



## **Professor Emeritus M. J. Sewell**

See:

<http://www.cl.cam.ac.uk/users/pes20/MJSewell/mjs.html>

<http://worldcat.org/identities/lccn-n80-132480>

<http://www.barnesandnoble.com/c/michael-j.-sewell>

Emeritus professor of applied mechanics  
University of Reading, UK

### **Main Research Interests:**

- Mechanics of elastic and plastic solids and structures
- Mechanics of fluids and continuum mechanics
- Meteorology
- Variational and extremum principles - duality
- Catastrophe and singularity theory - bifurcation theory

### **Other Interests:**

Mathematics masterclasses for young people. Local Organiser of Royal Institution Masterclasses for 13-year-olds in Berkshire (1991-2000), and for 8 to 10-year-olds in West Berkshire, and in Windsor and Maidenhead (1999-2011).

Playing member of Reading University Academic Staff Cricket Club, 1967 to 2002, and Captain from 1978 to 1981. Here are my descriptions of 17 Cricket Grounds visited by RUASCC.

Biographies of mathematics teachers (2006/7 below).

Family history (2002/6/7 below).

**Appointments:**

- 1960-1962 Assistant Lecturer in Mathematics, University of Nottingham
- 1962-1963 Lecturer in Mathematics, University of Nottingham
- 1963-1966 Research Associate in Theoretical Mechanics, University of Bristol
- 1966-1977 Reader in Applied Mathematics, University of Reading
- 1970-1971 Visiting Professor, Mathematics Research Center, University of Wisconsin (also summer 1982, 1983, 1984)
- 1976 Visiting Professor, Ecole Polytechnique, Paris (also University of Waterloo, Canada and University of Mexico)
- 1977-1999 Personal Professor of Applied Mathematics, University of Reading
- 1999-date Emeritus Professor of Applied Mathematics, University of Reading
- 2010 Associate Tutor, Faculty of Engineering and Physical Sciences, University of Surrey

**List of Publications:**

1960

- A General Theory of Inelastic Column Failure, Ph.D. Thesis, University of Nottingham.
- A General Theory of Inelastic Column Failure, Part I, (with R. Hill), *J. Mech. Phys. Solids* 8, 105 - 111, also published in Russian in *Mechanika* 6, 129 - 136, 1961.
- A General Theory of Inelastic Column Failure, Part II, (with R. Hill), *J. Mech. Phys. Solids* 8, 112 -118, also published in Russian in *Mechanika* 6, 137 - 144, 1961.

1962

- A General Theory of Inelastic Column Failure, Part III, (with R. Hill), *J. Mech. Phys. Solids* 10, 285 - 300.

1963

- On Reciprocal Variational Principles for Perfect Fluids, *J. Math. Mech.* 12, 495 - 504.
- A General Theory of Elastic and Inelastic Plate Failure, Part I, *J. Mech. Phys. Solids* 11, 377 - 393.

1964

- A General Theory of Elastic and Inelastic Plate Failure, Part II, *J. Mech. Phys. Solids* 12, 279 - 297.
- Inverse Rigid/Plastic Constitutive Equations, *Int. J. Engng. Sci.* 2, 317 - 325.

1965

- On the Calculation of Potential Functions defined on Curved Boundaries, *Proc. Roy. Soc. Lond.* A286, 402 - 411.
- The Static Perturbation Technique in Buckling Problems, *J. Mech. Phys. Solids* 13, 247 - 265.

1966

- On the Connexion between Stability and the Shape of the Equilibrium Surface, *J. Mech. Phys. Solids* 14, 203 - 230.

1967

- On Configuration-Dependent Loading, *Arch. Ratl. Mech. Anal.* 23, 327 - 351.

1968

A General Theory of Equilibrium Paths through Critical Points, Part I, Proc. Roy. Soc. Lond. A306, 201 - 223.

A General Theory of Equilibrium Paths through Critical Points, Part II, Proc. Roy. Soc. Lond. A306, 225 - 238.

