

CURRICULUM VITA (RÉSUMÉ)

of

Dr. Robert P. Bauman

Summary Page:

Present Position:

Professor of Physics Emeritus
University of Alabama at Birmingham
Birmingham, Alabama 35294

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Birmingham, Alabama 35213
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Education:

B.S., Chemistry and Physics, Purdue University, 1949.
M.S., Physical Chemistry, Purdue University, 1951.
Ph.D., Physics, University of Pittsburgh, 1954.

Principal Publications:

"The Absorption of Infrared Radiation", in *Advanced Analytical Chemistry*, Meites and Thomas, McGraw-Hill, New York, 1958.

Absorption Spectroscopy, John Wiley & Sons, Inc., New York, 1962.

An Introduction to Equilibrium Thermodynamics, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1966; translations into Japanese and Portuguese.

A First Course in Physical Science, John Wiley & Sons, Inc., New York, 1987.

Modern Thermodynamics with Statistical Mechanics, Macmillan Publishing Co., New York, 1992.

Papers in *Journal of Chemical Physics*, *Physical Review*, *American Journal of Physics*, *Journal of Chemical Education*, *The Physics Teacher*, and others.

National Offices:

Coblentz Society, Board of Managers, 1971-74; President, 1972-74.

American Association of Physics Teachers: Chairman, Section Representatives, 1979-81; President, 1983-84.

American Institute of Physics, Governing Board, 1981-85.

Award:

Gardner Award, 1984, Alabama Academy of Science, "for outstanding achievement in science during residence in Alabama". (Annual award to an individual, first given in 1984.)

Research Interests:

Molecular Physics: Infrared and Raman spectroscopy; valence theory; computer modeling of electric discharges.

Teaching-Learning Theory: Teaching for cognitive development; science museums as educational centers.

Applications of physics to accident reconstruction.

Listings:

Who's Who in America; *Who's Who in the South and Southwest*; *Who's Who in the World*; *American Men and Women of Science*.

Born: Jackson, Michigan, May 8, 1928

Married: 1949: Edith Gerkin Bauman

Children: Katherine B. Griffis, David G. Bauman, Jeffrey A. Bauman, Alice B. Morris.

Employment:

Purdue University, Teaching Assistant, 1949-50; Research Assistant, 1950-51.

Mellon Institute of Industrial Research (now Carnegie-Mellon Univ.),

Research Assistant, Dept. of Chemical Physics, 1951-54.

Polytechnic Institute of Brooklyn (now Polytechnic University), Dept. of Chemistry,

Instructor, 1954-56; Assistant Professor, 1956-62; Associate Professor, 1962-67.

Bethpage High School, APP Chemistry instructor, 1963-4.

Bell Telephone Laboratories, Murray Hill, N.J., Member Technical Staff, summer, 1966.

University of Alabama at Birmingham, Dept. of Physics, Professor, 1967-92; chairman,

1967-73; Director, Project on Teaching and Learning in University College, 1975-78.

Professor Emeritus, 1992- .

Visiting Scientist Fellow, Joint Institute for Laboratory Astrophysics, University of Colorado, 1980-81.

Professional Society Activities:

Spectroscopy Society of Pittsburgh, Secretary, 1953.

Alabama Academy of Science, Vice-Chairman, 1968-69; Vice-President, 1969-70.

Alabama Junior Academy of Science, Associate Counselor, 1970-73.

Coblentz Society, Board of Managers, 1971-74; President, 1972-74.

American Association of Physics Teachers:

Member Council, 1972-85, 1987-96; Executive Board, 1979-85.

Member Editorial Board, The Physics Teacher, 1972-75.

Chairman, Section Representatives, 1979-81.

President, 1983-4.

Alabama Section: Organized Section, 1972; Vice-President, 1972-73, 1977-78;

President, 1973-74, 1978-79, 1987-88;

Section Representative, 1972-81, 1987-96.

American Institute of Physics: Governing Board, 1981-5;

Committee on Public Education and Information, 1981-4;

Nominating Committee, 1982-3, Chairman 1983;

Committee on Educational Policy, Chairman, 1984-5.

