

CURRICULUM VITAE - MARTIN W. LIEBECK

Date of Birth 23 September, 1954

Appointment Professor of Pure Mathematics, Imperial College London
(appointed Professor 1991, Reader 1988, Lecturer 1986)

Higher Education

First Class B.A. in Mathematics, Oxford University, 1976

M.Sc. in Mathematics, Oxford University, 1977

D.Phil. in Mathematics, Oxford University, 1979

Awards and Fellowships

Senior Mathematical Prize, Oxford University, 1979

Johnson University Prize, Oxford, 1979

Postdoctoral Research Fellowship, University College Cardiff, 1979-82

SERC Advanced Fellowship, Cambridge University, 1982-86

Fellow of Downing College, Cambridge, 1982-86

Imperial College Teaching Fellowship, 1998

Maclaurin Fellowship, awarded by New Zealand Institute of Mathematics and Applications (NZIMA), held in Auckland, 2005 and 2008

Rector's Medal, Imperial College 2010 – awarded for excellence in teaching

Research Students

 Ph.D. students supervised:

D. Stewart, awarded PhD 2010 (now Junior Research Fellow, Oxford)

C. Marion, awarded PhD 2009 (now postdoc, University of Lausanne)

R. Nanayakarra, awarded PhD 2008

T. Burness, awarded PhD 2005 (now lecturer, Univ of Southampton)

E. O'Reilly-Regueiro, awarded PhD 2003 (now lecturer, National University of Mexico)

M. Stavrides, awarded PhD 2003

D. Goodwin, awarded PhD 1998

M. Schaffer, awarded Ph.D. 1998

J. Brundan, awarded Ph.D. 1996 (now professor, University of Oregon)

C. Purvis, awarded Ph.D. 1995

A. Vauhkonen, awarded Ph.D. 1993

P. Kleidman, awarded Ph.D. 1987

J. Hasa, 2008 -

A. Litterick, 2009 -

A. Thomas, 2010 -

M. Abiteboul, 2011 -

Editorships, External Committees, External Examiner

Editor for Bulletin, Journal and Proceedings of the London Mathematical Society, 1988 - 1998
Editor, Journal of Algebra, 2006 -
Guest editor of special issue of the Journal of Algebra for 60th birthday of Gordon James, December 2006
Guest editor of special issue of the Journal of Algebra in memory of Karl Gruenberg, 2009
Guest editor of special issue of the Journal of Australian Mathematical Society for 60th birthday of Cheryl Praeger, 2009
External examiner for London School of Economics, 1990 - 92
External examiner Bristol University, 2003 - 2006
External examiner King's College London, 2006 - 2010
LMS Research Meetings Committee, 1995 - 2000
Editorial Adviser LMS Student Texts, 2004 -
LMS Nominating Committee, 2010 -

Conferences organised

Durham Symposium on Groups and Combinatorics, 1990
Oberwolfach meeting on "Groups and Geometry", 1997
Milan meeting on "Algebraic Groups", May 2000
Durham Symposium on "Groups, geometry and combinatorics", July 2001
Conference on "Function Theory" in honour of 75th birthday of Walter Hayman, London, June 2001
Conference on "Groups and representations", Oregon, 2004
Oberwolfach meeting on "Groups and geometries", 2005
Oberwolfach meeting on "Groups and geometries", 2008
Banff meeting on "Groups and geometries", 2012

Conferences attended as invited speaker

Galway, Ireland, 1983
Sydney, Australia, 1985
Canberra, 1985
Amsterdam, 1986
Arcata, California, 1986
Novosibirsk, Siberia, 1989
Durham, 1990
Como, Italy, 1993
Istanbul, Turkey, 1994

Oberwolfach, Germany, 1984, 85, 86, 87, 88, 89, 91, 93, 94, 97, 98, 2002, 2005, 2007, 2008
Birmingham, 1995
Trento, Italy, 1995
Siena, Italy, 1996
Newton Institute, Cambridge, 1997
Jerusalem, 1998
MSRI, Berkeley, 1999
Milan, 2000
Brescia, Italy, 2001
Budapest, 2003
Perth, Australia, 2003
Bressanone, Italy, 2004
Napier, New Zealand, 2005
Auckland, New Zealand, 2005
Jerusalem, 2006
Kaikura, New Zealand, 2008
Perth, Australia, 2009
Banff, Canada, 2009
Berlin, 2009
Venice, 2010
Galway, 2011
Gregynog, 2011