1969

A Method of Post-Buckling Analysis, J. Mech. Phys. Solids 17, 219 - 233.

On Dual Approximation Principles and Optimization in Continuum Mechanics, Phil. Trans. Roy. Soc. Lond. A265, 319 - 351.

1970

On the Branching of Equilibrium Paths, Proc. Roy. Soc. Lond. A315, 499 - 518.

1972

On Dual Extremum Principles in Applied Mathematics, (with B. Noble), J. Inst. Maths. Applics. 9, 123 - 193.

A Survey of Plastic Buckling, pp. 85 - 197 of Stability, edited by H. Leipholz, Waterloo University Press.

1973

A Yield Surface Corner Lowers the Buckling Stress of an Elastic-Plastic Plate under Compression, J. Mech. Phys. Solids 21, 19 - 45.

The Governing Equations and Extremum Principles of Elasticity and Plasticity generated from a Single Functional, Part I, J. Struct. Mech. 2(1), 1 - 32.

The Governing Equations and Extremum Principles of Elasticity and Plasticity generated from a Single Functional, Part II, J. Struct. Mech. 2(2), 135 - 158.

1974

On Applications of Saddle-Shaped and Convex Generating Functionals, pp. 219 - 245 of Physical Structure in Systems Theory, edited by J.J. van Dixhoorn and F.J. Evans, Academic Press.

A Plastic Flow Rule at a Yield Corner, pp. 95 - 97 of Buckling of Structures, edited by B. Budiansky, Springer-Verlag.

A Plastic Flow Rule at a Yield Vertex, J. Mech. Phys. Solids 22, 469 - 490.

1975

Elastic and Plastic Bifurcation Theory, Lectures to the Seminar on the Plasticity Theory and its Application in Techniques, University of Nis, Yugoslavia.

Kitchen Catastrophe, Mathl. Gaz. 59, 246 - 249.

1976

Some Mechanical Examples of Catastrophe Theory, Bull. Inst. Maths. Applics. 12, 163 - 172, also published in Polish in Mechanika Teoretyczna i Stosowana 3, 15, 315 - 334.

1977

On Legendre Transformations and Elementary Catastrophes, Math. Proc. Camb. Phil. Soc. 82, 147 - 163.

Degenerate Duality, Catastrophes and Saddle Functionals, Lectures to the Summer School on Duality and Complementarity in the Mechanics of Solids, Polish Academy of Sciences, Warsaw, published in Mechanics

Today 6, 41 - 91, 1981, and also in Dualność w zagadnieniach mechaniki ciał odkształcalnych, Ossolineum, 1979.

Elementary Catastrophe Theory, pp. 391 - 426 of Problem Analysis in Science and Engineering, edited by F.H. Branin, Jr. and K. Huseyin, Academic Press, London.

1978

A Pure Catastrophe Machine, Bull. Inst. Maths. Applics. 14, 212 - 214.

On Legendre Transformations and Umbilic Catastrophes, Math. Proc. Camb. Phil. Soc. 83, 273 - 288.

Some Global Equilibrium Surfaces, Int. J. Mech. Engng. Educ. 6, 163 - 174.

General Estimates for Linear Functionals in Nonlinear Problems, (with B. Noble), Proc Roy. Soc. Lond. A361, 293 - 324.

Dual Extremum Principles for Non-negative Unsymmetric Operators, (with I. Herrera), J. Inst. Maths. Applics. 21, 95 - 115.

1980

Complementary Energy and Catastrophes, pp. 163 - 168 of Variational Methods in the Mechanics of Solids, edited by S. Nemat-Nasser, Pergamon Press, Oxford.

Constitutive Surfaces in Fluid Mechanics, (with D. Porter), Math. Proc. Camb. Phil. Soc. 88, 517 - 546.

1981

Singularities and Equilibrium Surfaces, Bull. Inst. Maths. Applics. 17, 190 - 192.