Optical Society of America

American Chemical Society

American Physical Society

Elected to:

Sigma Xi (science)

Phi Lambda Upsilon (chemistry)

Phi Delta Kappa (education)

Sigma Delta Chi (journalism)

Other Civic and Professional Activities:

Board of Education, Bethpage, N.Y., 1965-67; President, 1965-66.
Comprehensive Community Mental Health Advisory Board (UAB), 1972-1978; Chairman,
1972-3.
Red Mountain Museum: Board of Directors RMM Society, 1976-95;
President, 1988-95; Museum Board, 1984-95, Chairman, 1988-95.
Sloss Furnace Association, Member Board of Directors, 1976-80.
Consultant to The Discovery Place (Children's Museum).
Birmingham Concert Chorale, President, 1974-76; Chairman of Board,
1979-80.
Birmingham Science Center Board: Vice-Chairman Interim Bd., 1989.
Discover 2000 Science Center/McWane Center: Member Board of Trustees, 1990-97
Staff Consultant, 1997-98.

Consulting Activities:

Publishers: Wiley, McGraw-Hill, Worth, Merriam-Webster, Freeman, Harper & Row,
Saunders, others.
Industrial: Polytechnic Research and Development; Instruments and Communications, Inc.;
Intersea; others.
Academic: Southern Regional Education Board; Educational Development Project, Southern
Association of Colleges and Schools; Alabama Consortium for the Development of
Higher Education; Birmingham City Schools; Jefferson County Schools; others.
National Science Foundation
Legal: Expert witness in State and Federal cases, involving accident reconstruction (vehicles,
industrial accidents and fire, slip and fall, other).

Grants and Contracts:

Research Corporation
Air Materiel Command (U.S.A.F.)
National Institutes of Health
National Science Foundation
Exxon Foundation
Office of Education (co-author)

PUBLICATIONS

W.C. Hunt and R.P. Bauman, "Measuring Yellowing and Darkening in Weathered Plastics", *Modern Plastics* **32**, 156-158, 244 (October, 1954).

F.A. Miller and R.P. Bauman, "Vibrational Spectrum of Hexafluoro- 2-Butyne", *J. Chem. Phys.* **22**, 1544-1548 (1954).

R.P. Bauman, "Selection Rules for a Freely Rotating Ethane-Type Molecule", *J. Chem. Phys.* **24**, 13-15 (1956).

R.P. Bauman, Cons. Ed., "Biological Applications of Infrared Spectroscopy", *Ann. N. Y. Acad. Sci.*, **69**, 1-254 (1957).

R.P. Bauman, "The Absorption of Infrared Radiation", Chapter 9 in Meites and Thomas, *Advanced Analytical Chemistry*, McGraw-Hill, New York, 1958.

R.P. Bauman "A Least Squares Method for Multicomponent Analyses", *Applied Spectroscopy* **13**, 156-157 (1959).

G. Mandel, R.P. Bauman, and E. Banks, "Electronic Transitions of Rare Earth Ions in the Infrared Region", *J. Chem. Phys.* **33**, 192-193 (1960).

S. Abramowitz and R.P. Bauman, "The Solution Spectrum of CF₄", *Spectrochimica Acta* **11**, 125-126 (1961).

R.P. Bauman and J.P. Considine, "Derivation of Interelectronic Screening Parameters from Statistical Considerations", *J. Chem. Phys.* **34**, 1388-1391 (1961).

R.P. Bauman, *Absorption Spectroscopy*, John Wiley & Sons, Inc., New York, 1962.

R.P. Bauman and E. Thomson, "Solvent Effects on Carbonyl Bands in Infrared Spectra", *J. Opt. Soc. Am.* **53**, 202-203 (1963).

J.P. Considine and R.P. Bauman, "Screening Parameters for Two-, Three-, and Four-Electron Systems", *J. Chem. Phys.* **38**, 1278-1281 (1963).

R.P. Bauman, Review of *Advances in Spectroscopy*, Vol. II, H.W. Thompson, ed., Interscience, New York, 1961, in *J. Polymer Sci. A* **1**, 1087-1088 (1963).

R.P. Bauman and S. Abramowitz, "Crystal Chopper for the Perkin-Elmer Double-Pass Monochromator", *Rev. Sci. Inst.* **34**, 1153-1154 (1963).

S. Abramowitz and R.P. Bauman, "Measurement of Infrared Band Contours in Solution", *J. Chem. Phys.* **39**, 2757-2767 (1963).

