(56) are in this box also]
- (58) box of 7 slides showing the Clarendon’s old liquefiers, c.1950s; reference numbers are to the Clarendon photographic department
- (59) seven diagrammatic slides of simple low temperature systems
- (60) photoelectric cell made by Oxford Instrument Co., pre–world war two; made by Keeley and Bolton–King to sell through the company
- (61) modern slides associated with a general lecture on liquefiers
- (62) ten slides showing low temperature equipment at the Old Clarendon, pre–1939; individually labelled
- (63) labelled slides, some repeats of (58) and (59), used by lecturer on the new helium liquefier

- (64) colour slides of the new helium liquefier, post–1975
 - (65) pressure–measuring device or flow–rate measuring device, made at Clarendon
 - (66) three commercial Lindemann–Keeley electrometers, mid–1920s
 - (67) unidentified; German–made
 - (68) section of a needle valve for controlling rate of flow of gases
 - (69) section of a heat exchanger; designed by A.J. Croft
- Items (61)–(69) are in a box, together with an instruction book for a Curta model hand held calculator]*
- (70) vernier caliper gauge, made by Chesterman of Sheffield, first half of 20th century
 - (71) a binary divider; 12 of these were replaced by one integrated circuit in 1977
 - (72) framed sketch of design for pyrex torus by Peter Thonemann (28/1/1948), made by glassblower Douglas Saxton, 2/2/1948; Steve Giles has a copy in the glassblowing workshop; this sketch to be removed to a glass cupboard
 - (73) commercial Pirani vacuum gauge, by Edwards
 - (74) Dewar siphon used to convey liquefied gases from one container to another
 - (75) silvered version of (74)
 - (76) Penning gauge and magnet
 - (77) radiation dose meter, probably for X–rays; made by the Avo Company, 1950s
 - (78) early type of Geiger counter; developed by Douglas Roaf in the 1930s
 - (79) gaseous ion diffusion apparatus, 1910; designed by Prof. Townsend
 - (80) box of 2 small unidentified stainless steel apparatuses
 - (81) gold–leaf electrometer (electroscope), c.1900 (from Townsend’s lab)
 - (82) ballistic galvanometer; Cambridge Instruments, 1930s
 - (83) unidentified electrostatic apparatus
 - (84) wooden box containing 3 gyroscopes plus a stand; Watkins & Hill of London, pre–world war one
 - (85) large wooden box containing a potential divider, rewired in 1933 by Gambrell Bros. Ltd., London; originally made by Elliott Bros. of London, maybe 1920s
 - (86) cylindrical slide rule, 1904
 - (87) glass mercury pump to produce low pressure and high vacuum
 - (88) very early vacuum pump with 2 cylinders; 19th century (already marked as number 207)

7.2. Blue glass-fronted cupboard, second floor

- (89) open/shut shutter
- (90) induction balance (#185 on list of museum exhibits)
- (91) camera lucida in wooden box
- (92) early potentiometer, made by W. Groves of London (#178)
- (93) early micrometers, all measuring in metric units; two by Elliott Bros., one unsigned
- (94) Tinsley galvanometer, widely used in teaching after second world war
- (95) portable attracted disc electrometer in wooden box; Kelvin’s type, late 19th century, by Elliott Bros. (#173)
- (96) camera lens and shutter which opens aperture for a given length of time; Kodak, 7/5/1907
- (97) camera lens with iris diaphragm
- (98) camera lens with iris diaphragm by Emil Busch of Rathenau

- (99) portable boxed spectrograph by John Browning of London; purchased November 1889 for £11–10
- (100) spectroscope for demonstration of diffraction patterns, in wooden box; Elliott Bros.
- (101) portable magneto–electric machine for curative anaesthetic and experimental use (#179)
- (102) small homemade electric motor, pre–1900 (#189)
- (103) similar to (102) but cruder
- (104) Bourdon gauge to measure 0–60 pounds on the square inch (#197)
- (105) variable capacitor; can be evacuated, so may be used to measure the dielectric constant of air
- (106) demonstration dynamo made by Max Kohl of Germany
- (107) Professor Hughes’ magnetic balance; made by Groves of London (#184)
- (108) Professor Hughes’ sonometer, to measure the frequency of sound; made by W. Groves of London (#180)
- (109) camera by the London Stereoscopic Co.
- (110) variable resistance, not a potentiometer; Watkins & Hill of London (#160)
- (111) uranium glass bowl and flask with stopper (#188, mislabelled)
- (112) direct vision spectroscope, as 3 others in Well Cupboard
- (113) clinometer and compass – a surveying instrument which can be attached to a tripod or stand; by Casella of London, pre–1900
- (114) Ayrton and Perry’s spring ammeter; patented 1883, measures up to 20 amperes; Latimer Clark, Muirhead Co. of Westminster
- (115) monocular with internal crosswires, mid C19; J.G. Hofmann of Paris
- (116) boxed sliding caliper gauge with vernier, metric; Elliott Bros.
- (117) gasfilled X-ray tube fitted with a Lindemann constant pressure device, c.1912
- (118) set of camera lenses giving choice of focal length; Busch’s Vademecum
- (119) box of weights for the Kelvin electric balance (#194)
- (120) early glass frictional electricity generator, c.1860
- (121) high current measuring device; Siemens Bros. (#169)
- (122) standard millivoltmeter with temperature correction in $^{\circ}\text{C}$; Isenthal & Co., c.1900
- (123) bronze measuring stick with point for attachment; scale is not in inches or centimeters; Elliott Bros.
- (124) demonstration device for showing that sound is not propagated through a vacuum; Elliott Bros.
- (125) box of optical equipment, French–made: various eyepieces, polarisers, mirrors
- (126) Gramme’s dynamo, 1860; W. Ladd & Co. of Regent St., London, but made in France (#168)
- (127) electric dynamo or motor; W. Ladd, agents (#199)
- (128) early motor, 1850; Apps, London (#181)
- (129) large induction coil for producing sparks; W. Ladd
- (130) magnetometer, for measuring the horizontal component of the earth’s magnetic field; with instructions, addressed to R.B. Clifton, April 1873; certificate from Kew Observatory
- (131) signed lithograph of William Thomson; no date, but early