1982

Book: Mechanics of Solids. The Rodney Hill 60th Anniversary Volume, (edited with H.G.Hopkins), xxiv + 693 pp., Pergamon Press, Oxford.

Rodney Hill : Biographical Note, (with Geoffrey Hopkins), pp. ix - xiv of the above book.

Legendre Transformations and Extremum Principles, pp. 563 - 605 of the above book.

1983

Mechanical Demonstrations of Buckling and Branching, Bull. Inst. Maths. Applics. 19, 61 - 66.

1985

Properties of a Streamline in Gas Flow, Physics in Technology 16, 127 - 133.

1987

Book: Maximum and Minimum Principles. A Unified Approach, with Applications, xvi + 468 pp., Cambridge University Press. Reprinted 1990 and 2007.

Mathematical Modelling of the Quench Region in the Continuous Casting of Bimetallic Strip. Preliminary Assessment, (with H.J. Sewell), Math. Engng. Ind. 1, 289 - 312.

Temperature distribution in the quench region in continuous casting of bimetallic strip, (with H.J. Sewell), pp. 313 - 314 of Solidification Processing 1987, Proceedings of the Third International Conference, published by Sheffield University and The Institute of Metals.

1988

The Parabolic Umbilic and Atmospheric Fronts, (with S. Chynoweth and D. Porter), Proc. Roy. Soc. Lond. A419, 337 - 362.

1989

Dual Variables in Semigeostrophic Theory, (with S. Chynoweth), Proc. Roy. Soc. Lond. A424, 155 -186.

1990

Demonstrations of Buckling by Bifurcation and Snapping, pp. 315 - 345 of Elasticity: Mathematical Methods and Applications. The Ian Sneddon 70th Birthday Volume, edited by G. Eason and R.W. Ogden, Ellis Horwood Ltd.

Mesh Duality and Legendre Duality, (with S. Chynoweth), Proc. Roy. Soc. Lond. A428, 351 - 377.

Branching and Snapping in Mechanics, a Mathematics Masterclass, xiv + 34 pp.

1991

A Concise Derivation of the Semi-Geostrophic Equations, (with S. Chynoweth), Q. Jl. Roy. Met. Soc. 117, 1109 - 1128.

1992

A New Approach to Shallow Flow over an Obstacle. I General Theory, (with A.S. Broad and D. Porter), U.K. Meteorological Office Short Range Forecasting Division Scientific Paper No. 11, 54 pp.

A New Approach to Shallow Flow over an Obstacle. II Plane Flow over a Monotonic Mountain, (with A.S. Broad and D. Porter), U.K. Meteorological Office Short Range Forecasting Division Scientific Paper No. 12, 58 pp. Published in revised form in 1997, see below.

1993

Anatomy of the Canonical Transformation, (with I. Roulstone), Phil. Trans. Roy. Soc. Lond. A345, 577 - 598.

Structure of the Canonical Transformation, (with I. Roulstone), pp. 337 - 341 of Geometrical Methods in Fluid Dynamics, edited by R. Salmon and B. Ewing-Deremer, Woods Hole Oceanog. Inst. Tech. Rept., WHOI-94-12.

Mathematics Masterclasses for Young People - Objectives and Scope, Bull. Inst. Maths. Applics. 29, 34 - 41.

1994

Families of Lift and Contact Transformations, (with I. Roulstone), Proc. Roy. Soc Lond. A447, 493 - 512.

Shallow Flow over General Topography with Applications to Monotonic Mountains, (with A.S. Broad and D. Porter), pp. 133 - 138 of Proceedings of the Fourth IMA Conference on Stably Stratified Flows, edited by I. Castro and N. Rockliff, Oxford University Press.

1996

Potential Vorticities in Semigeostrophic Theory, (with I. Roulstone), Q. Jl. Roy. Met. Soc. 122, 983 - 992.

1997

Book: Mathematics Masterclasses - Stretching the Imagination, (edited), pp. xiii + 233, Oxford University Press. Reprinted 2000.