Previous Appointments

Postdoctoral Research Fellow, University College Cardiff, 1979-82
SERC Advanced Fellow, University of Cambridge, 1982-85

Research Grants

EPSRC Visiting Researcher Grants obtained for:

C.E. Praeger, April - June 1985
G.M. Seitz, July - August 1985
A.M. Cohen, June - July 1987
G.M. Seitz, May - July 1989
G.M. Seitz, February - August 1991
G.M. Seitz, June - August 1993
G.M. Seitz, September 1997 - September 1998 (£42,000)
G.M. Seitz, June - July 1999
G.M. Seitz, June - August 2001 (£10,000)
A. Shalev, September - October 2001

A. Shalev, September 2002 - September 2003 (£45,000)
G.M. Seitz, 2004 - 2007 (£13,500)
A. Shalev, 2005 - 2007 (£10,500)
G.M. Seitz, 2007 - 2010 (£20,500)
A. Shalev, 2009 - 2012 (£60,000)
G.M. Seitz, 2011 - 2013 (£30,000)

Holder of NATO Collaborative Research Grant (1994 - 99)

Visiting research positions held at:

University of Western Australia, 1983, 85, 90, 94, 96, 2000, 2001, 2003, 2006,

2010

California Institute of Technology, 1988

University of Amsterdam, 1988

Rutgers University, 1992

University of Oregon, 1999

Hebrew University, Jerusalem, 2000

Auckland University (Maclaurin Fellow), 2005, 2008, 2010

Imperial College administration

Head of Pure Mathematics Section, 1/4/97 - present

Chairman of Mathematics Department Undergraduate Course Committee

In charge of graduate admissions, Pure Mathematics, 1997 - 2006

PUBLICATIONS

Articles

1. “Transitive permutation groups of some special prime degrees”, *Math. Zeit.* **168** (1979), 35-52
2. “Lie algebras, 2-graphs and permutation groups”, *Bull. London Math. Soc.* **12** (1980), 29-33
3. “Transitive permutation groups of some special prime degrees, II: towards 4-transitivity”, *Math. Zeit.* **175** (1980), 53-66
4. “Bounds for the orders of some transitive permutation groups”, *Bull. London Math. Soc.* **14** (1982), 337-344
5. “Graphs with nilpotent adjacency matrices”, *J. Graph Theory* **6** (1982), 215-218
6. “Groups fixing graphs in switching classes”, *J. Austral. Math. Soc.* **33** (1982), 76-85
7. “Extensions of a theorem of Jordan on primitive permutation groups”, *J. Austral. Math. Soc.* **34** (1983), 155-171
8. “On graphs whose full automorphism group is an alternating or a finite classical group”, *Proc. London Math. Soc.* **47** (1983), 337-362
9. “Some applications of the classification of finite simple groups”, *Irish Math. Soc.*, 1983
10. “Permutation modules for rank three unitary groups”, *J. Algebra* **88** (1984), 317-329
11. “On the orders of transitive permutation groups”, *Bull. London Math. Soc.* **16** (1984), 523-524
12. “On minimal degrees and base sizes of primitive permutation groups”, *Arch. Math.* **43** (1984), 11-15
13. “Some recent results on finite permutation groups”, in *The Rutgers Group Theory Year 1983 – 4*, (eds. D. Gorenstein et al.), Cambridge Univ. Press, 1984, pp.53-66 (with J. Saxl)
14. “On the orders of maximal subgroups of the finite classical groups”, *Proc. London Math. Soc.* **50** (1985), 426-446
15. “Centralizers of semisimple elements in finite twisted groups of Lie type”, *J. London Math. Soc.* **31** (1985), 48-54 (with D. Deriziotis)
16. “Permutation modules for rank three symplectic and orthogonal groups”, *J. Algebra* **92** (1985), 9-15