7.3 Glass cases with sliding doors, second floor

- (132) Lindemann electrometer with microscope (#176)

- (133) quadrant electrometer with broken suspension fibre
- (134) mercury–filled diode rectifier, c.1930–40
- (135) Evershed’s moving–coil ammeter, c.1925
- (136) Weston micro–ammeter, made in USA c.1930s
- (137) experimental 2mm klystron
- (138) floating drift tube klystron with wavelength 6 or 8 mm; designed at SERL Baldock c.1949; Elliott-Lytton Ltd.
- (139) tangent galvanometer, c.1900
- (140) current measuring device; Elliott Bros. (#157)
- (141) galvanometer; Elliott Bros.
- (142) vessel for storing liquid hydrogen, created by sealing one flask inside another
- (143) 10cm magnetron
- (144) 10cm reflex klystron
- (145) K–band klystron; made by J. Sanders in 1943
- (146) 3cm klystron; made in America during the second world war
- (147) K–band klystron
- (148) 3cm magnetron; made in USA
- (149) early ammeter with permanent magnet and keeper (#183)
- (150) spherometer, to measure the radius of curvature of lenses
- (151) 36–inch focal length lens; wartime; possibly for bomb sighting
- (152) current measuring device (?); Elliott Bros.
- (153) telephone relay, pre–1914; Brown’s of London
- (154) vibration galvanometer, 50Hz
- (155) galvanometer
- (156) Muirhead galvanometer
- (157) galvanometer, c.1900; Siemens & Halske
- (158) galvanometer, c.1920s
- (159) mirror galvanometer used for a teaching course
- (160) Kelvin current balance, with certificate signed by Lord Kelvin, 1904; with instruction booklet
- (161) quadrant electrometer, C19
- (162) Ayrton and Perry’s spring ammeter (#172)
- (163) voltmeter, C19; current is probably AC rather than DC; Nalder Bros. & Thomson
- (164) voltmeter; Siemens Bros.
- (165) tangent galvanometer, c.1850s; Watkins & Hill
- (166) dynamometer; Cambridge Instruments
- (167) photo–multiplier, post–second world war
- (168) large photo–multiplier
- (169) 20 megabyte drive for a computer hard disk, 1970s
- (170) 20 megabyte drive with embedded SCSI controller, c.1984
- (171) high–quality tangent galvanometer with two Helmholtz coils; excellent condition; Elliott Bros.
- (172) ammeter with magnetometer (#174)
- (173) another current balance (as 160), but without a certificate
- (174) instrument to measure low resistance
- (175) Curie balance

- (176) two Mullard magnetic kits
- (177) portable voltmeter, 1942
- (178) Ayrton and Perry's spring ammeter, c.1880s; in box with instructions (#192)
- (179) variable condenser in box, c.1930–40
- (180) portable milliammeter, 1941
- (181) Tinsley potentiometer, c.1935–45; used by undergraduates
- (182) high current precision shunts, 1940s
- (183) universal meter, pre–1914; Siemens & Halske

7.4 Materials removed from Room 218; enquire as to new location

- (184) demonstration apparatus for Newton's rings
- (185) portable standard milliammeter, 1941
- (186) dipping refractometer; Zeiss
- (187) box of specimens of quartz, etc. for demonstrating optical properties of crystals; some prepared by Hofmann of Paris, others by Watkins & Hill; possibly obtained by R.B. Clifton at the Paris Exhibition, 1867
- (188) two photo–electric cells in boxes; probably made by Keeley and Bolton–King of the Oxford Instrument Co., c.1930s
- (189) diffraction demonstration apparatus; Duboscq of Paris, fl. 1867; possibly obtained by R.B. Clifton at the Paris Exhibition, 1867
- (190) Aldis signal lamp bulbs
- (191) Lucas searchlight bulbs
- (192) handwritten note describing a pressure appliance to be used with a heating apparatus; reference to Wied. Annalen, 45 (1892), p. 617, figure 1, plate VIII; also to Z. für Instr. Kunde, 9 (1889), p. 362
- (193) box of assorted optical apparatus, including refracting crystals, Fresnel rods and a reflection grating
- (194) gun sight; second world war, Air Ministry
- (195) electrometer (?), for measuring electrode potentials; Cambridge Instrument Co., c.1920s or 1930s
- (196) Air Ministry radio receiver, wartime model, long wave (200–400kHz); used for receiving weather forecasts from weather stations
- (197) Nichol prism in circular scale mount; part of a larger instrument
- (198) two boxes holding 19 slides showing the Clarendon Laboratory, c.1940–47; belonged to T.C. Keeley
- (199) apparatus containing elliptical gear wheels, 1957; Clarkson Engineers of Nuneaton
- (200) theodolite for measuring angles in surveying, c.1900; Elliott Bros.
- (201) portable Tinsley potentiometer; not for student use
- (202) two chemical balances, c.1900; one in a glass case, the other not
- (203) tangent galvanometer, with diagram and instructions for use; purchased from Siemens Bros. & Co. by R.B. Clifton – see enclosed letter of 29 August 1884