- R.P. Bauman, "Work of Compressing an Ideal Gas", *J. Chem. Ed.* **41**, 102-104, 674-677 (1964).
- R.P. Bauman, Review of *Molecular Vib-Rotors: The Theory and Interpretation of High Resolution Infrared Spectra*, by Harry C. Allen, Jr., and Paul C. Cross, John Wiley & Sons, Inc., New York, 1963, in *J. Chem. Ed.* **41**, 408-A530 (1964). Also reviewed in *Applied Spectroscopy* **18**, 95 (1964).
- R.P. Bauman, "Can Matter Be Converted to Energy?", *J. Chem. Ed.*, **43**, 366-367 (1966).
- R.P. Bauman and B.J. Bulkin, "Spectra and Structure of Perfluoro Cyclobutane", *J. Chem. Phys.* **45**, 496-498 (1966).
- N.C. Peterson, R.P. Bauman, and I.W. Price, "Digital Recording of Spectra. Conversion of Perkin-Elmer Model 521 Infrared Spectrometer", *Rev. Sci. Inst.* **37**, 1316-1317 (1966).
- R.P. Bauman, *An Introduction to Equilibrium Thermodynamics*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1966.
- R.P. Bauman and S.P.S. Porto, "Lattice Vibrations and Structure of Rare-Earth Fluorides", *Phys. Rev.* **161**, 842-847 (1967).
- R.P. Bauman, *An Introduction to Equilibrium Thermodynamics* (in Japanese), trans. by K. Ogino and K. Jubo, Tokyo Kagaku Dozin KK, Tokyo, Japan 1968.
- J.P. Hurrell, S.P.S. Porto, I.F. Chang, S.S. Mitra, and R.P. Bauman, "Optical Phonons of Yttrium Aluminum Garnet", *Phys. Rev.* **173**, 851-856 (1968).
- M. DiDomenico, Jr., S.H. Wemple, S.P.S. Porto, and R.P. Bauman, "Raman Spectrum of Single-Domain BaTiO₃", *Phys. Rev.* **174**, 522-530 (1968).
- R.P. Bauman and Howard L. Cockerham, III, "Pressure of an Ideal Gas on a Moving Piston", *Am. J. Phys.* **37**, 675-679 (1969).
- R.P. Bauman, "Visualization of the Coriolis Force", *Am. J. Phys.* **38**, 390-391 (1970).
- R.P. Bauman, "The Meaning of Conservation Laws", *Phys. Teach.* **9**, 186-189 (1971).
- R.P. Bauman "Another Way to Jump to the Conclusion", *Phys. Teach.* **10**, 364 (1972).
- R.P. Bauman, *Introducao Ao Equilibrio Termodinamico* (translation of *An Introduction to Equilibrium Thermodynamics* into Portuguese), translated by E. de Carvalho Filho and R.G. Cecchini, Edgard Blucher Ltda., Editora da Universidade de Sao Paolo, Brazil, 1972.
- R.P. Bauman, "Once Over Too Lightly", Review of *Physics*, by Gary R. Gruber, Monarch Press, N.Y. 1971, in *Phys. Teach.* **11**, 188 (1973).

- R.P. Bauman, "More on Least Action", *Phys. Teach.* **11**, 196 (1973).
- R.P. Bauman, Review of *Concepts in Physics*, by Reuben Benumof, Second Edition, Prentice-Hall, Inc. Englewood Cliffs, N.J., 1973, in *J. Coll. Sci. Teach* **2**, 59 (1973).
- R.P. Bauman, "A Preliminary Model for Effective Teaching", *Phys. Teach.* **12**, 287-291 (1974).
- R.P. Bauman, "When a Is Not g ," (Letter) *Phys. Teach.* **12**, 324 (1974).
- R.P. Bauman, "Massive Walls", (Letter) *Phys. Teach.* **13**, 196 (1975).
- R.P. Bauman, "Good Made Better", Review of *Mechanics* Volume 1, Berkeley Physics Course, Second Edition, by Kittel, Knight, Ruderman, Helmholtz, and Moyer, McGraw-Hill, N.Y. 1973, in *Phys. Teach.* **13**, 250-251 (1975).
- R.P. Bauman, "A Brave Try", Review of *Physics: A Modern Perspective*, by C. Gregory Hood, Houghton Mifflin, Boston, 1975, in *Phys. Teach.* **13**, 508-509 (1975).
- R.P. Bauman, "Applicability of Piagetian Theory To College Teaching", *J. Coll. Sci. Teach.* **6**, 94-96 (1976).
- R.P. Bauman, W.G. Findley, and P.A. Lyons, "Improving College Readiness by a Cognitive Therapy Course", *The Educational Interpreter*, **2** (1), 41-44, (December, 1976).
- R.P. Bauman and D. Moore, "More on Dancing Flames" (Letter), *Phys. Teach.* **15**, 389-448 (1977)
- R.P. Bauman, "Electrostatic Charges and Copying Machines", *Phys. Teach.* **15**, 543 (1977).
- R.P. Bauman, *The Logic of Mathematics and Science*, Birmingham, Alabama, 1977.
- R.P. Bauman, "Teaching for Cognitive Development", *Andover Review* **5**, No. 1, 83-100 (Spring, 1978).
- R.P. Bauman, T. Wdowiak, and I. Loomis, "Teaching for Cognitive Development", in *Cognitive Process Instruction at the College Level*, edited by John Lochhead and John Clement, Franklin Institute Press, Philadelphia, Pa., 1979.
- R.P. Bauman and D.R. Moore, "Classical Demonstration of Polarization", *Phys. Teach.* **18**, 214-5 (March, 1980).
- R.P. Bauman, "There are Better", Review of *Introductory College Physics*, by Atam P. Arya, Macmillan, New York, 1979, in *Phys. Teach.* **18**, 320-1 (1980).
- R.P. Bauman, "Hydraulic Models for Electrical Circuit Elements", *Phys. Teach.* **18**, 378 (1980).