Balloons and Bubbles, pp. 124 - 148 of the above book.

Dynamics of Dinosaurs, pp. 149 - 175 of the above book.

The Mathematical Structure of Theories of Semigeostrophic Type, (with I. Roulstone), Phil. Trans. Roy. Soc. Lond. A355. 2489 - 2517.

New Shallow Flows over an Obstacle, (with A.S. Broad and D. Porter), Q. Jl. Mech. Appl. Math. 50, 625 - 653.

Some Applications of Transformation Theory in Mechanics, U.K. Meteorological Office Forecasting Research Division Scientific Paper No. 49, 101 pp. Published in revised form in 2002 - see below.

2000

Organisation of Mathematics Masterclasses, Mathematics Today 36, 173 - 178.

2001

Mathematics Masterclasses and their Organisation. Invited lecture to the annual conference of Heads of Departments of Mathematical Sciences in universities (HODOMS), University of Birmingham. Published in The Mathematical Gazette, July 2003 - see below.

A Play on Graphs. Invited contribution to a Summer School for Gifted and Talented Children, Bisham Primary School, Windsor and Maidenhead Education Department.

2002

Some Applications of Transformation Theory in Mechanics, pp. 143 - 223 (Chapter 5) of Large-Scale Atmosphere-Ocean Dynamics, Volume II, Geometric Methods and Models, edited by J.Norbury and I.Roulstone, Cambridge University Press.

Review of Elastoplasticity Theory by V.A.Lubarda, CRC Press, 2002, in SIAM Review 44, No. 4, 741 - 742. Jacqueline's Gems. 23 pp. Privately printed.

2003

Mathematics Masterclasses and their Organization, The Mathematical Gazette, 87, 267 - 276.

Mathematics Masterclasses, Speech to the Meteorological Club, 12th February.

Roots - a Masterclass for 8-year-olds.

2005

Generalized Semi-Geostrophic Theory on a Sphere, (with M. J. P. Cullen, R. J. Douglas and I. Roulstone), J. Fluid Mech., 531, 123-157.

Vector and Tensor Theorems on Curved Surfaces, Mathematics and Mechanics of Solids, 10, 415 - 426.

A Rugby Riddle, Mathematics Today, 41, 126 - 128.

The Rugby Riddle Revisited. Letter in Mathematics Today, 41, 196.

2006

Tribute to Sir Harry Pitt F.R.S. 1914 - 2005, Mathematics Today, 42, 10-13.

Topics in Theoretical Mechanics, Lectures at the University of Surrey.

Mathematics in the Garden, Mathematics Today, 42, 215 - 216.

Daniel's Diary 2005. 24 pp. Privately printed.

2007

A Biography of Harry Marks, The Old Granthamian 30, 19 - 22.

A Sewell Family History 1807 - 2007. 144 pp. Privately printed.

Ben Sewell - Furniture Maker. 86pp. Privately printed.

The Joiner's Tale. 43pp. Privately printed.

Diary of an Apprentice. 21pp. Privately printed.

2009

Straight Sequences in a Spiralling Grid of Numbers. Mathematics in School 38 No. 2 (March), 15 - 17.

Grantham Cricket 1850 - 1950. 15 pp.

Mathematics for Ten-Year-Olds. 122 pp. Privately printed.

A Life at The King's School, pp. 221-230 of Memories of The King's School Grantham (293 pp.), written and edited by Ruth Crook. The book is obtainable from The King's School.

American Odyssey. 54pp. Privately printed.

2010

RUASCC in the Meadows and in the Press. 34pp. Privately printed.

Pythagoras and the Fleet Air Arm, Royal Institution Mathematics Masterclasses Autumn Newsletter, pp. 3 - 4.

Surrey Mathematics Lectures 2010, 53 pp.

2011

A Conversation with John Phillips, 2pp.

Mathematics Masterclasses for Ten-Year-Olds (in preparation).