8. Physiology Department Archives

8.1 Small yellow box containing photographs and negatives

- (1) Gray envelope marked '12 February 1949 – 29 March 1953', contains 110 black and white photographs (2.25 x 3.25 inches) recording the building of the department; with some duplication.
- (2) Ilford Films envelope containing the negatives for the photographs in (1). It is labelled with the same dates as above.
- (3) Nine glass negatives with photographs, individually wrapped, some with labels.
 - (a) Korenchevsky (monkey glands; worked in old lab basement)
 - (b) Santiago Ramon Cajal
 - (c) R.S. Creed (no photograph)
 - (d) unnamed man in middle age, early part of 20th century
 - (e) Professor P.M. Daniel (no photograph)
 - (f) 2 middle pages of a letter, written on stationery from 16 Grove Park, Liverpool, from C.S. Sherrington to Schäfer, 8 June 1907
 - (g) first and last pages of the same letter, which concerns the founding of a new journal
 - (h) a piece of metal apparatus standing on a small table
 - (i) the same piece of apparatus, with more components added
 - (j) biochemistry building, 1936 (slide is flexible, not glass)

8.2 Pink file wallet marked 'Portraits of C.S. Sherrington'

Photographs of C.S. Sherrington (CSS) at various ages and with different colleagues:

- (1) CSS in extreme old age; no date; 2 copies
- (2) clear wallet with photo of CSS and Harvey Cushing, Royal College of Surgeons, London, 1938; 2 prints of CSS; 1 print of Cushing; another photograph of CSS and Cushing
- (3) 3 large photographs: 2 prints of CSS and 1 of CSS posed before a piece of apparatus; no date (found in Bodleian)
- (4) photograph of illustration from the Waynflete Lectures, Magdalen College, 1952: 'Locating the Soule in the Braine'
- (5) CSS in the early 1920s
- (6) CSS in 1917, with 2 assistants or students in the mammalian class; another copy plus negatives
- (7) CSS with Arnold Klebs, Royal College of Surgeons, 1938 (in envelope)
- (8) postcard of the R.G. Eves portrait of CSS (1927)
- (9) CSS in 1951, with letter from grand-daughter Unity Sherrington (22/6/1992)
- (10) offprint: J.F. Fulton, 'The Nobel Prize in Physiology and Medicine: Sir Charles Scott Sherrington', *The Scientific Monthly*, 35 (1932), 568–9
- (11) plastic covers containing a photograph of CSS with commentary in Japanese [the same photograph has obviously been used in more than one biographical notice, and there is a mounted autograph copy of the same]; CSS in dress of President of Royal Society, en route to Buckingham Palace in the 1920s (2 copies); CSS with W.C. Gibson, 1938; 2 photographs of CSS taken at his home in Ipswich, 1937
- (12) CSS with Alexander Forbes and E.D. Adrian

- (13) signed photograph of CSS with John (Jack) Eccles in envelope with early photograph of CSS posing before a piece of apparatus
- (14) 5 negatives of an autograph photograph of CSS
- (15) CSS with H. Cushing and W.H. Welch, taken by A. Klebs in Switzerland, 5 September 1931; in envelope
- (16) group photograph taken after a lunch at Exeter College, 1935, includes B.Sc. students Odoriz (Spain) and Obrador (Argentina)
- (17) Bacteriological Section, International Congress of Hygiene and Demography, 1891; mounted
- (18) envelope containing 4 negatives of apparatus and one print, plus photograph of Gibson and Jack Eccles in 1937, and Eccles in 1936
- (19) photograph and negative of lithograph of Michael Servetus, with a group picture taken in Leningrad c.1930s
- (20) offprint: Raymond Williamson, 'A Photograph of Sir Charles Sherrington and Professor Charles Smart Roy and Three Letters by Sir Charles Sherrington', *Medical History*, 3 (1959), 78–81; with a print of the photograph, which was taken in 1893 in Cambridge
- (21) envelope containing copies of photographs of CSS with H. Cushing (6); CSS, Cushing, and ? A.V. Hill (4); CSS and A.C. Klebs (2)