17. "Primitive permutation groups containing an element of large prime order", *J. London Math. Soc.* **31** (1985), 237-249 (with J. Saxl)
18. "The primitive permutation groups of odd degree", *J. London Math. Soc.* **31** (1985), 250-264 (with J. Saxl)
19. "The finite primitive permutation groups of rank three", *Bull. London Math. Soc.* **18** (1986), 165-172 (with J. Saxl)
20. "Multiplicity free permutation representations of finite linear groups", *Math. Zeit.* **192** (1986), 329-337 (with N. Inglis and J. Saxl)
21. "The affine permutation groups of rank three", *Proc. London Math. Soc.* **54** (1987), 477-516
22. "The factorizations of the finite exceptional groups of Lie type", *J. Algebra* **106** (1987), 517-527 (with C. Hering and J. Saxl)
23. "Distance transitive graphs with symmetric or alternating automorphism group", *Bull. Austral. Math. Soc.* **35** (1987), 1-25 (with C. Praeger and J. Saxl)
24. "The classification of finite simple Moufang loops", *Math. Proc. Camb. Phil. Soc.* **102** (1987), 33-47
25. "On the orders of maximal subgroups of the finite exceptional groups of Lie type", *Proc. London Math. Soc.* **55** (1987), 299-330 (with J. Saxl)
26. "Permanents and immanants of Hermitian matrices", *Proc. London Math. Soc.* **55** (1987), 243-265 (with G. James)
27. "On the overgroups of irreducible subgroups of the finite classical groups", *Proc. London Math. Soc.* **55** (1987), 507-537 (with J. Saxl and G. Seitz)
28. "A classification of the maximal subgroups of the finite alternating and symmetric groups", *J. Algebra* **111** (1987), 365-383 (with C. Praeger and J. Saxl)
29. "The local maximal subgroups of the finite simple groups", *Proc. Symp. Pure Math.* **47** (1987), 455-461
30. "On maximal subgroups and maximal factorizations", *Proc. Symp. Pure Math.* **47** (1987), 449-454 (with C. Praeger and J. Saxl)
31. "A survey of the maximal subgroups of the finite simple groups", *Geom. Dedicata* **25** (1988), 375-389 (with P. Kleidman)
32. "On the O'Nan-Scott theorem for primitive permutation groups", *J. Austral. Math. Soc.* **44** (1988), 389-396 (with C. Praeger and J. Saxl)
33. "Graphs whose full automorphism group is a symmetric group", *J. Austral. Math. Soc.* **44** (1988), 46-63

34. "On the 2-closures of primitive permutation groups", *J. London Math. Soc.* **37** (1988), 241-252 (with C. Praeger and J. Saxl)
35. "Smoothly approximated ω -categorical structures", *Proc. London Math. Soc.* **59** (1989), 439-463 (with W. Kantor and H. Macpherson)
36. "On a theorem of Feit and Tits", *Proc. Amer. Math. Soc.* **107** (1989), 315-322 (with P. Kleidman)
37. "Maximal subgroups of exceptional groups of Lie type, finite and algebraic", *Geom. Dedicata* **36** (1990), 353-387 (with G. Seitz)
38. "Finite linear spaces with flag-transitive automorphism groups", *Geom. Dedicata* **36** (1990), 89-94 (with F. Buekenhout, A. Delandtsheer, J. Doyen, J. Saxl and P. Kleidman)
39. "Minimal degrees of primitive permutation groups, with an application to monodromy groups of Riemann surfaces", *Proc. London Math. Soc.* **63** (1991), 266-314 (with J. Saxl)
40. "On point stabilizers in primitive permutation groups", *Commun. in Alg.* **19** (1991), 2777-2786 (with J. Saxl)
41. "On exponents of almost simple groups and an application to the restricted Burnside problem", *Math. Zeit.* **208** (1991), 401-409 (with M. Aschbacher and P. Kleidman)
42. "Maximal subgroups of finite simple groups and their automorphism groups", *Contemp. Math.* **131** (1992), 243-259 (with J. Saxl)
43. "The local maximal subgroups of exceptional groups of Lie type, finite and algebraic", *Proc. London Math. Soc.* **64** (1992), 21-48 (with A. Cohen, J. Saxl and G. Seitz)
44. "Subgroups of maximal rank in finite exceptional groups of Lie type", *Proc. London Math. Soc.* **65** (1992), 297-325 (with J. Saxl and G. Seitz)
45. "Relation algebras and permutation groups", *J. London Math. Soc.* **45** (1992), 433-445 (with C. Praeger)
46. "Generators for finite simple groups, with applications to linear groups", *Quarterly J. Math.* **43** (1992), 441-458 (with J. Hall and G. Seitz)
47. "Affine distance transitive groups with symmetric or alternating point stabilizer", *Eur. J. Comb.* **13** (1992), 489-501 (with C. Praeger)
48. "Subgroups generated by root elements in groups of Lie type", *Annals of Math.* **139** (1994), 293-361 (with G. Seitz)
49. "The probability of generating a finite simple group", *Geom. Dedicata* **56** (1995), 103-113 (with A. Shalev)

