

May 2016

Alan J. Roche

## EDUCATION

B.A., 1969, Chemistry, Beloit College, Beloit, Wisconsin  
M.A., 1973, History of Science, University of Wisconsin-Madison  
Thesis: "Isaac Newton's Theory of Matter"  
University of Munich, West Germany, 1974-75  
Ph.D., 1975, History of Science, University of Wisconsin-Madison  
Dissertation: "Origins of the Structural Theory in Organic Chemistry"

## ACADEMIC EMPLOYMENT

### University of Wisconsin-Madison

1969-74 Teaching Assistant, Depts. of Chemistry and History of Science  
1975-78 Lecturer, Depts. of Chemistry and Integrated Liberal Studies

### Case Western Reserve University

1978-84 Assistant Professor of History of Science and Technology,  
Department of Interdisciplinary Studies  
1984-93 Associate Professor of History of Technology and Science  
1993-2016 Professor of History  
1995-2016 Henry Eldridge Bourne Professor of History  
2012- Distinguished University Professor

## AWARDS AND HONORS

Jack Youden Prize (American Society for Quality Control, Chemical Division), 1982  
Carl F. Wittke Award for Excellence in Undergraduate Teaching, 1988  
Outstanding Paper Award (American Chemical Society, History Division), 1992  
Dexter Award for Outstanding Lifetime Contributions to the History of Chemistry  
(American Chemical Society), 2000  
Fellow of the American Association for the Advancement of Science, 2000  
Liebig-Wöhler Freundschafts-Preis, Lewicki Foundation, Göttingen, 2002  
Membre correspondant, Académie Internationale d'Histoire des Sciences, 2007  
Fellow of the American Chemical Society, 2012  
Distinguished University Professor, 2012

## FELLOWSHIPS AND GRANTS

Research Assistantship, organic chemistry, 1970  
Deutscher Akademischer Austauschdienst Fellowship, 1974-75  
American Council of Learned Societies Grant-in-Aid, June 1979  
DOE/NEH Summer Workshop on Energy for High School Teachers, 1979  
DOE Summer Workshop on Energy, 1981  
DAAD Studienaufenthalt, West Germany, June and July 1984; June 1992  
Michelson Era Symposium, private and corporate sponsors, October 1987  
NEH (Science, Technology, and Humanities), May 1988 to August 1990  
Fund for Improvement of Post-Secondary Education, summer 1989

Ohio Board of Regents Research Initiation Grant, summer 1990  
American Philosophical Society summer research grant, 1992  
NSF (Science and Technology Studies), May 1995 to April 1997  
Visiting Scholar, Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, spring 1999  
Nord Grant, "Food in History," 2000  
Visiting Scholar, Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, summer 2003  
NSF (History of Science and Technology, Scholar's Award), September 2006 to July 2007

## PUBLICATIONS AND PAPERS PRESENTED

### A. Books

*From the Molecular World, A Nineteenth-Century Science Fantasy.* By Hermann Kopp. Translated, introduced, and annotated by A. J. Rocke. Heidelberg: Springer-Verlag, 2012.

Reviews: William Brock, *Royal Society of Chemistry Historical Group Newsletter*, no. 62, summer 2012, p. 24; Alan Dronsfield, *Chemistry World*, 9:8 (August 2012); [Christoph Meinel], *Mitteilungen der Fachgruppe Geschichte der Chemie der Gesellschaft Deutscher Chemiker*, no. 22 (2012), 160-61; Seymour Mauskopf, *Angewandte Chemie International Edition*, 52 (2013), 5365-67; Peter Ramberg, *Ambix*, 60 (2013), 187-89.

*Image and Reality: Kekulé, Kopp, and the Scientific Imagination.* Chicago: University of Chicago Press, 2010.

Reviews: Andrew Robinson, *Nature*, vol. 465, 6 May 2010, 36-37; Peter Ramberg, *Science*, vol. 329, 16 July 2010, pp. 280-81; Jerome Berson, *Bulletin for the History of Chemistry*, 35 (2010), 130-31; Jeremiah James, *American Scientist*, 98 (2010), 500-1; Michael Gordin, *Chemical Heritage*, 28:3 (fall 2010) (essay review), 45; William Brock, *Ambix*, 58 (2011), 282-83; Trevor Levere, *Isis*, 102 (2011), 191-92; Mary Jo Nye, *Metascience*, 20 (5 January 2011) (essay review); E. Scerri, *American Journal of Physics*, 79:2 (February 2011); R. Buntrock, *Journal of Chemical Education*, 88:4 (2011), 386; R. Buntrock, *Choice*, 48:6 (March 2011); Catherine Jackson, *Chemistry World*, 8:4 (April 2011), 56; Henning Hopf, *Angewandte Chemie International Edition*, 50 (2011), 5795-96; Stephen Weininger, *Hyle*, 17 (2011), 36-40; Jeffrey Johnson, *Annals of Science*, 71 (2014), 121-23.