8.3. Envelope containing miscellaneous photographs

- (1) departmental group, no date, 2 copies
- (2) two women and a group of 33 children, late 19th century
- (3) five members of faculty/staff outside the entrance to the modern department
- (4) a male baboon, labelled 'Papio Sphinx'
- (5) the department, c.1950s, 2 copies
- (6) December 1969: David Whitteridge, Eddy Giles, Charles Phillips
- (7) 10 photographs taken at a conference (?), no date; subjects include:
Brian Boycott, Alan Cowey, Victor Coxon, Jack Eccles, Marianne Fillenz, John Gray, Hans Green, Julian Jack, Bernard Katz, Roy Kay, Steve Kuffler, Yves Laporte, Richard Mark, Peter Matthews, Jacques Paillard, Charles Phillips, Tom Sears, Pat Wall

8.4. White envelope marked 'Letters from Sherrington'

- (1) CSS to Dr L. Mond, 18 November 1901, on his experiments on the physiology of the anthropoid brain
- (2) three letters to E.G.T. Liddell, 20/9/1931, 2/8/1934, 5/10/1935
- (3) two letters to E.G.T. Liddell, 9/8/1949, 15/1/1951

8.5. Cassette tapes

- (1) Sir John Eccles and Ted Honderich, 'Mind and Brain: Two or One?', a lecture given in the Department of Physiology, 26 October 1984
Note that Eccles, a physiologist and philosopher, spent 12 years in Oxford, 1925–37; in 1963 he won a Nobel Prize. This lecture is more philosophical than scientific in nature.
- (2) Sir Charles Sherrington introducing the third programme in the BBC series 'The Physical Basis of Mind', 29 December 1948. Copied from 78rpm recordings
Note that this tape appears to be blank.

8.6. Miscellaneous items held in the Sherrington Room

(The Sherrington Room is dedicated to the history of neuroscience)

- (1) Four gray boxes of letters and papers; cataloguing in progress; summary available
- (2) Folder of handwritten notes about the spinal cord of a cat, Sherrington's last experiments in Oxford, 1932–34
- (3) Ledger book containing diverse clippings collected by Charles Arthur Lovatt Evans, Emeritus Professor of Physiology, University of London, covering the years 1908–55
- (4) Two large, red photograph albums, prepared for the opening of the Sherrington Room in 1984; include photographs of the laboratories, faculty, students and visitors
- (5) The letters of Dr John F. Fulton, typed and pasted into 18 volumes covering the years 1922–60; donated by Arnold Muirhead. Fulton was an American who studied at Oxford as a Rhodes Scholar
- (6) Bound typescript by A. Muirhead, 'Portrait of a Bibliophile – John Farquhar Fulton', 1963

8.7. Additional information

- (1) Yearly photographs of physiology finalists (1888 onward) hang on the walls in the corridors of the present department.
- (2) The department has a collection of scientific apparatus mounted in display cases; contact Dominic McKeown.

9. Forestry Institute Archives

9.1 Reports, journals and other publications

- (1) Annual Reports of the Imperial Forestry Institute, 1924–. Renamed in 1961 as Commonwealth Forestry Institute and in 1985 as the Oxford Forestry Institute. Reports #1–13 include prospectuses. Copies of each Report are sent to the Bodleian Library, the Library of the Forestry Institute, and several Oxford colleges.
- (2) Journal of the Oxford University Forestry Society, founded in 1919. Each year includes photographs of staff and students at the Institute; the Library holds a complete set.
- (3) Reports prepared for the Commonwealth Forestry Conference every four years
- (4) Annual Reports of the Unit of Tropical Silviculture of the CFI, created 1962; links with many countries are reported

9.2 Slides

Box containing 267 glass slides and 83 flexible slides, many with original packaging, all labelled or numbered by Professor H.G. Champion; taken all over the world, but mainly in India c.1920–35; they show people and locations.

9.3 Box of papers, c/o Dr J. Burley

- (1) contributions made by Commonwealth countries to the Overseas Education and Research Fund, c.1973–85
- (2) printed copy of a speech by President J.K. Nyerere of Tanzania, n.d.
- (3) General Board of the Faculties, Planning and Development Committee, 'The Future of the Department of Forestry: communication from the Biological and Agricultural Sciences Board', 1983
- (4) Professor M.E.D. Poore, 'Memorandum on the Commonwealth Forestry Institute', 16/5/1983
- (5) five–page note on the history of the Commonwealth Forestry Institute
- (6) notes on departmental prizes and scholarships available
- (7) metric guide for forestry, 1969
- (8) Report of the Committee of Inquiry into the future of Library Services, Hilary Term 1987
- (9) information about the Overseas Development Administration
- (10) memorandum of the committee for forestry, November 1951
- (11) photocopied minutes, bound together, of the meetings of the Board of Governors of the Imperial Forestry Institute, 1924–34 (1st to 29th meetings)
- (12) book containing pasted–in copies of the minutes of meetings of the departmental committee, 1968–79
- (13) photocopy: 'Forestry in Great Britain, Statement prepared by the Forestry Commission for the British Empire Forestry Conference', Ottawa, July 1923
- (14) photocopy of the Empire Forestry Journal, vol. 3, #1 (1924)
- (15) replies of Forestry Institute to a questionnaire from the University Grants Committee, 1968
- (16) folder containing 10 special forestry examinations written by J. Whitton Aris, September–November 1909, January–February and April 1910; handwritten on legal–sized paper; marked by LSW; there is one page of paper #14; the candidate did very well