50. "Subgroups of exceptional groups", in *Groups of Lie type and their geometries* (eds. W. Kantor and L. di Martino), London Math. Soc. Lecture Note Series **207**, Cambridge Univ. Press, 1995, pp.151-156 (with G. Seitz)
51. "Subgroups of simple algebraic groups and of related finite and locally finite groups of Lie type", *Finite and locally finite groups* (eds. B. Hartley et al.), NATO ASI Series C, Vol 471, Kluwer, 1995, pp. 71-96.
52. "Subgroups of large rank in groups of Lie type", *Proc. London Math. Soc.* **72** (1996), 425-457 (with J. Saxl and D. Testerman)
53. "Factorizations of simple algebraic groups", *Trans. Amer. Math. Soc.* **348** (1996), 799-822 (with J. Saxl and G. Seitz)
54. "Characterization of classical groups by orbit sizes on the natural module", *Proc. Amer. Math. Soc.* **124** (1996), 2961-2966
55. "Simple groups, probabilistic methods, and a conjecture of Kantor and Lubotzky", *J. Algebra* **184** (1996), 31-57 (with A. Shalev)
56. "Classical groups, probabilistic methods and the (2, 3)-generation problem", *Annals of Math.* **144** (1996), 77-125 (with A. Shalev)
57. "Maximal subgroups of symmetric groups", *J. Comb. Theory, Series A* **75** (1996), 341-352 (with A. Shalev)
58. "Regular orbits of linear groups", *J. Algebra* **184** (1996), 1136-1142.
59. "On factorizations of almost simple groups", *J. Algebra* **185** (1996), 409-419 (with C. Praeger and J. Saxl)
60. "On the genus of a finite classical group", *Bull. London Math. Soc.* **29** (1997), 159-164 (with C. Purvis)
61. "Modules for algebraic groups with finitely many orbits on subspaces", *J. Algebra* **196** (1997), 211-250 (with R. Guralnick, H. Macpherson and G. Seitz)
62. "Upper bounds for the number of conjugacy classes of a finite group", *J. Algebra* **198** (1997), 538-562 (with L. Pyber)
63. "On the subgroup structure of exceptional groups of Lie type", *Trans. Amer. Math. Soc.* **350** (1998), 3409-3482 (with G. Seitz)
64. "Regular orbits and the $k(GV)$ -problem", in *Groups and Geometries* (ed. L. di Martino et al.), Trends in Mathematics, Birkhäuser, 1998, pp.145-148
65. "Probabilistic methods in the generation of finite simple groups", in *The Atlas ten years on* (eds. R. Curtis and R. Wilson), London Math. Soc. Lecture Note Series **249**, Cambridge Univ. Press, 1998, pp. 163-173 (with A. Shalev)