- R.P. Bauman, "What is Centrifugal Force", *Phys. Teach.* **18**, 527-9 (1980).
- R.P. Bauman and Thomas J. Wdowiak, "Cosmological Models", *Phys. Teach.* **18**, 639-645 (1980).
- D.L. Rousseau, R.P. Bauman, and S.P.S. Porto, "Normal Mode Determination in Crystals", *J. Raman Spect.* **10**, 253-290 (1981).
- R.P. Bauman, "A Coriolis Paradox", *Phys. Teach.* **21**, 461 (1983).
- R.P. Bauman, "Research, anyone?", (editorial), *Phys. Teach.* **21**, 77, 113 (1983).
- R.P. Bauman, "Toward Better Terminology", (Letter), *Phys. Teach.* **21**, 70 (1983).
- R.P. Bauman, "Absorption Spectra", in *The Encyclopedia of Physics*, 3rd Edn., R. Besancon, ed., Van Nostrand Reinhold, N.Y., 1984.
- R.P. Bauman and C.E. Swartz, "Treatment of Errors and Significant Figures in Laboratory Manuals", *Phys. Teach.* **22**, 235 (1984).
- R.P. Bauman, "In My Opinion...We Can Do Better To Help Students Understand Physics", *Phys. Teach.* **23**, 377 (1985).
- R.P. Bauman, "Archimedes' Bath", *Phys. Teach.* **25**, 162 (1987).
- R.P. Bauman, *A First Course in Physical Science*, Wiley, New York, 1987.
- R.P. Bauman, *Instructor's Manual for A First Course in Physical Science*, Wiley, New York, 1987.
- R.P. Bauman, "Fly Physics" (Letter), *Phys. Teach.* **26**, 328-9, (Sept., 1988).
- R.P. Bauman and Saleh Adams, "Misunderstandings of Electric Current", *Phys. Teach.* **28**, 334 (May, 1990).
- R.P. Bauman, *Modern Thermodynamics with Statistical Mechanics*, Macmillan Publishing Co., New York, 1992.
- R.P. Bauman, "Physics that Textbook Writers Usually Get Wrong", *Phys. Teach.* "I. Work", **30**, 264-269, "II. Heat and Energy", **30**, 353-356, "III. Forces and Vectors", **30**, 402-407 (May, Sept., Oct., 1992).
- R.P. Bauman, "Are Arrows Vectors? and Similar Problems" (Letter), *Phys. Teach.* **31**, 390 (1993).

R.P. Bauman, "Mass and Energy: The Low-Energy Limit", *Phys. Teach.* **32**, 340-342 (September 1994).

R.P. Bauman and Rolf Schwaneberg, "Interpretation of Bernoulli's Equation", *Phys. Teach.* **32**, 478-488 (November 1994).

R.P. Bauman, "The Author Replies" (Letter), *Phys. Teach.* **33**, 325 (Sept. 1995).

R.P. Bauman, "Probability and Disorder" (Letter), *Phys. Teach.* **33**, 420 (Oct. 1995).

R.P. Bauman, "Opening Doors to Understanding", *Phys. Teach.* **34**, 56 (January, 1996): review of *The Refrigerator and the Universe*, Martin Goldstein and Inge F. Goldstein, Harvard U. Press, 1993.

R.P. Bauman, "Warped Time and Physics", *Phys. Teach.* **34**, 120 (Feb. 1996): review of *An Equation that Changed the World*, Harald Fritsch, transl. by Karin Heusch, U. of Chicago Press, 1994.

R.P. Bauman and Joseph G. Harrison, "Note on a van der Waals Gas", *Phys. Teach.* **34**, 248-249 (April, 1996).