9.4 Library

Enquiries to Mr R.A. Mills, Head of Library Services

- (1) correspondence of George Claridge Druce (1850–1932); not catalogued or indexed; 32 box files
- (2) collection of hundreds of photographs, 1930–50, classified in subject order

10. Oxford University Archives

10.1 Minutes and reports

- (1) The minutes of the Delegates of the University Museum, 1853 to 1905.
- (2) Faculty Board records: minutes and reports (agenda papers), listed by faculty. There is no contents listing, so searches must be done by dates.
- (3) Council and General Board papers

10.2 The University Museum

- (1) There is a separate listing for all holdings relating to the Museum.
- (2) There is some material on geology and mineralogy, but little else. There has been no systematic classification of science-related material.

10.3 Additional information

Council and General Board papers less than 30 years old may only be seen with the permission of the Registrar. Papers more than 30 but less than 80 years old may be seen with the permission of the Keeper of the Archives.

11. Christ Church

College Archives and Library

11.1 Physics examination papers, c.1900.

For further information contact the Archivist or the Librarian

11.2 Handwritten list of the science journals and books taken at Christ Church around 1900; as yet uncatalogued

- (1) many of the listed books are still in the College; most are on chemistry and physics
- (2) journals are British, French and German, including very complete runs of such titles as *Nature*, *Chemical News*, *Annales de Chimie et de Physique*, *Berichte der Deutschen Chemischen Gesellschaft zu Berlin* (for the years c.1895–1920)

12. Nuffield College

12.1 Handlist of Cherwell Papers

(Three volumes bound in two parts, plus supplement)

F.A. Lindemann was created Baron Cherwell of Oxford in 1941, Viscount in 1956. The Handlist has an index which includes the names of individuals, learned societies and organisations, but there is no subject index. The material is divided into 10 sections, A–K excluding I, each having its own introduction:

- A: Personal and Biographical
- B: Oxford University
 - The Clarendon Laboratory
 - Oxford Science Departments and Institutes
 - General Correspondence on University Affairs, 1929–57
 - Wadham College, 1919–56
 - Christ Church, 1921–57
 - Other Oxford Colleges
 - Oxford University Clubs and Societies
 - Correspondence and Papers on the Oxford Roads Problem, 1953–57
- C: Scientific Research, Writings, Conferences
- D: Scientific Correspondence
- E: Publications, Lectures, Speeches
- F: Second World War – Preparations and Statistical Section, General Papers
- G: Second World War – Statistical Section, Military and Scientific Topics
- H: Second World War – Statistical Section, Economic Topics
- J: Politics and the Conservative Party
- K: Personal and Social Correspondence

12.2 Handlist of Nuffield Papers

The papers of William Richard Morris, Viscount Nuffield (1877–1963), in the college library. Few papers remain that shed light either on his business affairs or on his private life. Items of interest include:

- Box 7/37 1947: Catalogue of an exhibition of books on medicine, surgery and physiology, Bodleian Library
- Box 8/1/1–15 1949–53: correspondence of Morris, the President of the Royal College of Surgeons, the President of the Royal Society of Medicine and the Prime Minister about the inclusion of R.R. Macintosh, Nuffield Professor of Anaesthetics, in the Honours List (RRM was knighted in 1955)
- Box 8/17 1952: letter from Lord Cherwell
- Box 8/20/1–2 1953: letter from J. Trueta, Nuffield Professor of Orthopaedic Surgery, enclosing a pamphlet, 'Exercises in the Bath'
- Box 8/22/1–4 1953–54: correspondence about Morris's gift of an operating theatre at the Radcliffe Infirmary
- Box 12/14, 1969–71: Report, Lord Nuffield's Benefaction for the Advancement of Medicine
- Box 13/38* 1949: decree of thanks from the University of Oxford for a gift of £3500 towards expenses of cineradiographic research
- Box 16/19 1936: announcement of addition of £750,000 to gift of £2,000,000 to University of Oxford Medical School

- Boxes 43–47 Cash books and ledgers, with records of charitable donations
- Box 48/6/1 1937: Laboratory for Physical Chemistry; College for Postgraduate Work, Deed of Covenant and Trust; £153,846–3–0 for 6□ years together with a site of the value of approximately £100,000
- Box 50/1 1948: Nuffield (Penicillin) Research Trust Fund, Deed, £50,000 to Lincoln College, Oxford

13. Wolfson College

13.1 Papers of Dr H.B.D. Kettlewell

HENRY BERNARD DAVIS KETTLEWELL (1907–1979)

Originally a medical practitioner, Kettlewell was also an outstanding lepidopterist and geneticist. He was co-founder of the Rothschild–Cockayne–Kettlewell collection in the British Museum (Natural History), and is well-known for his work on industrial melanism in the Lepidoptera which illustrates evolution in action.