66. "Introduction to the subgroup structure of algebraic groups", in *Representations of reductive groups* (eds. R.W. Carter and M. Geck), Cambridge Univ. Press, 1998, pp.129-149.
67. "Subgroups of exceptional groups", in *Algebraic groups and their representations* (eds. R. Carter and J. Saxl), NATO ASI Series C, Vol 471, Kluwer, 1998, pp.275-290.
68. "On the subgroup structure of classical groups", *Invent. Math.* **134** (1998), 427-453 (with G.M. Seitz)
69. "On the diameter of a Cayley graph of a simple group of Lie type based on a conjugacy class", *J. Comb. Theory, Series A* **83** (1998), 118-137 (with R. Lawther)
70. "The classification of finite linear spaces with flag-transitive automorphism group of affine type", *J. Comb. Theory, Series A* **84** (1998), 196-235
71. "Subgroups of simple algebraic groups containing elements of fundamental subgroups", *Math. Proc. Camb. Phil. Soc.* **126** (1999), 461-479 (with G. Seitz)
72. "Simple groups, permutation groups, and probability", *J. Amer. Math. Soc.* **12** (1999), 497-520 (with A. Shalev)
73. "Random generation of finite simple groups", *J. Algebra* **219** (1999), 345-355 (with R. Guralnick, J. Saxl and A. Shalev)
74. "On finite subgroups of exceptional algebraic groups", *J. reine angew. Math.* **515** (1999), 25-72 (with G.M. Seitz)
75. "Transitive subgroups of primitive permutation groups", *J. Algebra* **234** (2000), 291-361 (with C.E. Praeger and J. Saxl)
76. "Finite linear groups and bounded generation", *Duke Math. J.* **107** (2001), 159-171 (with L. Pyber)
77. "Diameters of finite simple groups: sharp bounds and applications", *Annals of Math.* **154** (2001), 383-406 (with A. Shalev)
78. "Random (r, s) -generation of finite classical groups", *Bull. London Math. Soc.* **34** (2002), 185-188 (with A. Shalev)
79. "Primitive permutation groups with a common suborbit, and edge-transitive graphs", *Proc. London Math. Soc.* **84** (2002), 405-438 (with C.E. Praeger and J. Saxl)
80. "Fixed point ratios in actions of finite exceptional groups of Lie type", *Pacific J. Math.* **205** (2002), 393-464 (with R. Lawther and G. Seitz)
81. "Fixed point spaces in actions of exceptional algebraic groups", *Pacific J. Math.* **205** (2002), 339-391 (with R. Lawther and G. Seitz)
82. "Bases of primitive linear groups", *J. Algebra* **252** (2002), 95-113 (with A. Shalev)

83. “Variations on a theme of Steinberg”, *J. Algebra* **260** (2003), 261-297 (with G. Seitz)
84. “A survey of maximal subgroups of exceptional groups of Lie type”, in *Groups, Combinatorics and Geometry: Durham, 2001*, World Scientific, 2003 (with G. Seitz)
85. “Bases of primitive permutation groups”, in *Groups, Combinatorics and Geometry: Durham, 2001*, World Scientific, 2003 (with A. Shalev)
86. “Residual properties of the modular group and other free products”, *J. Algebra* **268** (2003), 264-285 (with A. Shalev)
87. “Residual properties of free products of finite groups”, *J. Algebra* **268** (2003), 286-289 (with A. Shalev)
88. “The number of homomorphisms from a finite group to a general linear group”, *Communications in Algebra* **32** (2004), 657-661 (with A. Shalev)
89. “Fuchsian groups, coverings of Riemann surfaces, subgroup growth, random quotients and random walks”, *J. Algebra* **276** (2004), 552-601 (with A. Shalev)
90. “Subgroups of exceptional algebraic groups which are irreducible on an adjoint or minimal module”, *J. Group Theory* **7** (2004), no. 3, 347-372 (with G.M. Seitz)
91. “Irreducible subgroups of algebraic groups”, *Quarterly J. Math* **55** (2004), 47-55 (with D.M. Testerman)
92. “Character degrees and random walks in finite groups of Lie type”, *Proc. London Math. Soc.* **90** (2005), 61-86 (with A. Shalev)
93. “Fuchsian groups, finite simple groups and representation varieties”, *Invent. Math.* **159** (2005), 317-367 (with A. Shalev)
94. “Maximal subgroups of large rank in exceptional groups of Lie type”, *J. London Math. Soc.* **71** (2005), 345–361 (with G. Seitz)
95. “On conjugacy classes of maximal subgroups of finite simple groups, and a related zeta function”, *Duke Math. J.* **128** (2005), 541–557 (with B. Martin and A. Shalev)
96. Three articles: “The insolubility of the quintic”; “The classification of finite simple groups”; “Permutation groups”, in the *Princeton Companion to Mathematics* (ed. W.T. Gowers), Princeton University Press, 2008.
97. “On a conjecture of G.E. Wall”, *J. Algebra* **317** (2007), 184–197 (with L. Pyber and A. Shalev)
98. “Finding the characteristic of a group of Lie type”, *J. London Math. Soc.* **75** (2007), 741–754 (with E. O’Brien)
99. “The sparsity of dimensions of irreducible representations of finite simple groups”, *Bull. London Math. Soc.* **39** (2007), 467–472 (with A. Shalev)