*Nationalizing Science: Adolphe Wurtz and the Battle for French Chemistry.* MIT Press, 2001.

Reviews: Colin Russell, *Chemistry in Britain*, August 2001; Seymour Mauskopf, *Chemical Heritage*, 19:3 (2001), 36-38; Georges Bram, *Nature*, 412 (26 July 2001), 381-82; Hugh Cartwright, *The Chemical Educator*, 6:2 (2001), 139-40; F. L. Holmes, *American Scientist*, **89** (2001), 566-68; L. W. Fine, *Choice* (October 2001); Ana Carneiro, *British Journal for the History of Science*, **34** (2001), 476-78; M. Crosland, *Ambix*, **48** (2001), 201-2; A. Leegwater, *Bulletin for the History of Chemistry*, **27:2** (2002), 146-47; D. Knight, *Annals of Science*, **59** (2002), 440-41; J. R. Bertomeu Sanchez, *Dynamis*, **22** (2002), 591-609; J. Simon, *Metascience*, **11** (2002), 112-15; P. Knochel, *Angewandte Chemie*, 114 (2002), 4091; idem, *Angewandte Chemie, International Edition*, 41 (2002), 3918-19; P. Morris, *HIST [ACS] Newsletter* (fall 2004), p. 12; K. Hufbauer, *Isis*, **95** (2004), 514-15; D. Fauque, *Revue d'histoire des sciences*, 57 (2004), 493-508.

*Justus von Liebig und Hermann Kolbe in ihren Briefen, 1846-1873.* Mannheim: Bionomica-Verlag, 1994. Bearbeitet von A. J. Rocke and Emil Heuser.

Reviews: William Brock, *Ambix*, **42** (1995), 123-24; Christoph Meinel, *Isis*, **87** (1996), 186.

*The Quiet Revolution: Hermann Kolbe and the Science of Organic Chemistry.* Berkeley/Los Angeles: University of California Press, 1993.

Reviews: John Brooke, *Isis*, **85** (1994), 534-35; Nina Roscher, *Chemical and Engineering News*, 23 May 1994, pp. 44-45; James Altena, *Chemical Heritage*, **11:2** (summer 1994), 17; G. B. Kauffman, *Angewandte Chemie*, **106** (1994), 2317-18; idem, *Angewandte Chemie, International Edition*, **33** (1994), 1195; Jeffrey Johnson, *American*

*Historical Review*, **100** (1995), 177-78; Trevor Levere, *Annals of Science*, **52** (1995), 421-22; D. S. Tarbell, *Central European History*, **27** (1995), 528-30; Mi Gyung Kim, *Studies in the History and Philosophy of Science* (essay review), **26** (1995), 155-65; William Brock, *Ambix*, **42** (1995), 192; Martin Saltzman, *Bulletin for the History of Chemistry*, **17-18** (1995), 63-64; F. Abbri, *Nuncius*, **10** (1995), 402-5; Hans-Werner Schütt, *Berichte zur Wissenschaftsgeschichte*, **18** (1995), 186-87; Anders Lundgren, *Lychnos*, **1995**, 223-27.

*Chemical Atomism in the Nineteenth Century: From Dalton to Cannizzaro*. Columbus: Ohio State University Press, 1984.

Reviews: David Knight, *Isis*, **76** (1985), 129-30; W. H. Brock, *British Journal for the History of Science*, **18** (1985), 346-47; T. H. Levere, *American Scientist*, **73** (1985), 211; F. Abbri, *Annali dell'Istituto e Museo di Storia della Scienza di Firenze: Rivista internazionale di storia della scienza*, **10** (1985), 154-56; Evan Melhado, *Center for History of Chemistry Newsletter*, **4:1** (fall 1986), 15-17; Anders Lundgren, *Lychnos*, **1988**, 225-27.

#### B. Articles in Refereed Journals and in Books

“Extraction and GLC Detection of Pentachlorophenol and 2,3,4,6-Tetrachlorophenol in Fats, Oils, and Fatty Acids,” *Journal of the Association of Official Analytical Chemists*, **53** (1970), 673-76 (with G. R. Higginbotham and J. Ress).

“Atoms and Equivalent: The Early Development of the Chemical Atomic Theory,” *Historical Studies in the Physical Sciences*, **9** (1978), 225-63.

“Gay-Lussac and Dumas: Adherents of the Avogadro-Ampère Hypothesis?” *Isis*, **69** (1978), 595-600.

“The Reception of Chemical Atomism in Germany,” *Isis*, **70** (1979), 519-36.

“A Badger Chemist Genealogy: The Faculty at the University of Wisconsin-Madison,” *Journal of Chemical Education*, **56** (1979), 93-95 (with A. J. Ihde).

“Kekulé, Butlerov, and the Historiography of the Theory of Chemical Structure,” *British Journal for the History of Science*, **14** (1981), 27-57.