The extensive correspondence held by Wolfson College, Oxford, covers the years 1936–79, and includes copies of many of Kettlewell's own letters. Correspondents include:– Sir Gavin de Beer, Sir Isaiah Berlin, Sir Lawrence Bragg, Sir Cyril Clarke, E.A. Cockayne, Armand and Michaela Denis, T. Dobzhansky, E.B. Ford, J.B.S. Haldane, Sir Alister Hardy, J.W. Heslop Harrison, Sir Julian Huxley, W. Le Gros Clarke, N.D. Riley, Hon. Miriam Rothschild, S.G. Castle Russell, P.M. Sheppard, N. Tinbergen, E.P. Wiltshire and Baron C. de Worms.

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Up to January 1993 Kettlewell's research data and experimental notes have not been found. If anyone knows the whereabouts of these papers, please inform the Librarian, Wolfson College, Oxford.

Audrey Z. Smith (former Hope Librarian, University Museum, Oxford)

Ruth M. Wickett (former secretary to Dr. H.B.D. Kettlewell)

13.2 Additional information

- (1) The correspondence occupies 40 box files, each of which have a detailed listing of their contents. The complete list is 27 pages long.
- (2) Copies of the list of Kettlewell correspondence will shortly be deposited in the following institutions: British Museum (Natural History), American Museum of Natural History, Smithsonian Institution, Bodleian Library, Royal Entomological Society of London, British Entomological and Natural History Society, Balfour Library (Cambridge), Department of Zoology (Oxford), The Lepidopterist's Society (USA), Linnean Society, Society for the Study of Evolution.

14. Museum of The History Of Science

14.1 In the Library of the Museum

The Librarian has compiled a 'List of Departmental and Society Archives, and Some Related Material' (five pages plus one page of information about material viewed in the Department of Pharmacology). There is also a list (nine pages) of principal individuals represented in the manuscript collections of the Museum, few of whom were closely attached to Oxford. Both lists are available from the Librarian upon request. The following is a brief summary of relevant information:

- (1) Departmental and society archives
 - (a) Balliol–Trinity Laboratories, 1880–1941
 - (b) Botanic Garden, 1873–1918
 - (c) Chemistry (manuscripts, etc.)
 - (d) Clarendon Laboratory
 - (i) Oxford University Physical and Radio Society: manuscript minutes of meetings (with some term cards) from Michaelmas Term 1940 to Trinity Term 1941
 - (ii) Oxford University Physical Society: well kept manuscript minute book covering from February 1937 to 1946; term cards inserted
 - (iii) Terminal Examinations: manuscript book recording collections marks from December 1926 to 1942
 - (e) Oxford University Alembic Club, 1902–73
 - (f) Department of Physiology, 1908–1964 (T.A. Marsland)
 - (g) Radcliffe Observatory, mid-18th to mid-19th centuries
- (2) Manuscript collections of Oxford scientists
 - (a) Robert Bellamy Clifton (1836–1921), physicist
 - (b) Charles Giles Bridle Daubeny (1795–1867), chemist
 - (c) Robert William Theodore Gunther (1869–1940), zoologist and museum curator
 - (d) Frederick John Jervis–Smith (1848–1911), physicist and inventor
 - (e) Sir Edwin Ray Lankester (1847–1929), zoologist
 - (f) Frederick Alexander Lindemann (1886–1957), physicist
 - (g) Henry Gwyn Jeffreys Moseley (1887–1915), physicist
 - (h) William Odling (1829–1921), chemist
 - (i) Sir William Osler (1849–1919), physician
 - (j) William Henry Perkin, Jr. (1860–1929), chemist
 - (k) John Phillips (1800–1874), geologist
 - (l) Stephen Peter Rigaud (1774–1839), astronomer and physicist
 - (m) Nevil Vincent Sidgwick (1873–1952), chemist
 - (n) Frederick Soddy (1877–1956), chemist

- (3) Notebook belonging to Rev. Robert Walker of the Clarendon Laboratory
At the front in a paper wallet are 12 photographs, including one of the Old Clarendon and 11 which are possibly taken inside that building. Could these be from Robert Clifton's photograph album?
Large notebook in which the Rev. Robert Walker pasted correspondence from instrument makers, especially Watkins & Hill but including some others (eg. L. Casella & Co., Elliott & Sons), principally from the 1840s and 1850s but with some letters dated as late as 1862 and one as early as 1826. He also included handwritten and printed instructions for the use of the instruments that he purchased, as well as some diagrams. He drew up a list of the accoustical apparatus available from Watkins & Hill in January 1846, placing checkmarks against 10 of the 20 listed instruments. There is a letter from C. Wheatstone, 19 February 1850, giving directions for using the 'wave machine'. At the back of the book are several loose instruction sheets, rough notes and a letter dating from Walker's time, as well as four letters addressed to Robert Clifton in the 1890s and 1911.

14.2 Additional information

The Librarian has created a file of the physics-related archives held in the Museum.