R.P. Bauman, "More on Textbook Errors", (Letter) *Phys. Teach.* **34**, 328 (Sept. 1996).

R.P. Bauman, "Diffraction and Non-Diffraction Fringes", *Phys. Teach.* **34**, 339 (Sept., 1996).

R.P. Bauman, "Tension Headache", (Letter) *Phys. Teach.* **34**, 388 (Oct., 1996).

R.P. Bauman, "An Alternative Derivation of Bernoulli's Principle", *Am. J. Phys.*, **68**, 288-289 (March, 2000).

R.P. Bauman, "Relativity and Inertia" (Letter), *Phys. Teach.* **39**, 68 (Feb., 2001).

R.P. Bauman, "Electromotive Terminology" (Letter), *Phys. Teach.* **39**, 198 (April, 2001).

R.P. Bauman, "A Note on Integration of Scalar Products", *Phys. Teach.* **39**, 270-271 (May, 2001)

R.P. Bauman, "Wave Propagation", *Phys. Teach.* **39**, 545-551 (Dec., 2001)

In Process:

R.P. Bauman, *The Tiger and the Physicist; Insights into the Physics We Teach*.

R.P. Bauman *et al.*, *Physics in a Nutshell* (temp. title): An introductory textbook of physics.

R.P. Bauman, *Introductory Physics for Teachers of Physics*.

R.P. Bauman, *A World of Physics*.

Theses Supervised by R.P. Bauman

Gerald Mandel, "Infrared Absorption Spectra of Some Rare Earth Fluorides in Solid Solution with Cadmium Fluoride", B.S. in Chemistry, June, 1957 (with E. Banks).

William A. Roth, "Infrared and Raman Spectra of 2-Butyne", B.S. in Chemistry, June, 1961.

Bernard Bulkin, "Spectra and Structure of Perfluorocyclobutane", B.S. (Chem.), June, 1962.

Anthony A. Rapisarda, "Intramolecular Hydrogen Bonding of Some Simple Systems: An Infrared Study", M.S. (Chem.), June, 1962.

Arnold Schaffer, "Vibration-Rotation Band Contours", B.S. (Chem.), June, 1963.

Louis P. Torre, "An Infrared Study of Propanal", B.S. (Chem.), June, 1963.

James P. Considine, "The Calculation of Energies of Two-, Three-, and Four-Electron Atoms", Ph. D. (Chem.), June, 1963.

Stanley Abramowitz, "Vibrational Band Contours in Condensed Phases", Ph.D. (Chem.), June, 1963.

Mary Caldera Caulfield, "Hydrogen Bonding in Some Hydroxyanthraquinones", Ph.D. (Chem.), June, 1963.

Henry C. Lee, Jr., "Studies in Molecular Spectroscopy: Part I. Experimental Raman Spectroscopy; Part II. N-H Stretching Vibration Infrared Bands", M.S. (Chem.), June, 1964.

Marshall M. Siegel, "Contour Analysis of Carbonyl Infrared Bands in Solution", M.S. (Chem.), June, 1966.

Gerard Macri, "Spectra of Propanal and Propenol", M.S. (Chem.), June, 1966.

Peter D'Antonio, "Hydrogen Bonding in Aminoanthraquinones", Ph.D. (Chem.), June, 1967.

Seymour D. Ukeles, "Hydrogen Bonding in Primary and Secondary Amines", Ph.D. (Chem.), June, 1968.

Contributions To:

Organic Electronic Spectral Data, Interscience, New York: Volume I, 1946-1952, M.J. Kamlet, editor, 1960; Volume II, 1953-1955, H.E. Engnade, editor, 1960.

Encyclopaedic Dictionary of Physics, J. Thewlis, editor, Pergamon Press, Oxford, 1961.

Webster's Third New International Dictionary, G. & C. Merriam Co., Springfield, Mass., 1961.

The Encyclopedia of Physics, Third Ed., Robert M. Besancon, editor, Van Nostrand Reinhold Co., New York, 1985.

Macmillan Encyclopedia of Physics, John S. Rigden, editor, Macmillan, Inc., 1996.

Technical Notes and Reports:

R.P. Bauman, "Losses in Dielectrics", Technical Note RADC-TN-59-381, Contract AF30 (602)-1899, 1 December, 1959.

R.P. Bauman, "A Technique for Measuring Dielectric Loss", Technical Note RADC-TN-60-56, Contract No. AF30 (60)-1899, 1 March, 1960.

R.P. Bauman, "Intermolecular Forces in Condensed Phases", Technical Documentary Report No. ASD-TDR-63-314, Contract No. AF33 (647)-7757, August, 1963.