- 100. “Short Two-Variable Identities for Finite Groups”, *J. Group Theory* **11** (2008), 675–690 (with D. Cargo, W. de Launey and R. Stafford)
- 101. “Base sizes for simple groups and a conjecture of Cameron”, *Proc. London Math. Soc.* **98** (2009), 116–162 (with T. Burness and A. Shalev)
- 102. “Primitive permutation groups of bounded orbital diameter”, *Proc. London Math. Soc.* **100** (2010), 216–248 (with H.D. Macpherson and K. Tent)
- 103. “The Ore Conjecture”, *J. European Math. Soc.*, **12** (2010), 939–1008 (with E. O’Brien, A. Shalev, P. Tiep)
- 104. “A conjecture on product decompositions in simple groups”, *Groups, Geometry and Dynamics* **4** (2010), 799–812 (with N. Nikolov and A. Shalev)
- 105. “Groups of Lie type as products of SL_2 subgroups”, *J. Algebra* **326** (2011), 201–207 (with N. Nikolov and A. Shalev)
- 106. “A rigid triple of conjugacy classes in G_2 ”, *J. Group Theory* **14** (2011), 31–36 (with A. Litterick and C. Marion)
- 107. “Products of squares in finite simple groups”, *Proc. Amer. Math. Soc.* **140** (2012), 21–33 (with E. O’Brien, A. Shalev, P. Tiep)
- 108. “Fixed points of elements of linear groups”, *Bulletin London Math. Soc.*, to appear (with A. Shalev)
- 109. “Commutators in finite quasisimple groups”, *Bull. London Math. Soc.*, to appear (with E. O’Brien, A. Shalev, P. Tiep)
- 110. “The density of representation degrees”, *J. European Math. Soc.*, to appear (with D. Segal and A. Shalev)
- 111. “Product decompositions in finite simple groups”, *Bulletin London Math. Soc.*, to appear (with N. Nikolov and A. Shalev)
- 112. “The classification of almost simple $\frac{3}{2}$ -transitive groups”, *Trans. Amer. Math. Soc.*, to appear (with J. Bamberg, M. Giudici, C. Praeger and J. Saxl)

Memoirs

- 113. “The maximal factorizations of the finite simple groups and their automorphism groups”, *Memoirs Amer. Math. Soc.* **86** (1990), pp.1-151 (with C. Praeger and J. Saxl)
- 114. “Reductive subgroups of exceptional algebraic groups”, *Memoirs Amer. Math. Soc.* **121** (1996), No. 580, pp.1-111 (with G. Seitz)

- 115. “The maximal subgroups of positive dimension in exceptional algebraic groups”, *Memoirs Amer. Math. Soc.* **169** (2004), no. 802, pp.1-227 (with G.M. Seitz)
- 116. “Regular subgroups of primitive permutation groups”, *Memoirs Amer. Math. Soc.* **203** (2010), pp. 1-88. (with C. Praeger and J. Saxl)

Books

- 117. *The subgroup structure of the finite classical groups*, London Math. Soc. Lecture Note Series No. 129, Cambridge Univ. Press, 1990, 303pp. (with P. Kleidman)
- 118. *Groups, geometry and combinatorics*, London Math. Soc. Lecture Note Series No. 169, Cambridge Univ. Press, 1992, 540pp. (editor, with J. Saxl)
- 119. *Representations and characters of groups*, Cambridge Univ. Press, 1993, 419pp. (with G. James); Second Edition, 2001
- 120. *A concise introduction to Pure Mathematics*, Chapman and Hall/CRC Press, 2000; Second Edition, 2005; Third Edition, 2010
- 121. *Groups, Combinatorics and Geometry: Durham, 2001*, World Scientific, 2003 (editor, with A. Ivanov and J. Saxl)
- 122. *Unipotent and nilpotent classes in simple algebraic groups and Lie algebras*, to appear in Math. Surveys and Monographs Series, American Math. Soc., 2012 (with G.M. Seitz)

Lecture Notes

- 123. *Some aspects of the representation theory of finite groups of Lie type*, Lecture Notes, Math. Institute, Oxford 1978 (notes based on lectures by R. Carter)

Theses

- 124. *Primitive permutation groups: a problem of Wielandt*, Oxford M.Sc. Thesis, 1977
- 125. *Finite permutation groups*, Oxford D. Phil. Thesis, 1979