15. University Museum Archives

Queries to the Librarian

15.1 Geological collections

- (1) There is a diverse collection of correspondence, notes, maps, photographs, drawings, fossil listings, etc. relating to the work of the following individuals: William Joscelyn Arkell (1904–58); C.J. Bayzand; J.A. Douglas; Alexander Henry Green (1832–96); T.T. Groom; James Parker (1833–1912); John Phillips (1800–74); Joseph Prestwich (1812–96); H. Simpson; W.J. Sollas (1849–1936); Ronald Hawkesby Thomas
- (2) Major archives of William Smith (1769–1839); William Buckland (1784–1856); E. Donovan (1792–1813) (catalogued)

15.2 General

- (1) Early photographs recording the building of the Museum (listed)
- (2) Documents concerning the building, furnishing and equipping of the Museum (catalogued)
- (3) Photographs relating to the Museum and the geology department

15.3 Mineral collections

Queries to Miss M. Price, Assistant Curator, Mineral Collections. Cataloguing work is in progress. Some scientific apparatus.

- (1) Papers relating to the administration of the Department of Mineralogy (1896–1941), and the mineral collections of the Museum, 1896 to date. Notes on academic research in the department from 1896 to date.
- (2) Collections relating to the work of: Thomas Vipond Barker; Herbert Lister Bowman (1874–1942); Hugo Muller (1833–1915); Mary Porter (1886–1981); L. R. Wager (1904–65); Eric J.W. Whittaker

15.4 Publications relating to zoology and entomology

- (1) K. C. Davies and J. Hull, *The Zoological Collections of the Oxford University Museum: a historical review and general account, with comprehensive donor index to the year 1975* (Oxford: Oxford University Museum, 1976). Copies obtainable from Ms Jane Pickering (Assistant Curator)
- (2) Audrey Z. Smith, *A History of the Hope Entomological Collections in the University Museum, Oxford: with lists of archives and collections* (Oxford: Clarendon Press, 1986). Revised and expanded in 1993. Copies obtainable from Dr S.J. Simpson (Curator), or Dr G. McGavin (Assistant Curator)

16. Additional Information

All information listed here (unless otherwise indicated) is available for consultation in the History of Science research area of the History Faculty, George Street, Oxford.

- (1) Dr P. W. Kent of Christ Church and the Nuffield Department of Clinical Biochemistry has compiled a short dossier on Oxford scientists E.W.B. Gill (1883–1959), physicist; C.H. Collie (1903–91), physicist; and A.G. Vernon Harcourt (1834–1919), chemist. In addition, Dr Kent is in possession of a copy of two lectures on organic reactions delivered by Robert Robinson (1886–1975) in 1932. The notes are of particular interest because it was then unusual to deal with the subject mechanistically. Dr Kent has a copy of lectures delivered by C.K. Ingold (1893–1970) at University College, London, in 1936–37 (113 pages); note that there is no copy of Ingold's notes in the History Faculty.
- (2) The Department of Earth Sciences has several hundred copies of a booklet by Mary W. Porter, *The Diary of Henry Alexander Miers, 1858–1942* (Oxford, 1973). The work focuses on personal aspects of Miers's life and career during the years 1902–08. Contact Mr J. O'Sullivan, Administrator, Department of Earth Sciences, Parks Road, Oxford, OX1 3PR.
- (3) Dr S. Bradbury of Pembroke College and the Department of Human Anatomy has compiled a series of diagrams showing the physical growth of the department from 1891 to 1962. Most of the department's archival material has been sent to the Museum of the History of Science.
- (4) Professor E.A. Vincent of University College and the Department of Earth Sciences has written a history of the department: *Geology and Mineralogy at Oxford 1860–1986: record and reminiscence* (privately printed, 1994). The book contains an index and many photographs.
- (5) Sir Martin Wood, formerly of the Clarendon Laboratory, plans to create a small museum dedicated to the work of the company he founded in 1959, Oxford Instruments. He has kept the shed in which he first manufactured commercial products (high magnetic field research), and will display in it various bits of equipment that have been used and discarded from both the Clarendon and the company. Address: c/o Oxford Instruments plc, Old Station Way, Eynsham, Witney, OX8 1TL.
- (6) Mr Roger Hutchins of Magdalen College has compiled an extensive listing of Oxford science professors and lecturers of the 17th to early 20th centuries. For those who had some attachment to Magdalen, he has listed the archival material which remains in the college. He has also checked the archives of the Royal Astronomical Society, to produce a list of the papers held there which relate to Oxford science dons. The Magdalen College Archivist is Dr Janie Cottis.
- (7) Dr P. Weindling, formerly of the Wellcome Unit for the History of Medicine, is in possession of the responses received from the heads of 33 Oxford science departments in reply to a questionnaire of March 1989. The survey was carried out with the late Dr P. Hoch, in relation to the writing of chapters on science and medicine for *The Illustrated History of Oxford University* (Oxford: OUP, 1993), and sought information about historical resources remaining in departments. A list of respondents is available.
- (8) Cassette recordings, 'The Recent History of the Oxford Science Area', to be deposited in the Museum of the History of Science:
 - (a) Prof. J.W. Christian: The History of Metallurgy at Oxford (27.4.89)
 - (b) Prof. E.A. Vincent: Geology and Earth Sciences at Oxford (4.5.89)
 - (c) Prof. R.W. Steel & C.G. Smith: The Development of Geography at Oxford after 1930 (11.5.89)
 - (d) A.M. Howatson: Aspects of the History of Engineering Science at Oxford (18.5.89)
 - (e) J. Roche: Teaching and Research in the Science Area (21.2.90)
 - (f) H. Blaschko: Pharmacology in Oxford (24.4.90)
 - (g) P.J. Brunet: Zoology in Oxford (side B) plus some material by P. Hoch (side B) (1.5.90)
 - (h) Sir J. Burnett: Plant Sciences in Oxford (8.5.90)
 - (i) M. Ord & L.A. Stocken: Biochemistry (15.5.90)
 - (j) Prof. R.J.P. Williams: The Inorganic Chemistry Laboratory at Oxford (23.4.91)
 - (k) C.J. Danby: Physical Chemistry at Oxford (7.5.91)
 - (l) Prof. E.T. Hall: The History of the Laboratory for Archaeology and the History of Art (14.5.91)
 - (m) Sir E.P. Abraham: interview by J. Roche (18.9.91)
 - (n) Prof. B. Bleaney: The History of the Clarendon Laboratory (5.5.92)
 - (o) M.G. Adam: The History of Astronomy at Oxford (19.5.92)
 - (p) N. Kurti: Oxford and the Fissile Missile (3.11.92)
 - (q) J.R. Clarke: The Bureau of Animal Population (13.5.93)
 - (r) J.M. Walker, S.C. Truelove & D.M. Hawke: The Development of Clinical Medical Studies in Oxford soon after the Second World War (3.5.94) [tape missing]
 - (s) S. Bradbury: A Hundred Years of Anatomy in Oxford (12.5.94) [tape missing]
 - (t) J. Glozier: Forty Years as a Laboratory Technician (17.5.94)
- (9) Theses submitted for Part II of the Final Honour School of Natural Science (Chemistry) – a selection of those relevant to the history of science in Oxford; held in the History Faculty Library, Broad Street
 - (a) C. Brookes, 'Experimental chemistry in Oxford 1648–c.1700, its techniques, theories and personnel' (1985)
 - (b) E.A. Dunn, 'N.V. Sidgwick, and his role in the development of the Electronic theory of Valency' (1994)
 - (c) D. Goberdhan, 'The English chemical tradition from the late sixteenth century to the mid-seventeenth, with particular reference to the contributions of Oxford men' (1986)
 - (d) N.I. Miller, 'Chemistry for gentlemen: Charles Daubeny and the role of a chemical education at Oxford, 1800–1867' (1986)
 - (e) C. O'Meara, 'Oxford chemistry, 1700–1770: a study in the effect of Newtonianism on chemistry' (1987)
 - (f) I. Tollett, 'Changing concepts in Oxford chemistry in the late seventeenth century' (1993)

17. List Of Addresses For Enquiries

17.1 Clarendon Laboratory

Mrs J. Timms, Librarian, Clarendon Laboratory, Parks Road, Oxford, OX1 3PU; telephone 272265

17.2 Physiology Department

Miss W. Saywood, Librarian, University Laboratory of Physiology, Parks Road, Oxford, OX1 3PT; telephone 272524

17.3 Forestry Institute

Dr J. Burley, Director, Oxford Forestry Institute, Department of Plant Sciences, South Parks Road, Oxford, OX1 3RB; telephone 275049 (secretary)

17.4 Oxford University Archives

Mr S. Bailey, Archivist, Oxford University Archives, Bodleian Library, Oxford, OX1 3BG; telephone 277145

17.5 Christ Church, Oxford, OX1 1DP;

Telephone 276169 (Library)

17.6 Nuffield College

Mrs E. Vallis, Archives Assistant, Nuffield College, Oxford, OX1 1NF; telephone 278577

17.7 Wolfson College

Mr A. Hale, Librarian, Wolfson College, Oxford, OX2 6UD; telephone 274076

17.8 Museum of the History of Science

Mr A.V. Simcock, Librarian, Museum of the History of Science, Old Ashmolean Building, Broad Street, Oxford, OX1 3AZ; telephone 277284

17.9 Oxford University Museum

Ms S. Brecknell, Librarian, The University Museum, Parks Road, Oxford, OX1 3PW; telephone 272982

18. General Works Of Reference

- (1) Peter Harper, *Guide to the Manuscript papers of British scientists catalogued by the Contemporary Scientific Archives Centre and the National Cataloguing Unit for the Archives of Contemporary Scientists, 1973–1993* (Bath: NCUACS, 1993). This publication should be available in most university libraries. Further enquiries to Mr P. Harper, Archivist, NCUACS, University of Bath, Claverton Down, Bath, BA2 7AY
- (2) R.M. MacLeod and J.R. Friday, *Archives of British Men of Science* (London: Mansell, 1972). This forms the Introduction and Index to the publication in microfiche of a survey of private and institutional holdings.
- (3) Royal Commission on Historical Manuscripts, *Manuscript Papers of British Scientists 1600–1940* (London: HMSO, 1982).
- (4) N. Baldwin, *The Society for the Protection of Science and Learning Archive* (Oxford: Bodleian Library, 1988). This index of emigré scientists, a copy of which is available in the New Bodleian Library, Room 132, is by discipline and by name, so it is not immediately possible to identify those who came to Oxford. Professor Paul Weindling, formerly of the Wellcome Unit for the History of Medicine, is compiling a biographical database of medically-qualified refugees coming to Britain from Europe during the 1930s and 1940s.