“Are Robust Estimators Really Necessary?” *Technometrics*, **24** (1982), 95-101 (with D. M. Rocke and G. W. Downs). Winner of the Jack Youden Prize as the best article (of 40) published in *Technometrics* in 1982.

“Subatomic Speculations and the Origin of Structure Theory,” *Ambix*, **30** (1983), 1-18.

“Hypothesis and Experiment in the Early Development of Kekulé’s Benzene Theory,” *Annals of Science*, **42** (1985), 355-81.

“Agricola, Paracelsus, and ‘Chymia’,” *Ambix*, **32** (1985), 38-45.

“With No Reimer Reason: A ‘Name Reaction’ With the Wrong Attribution,” *Journal of Chemical Education*, **63** (1986), 309-10 (with A. J. Ihde).

“Ontology and Convention in Nineteenth Century Organic Chemistry,” in James Traynham, ed., *Essays*

*on the History of Organic Chemistry* (Baton Rouge: LSU Press, 1987), pp. 1-20.

“Kolbe Versus the Transcendental Chemists: The Emergence of Classical Organic Chemistry,” *Ambix*, **34** (1987), 156-68.

“Kekulé’s Benzene Theory and the Appraisal of Scientific Theories,” in A. Donovan, L. Laudan, and R. Laudan, eds., *Scrutinizing Science: Empirical Studies of Scientific Change* (Boston: Kluwer, 1988), pp. 145-61; new paperback edition, Johns Hopkins University Press, 1992.

“Koerner, Dewar, and the Structure of Pyridine,” *Bulletin for the History of Chemistry*, fall 1988, pp. 4-6.

“Methodology and Its Rhetoric in Nineteenth Century Chemistry: Induction Versus Hypothesis,” in E. Garber, ed., *Beyond History of Science: Essays in Honor of Robert E. Schofield* (Bethlehem, PA: Lehigh University Press, 1990), pp. 137-55.

“‘Between Two Stools’: Kolbe, Kopp, and the History of Chemistry,” *Bulletin for the History of Chemistry*, **7** (1990), 19-24 (winner of 1992 Outstanding Paper Award, American Chemical Society, History Division).

“Berzelius’ Animal Chemistry: From Physiology to Organic Chemistry, 1805-14,” in Tore Frängsmyr and Evan Melhado, eds., *Enlightenment Science in the Romantic Era: The Chemistry of Berzelius and Its Cultural Setting* (Cambridge University Press, 1992), pp. 107-131.

“The Quiet Revolution of the 1850s: Social and Empirical Sources of Scientific Theory,” in Seymour Mauskopf, ed., *Chemical Sciences in the Modern World* (Philadelphia: University of Pennsylvania Press, 1993), pp. 87-118.

“Research Groups and Group Research in German Chemistry: Kolbe’s Marburg and Leipzig Institutes,” *Osiris*, [2] **8** (1993), 51-79.

“Pride and Prejudice in Chemistry: Chauvinism and the Pursuit of Science,” *Bulletin for the History of Chemistry*, **13-14** (1993), 29-40.

“History and Science, History of Science: Adolphe Wurtz and the Renovation of the Academic Professions in France,” *Ambix*, **41** (1994), 20-32.

“Adolphe Wurtz and the Development of Organic Chemistry in France: The Alsatian Connection,” *Bulletin de la Société Industrielle de Mulhouse*, no. 833 (1994), 29-34.

“Pride and Prejudice in Chemistry: Kolbe, Hofmann, and German Antisemitism,” in Yakov Rabkin and Ira Robinson, eds., *The Intersection of Jewish and Scientific Cultures* (Lewiston, NY: Mellen Press, Jewish Studies volume 14, 1995), pp. 127-59.

“Christian Friedrich Schönbein and the Discovery of Ozone,” in A. R. Bandy, ed., *The Chemistry of the Atmosphere: Oxidants and Oxidation in the Earth’s Atmosphere* (London: Royal Society of Chemistry,

1995), pp. 140-48.

“A Chemist to Remember,” *Chemistry in Britain*, **33**:8 (1997), 27-29.

“Les nouveaux magiciens de laboratoire,” *Les cahiers de science et vie*, no. 42 (December 1997), 26-36.

“Organische Chemie im Wandel: Der Einzug des Liebig’schen Apparates in französische Laboratorien,” *Mitteilungen der Fachgruppe Geschichte der Chemie, Gesellschaft Deutscher Chemiker* **15** (2000), pp. 98-112.

“Organic Analysis in Comparative Perspective: Liebig, Dumas, and Berzelius, 1811-1840,” in T. Levere and F. L. Holmes, eds., *Instruments and Experimentation in the History of Chemistry* (MIT Press, 2000), pp. 273-310.

“Éloge: Aaron John Ihde, 1909-2000,” *Isis*, **91** (2000), 551-53.

“Aaron Ihde and His Students,” *Bulletin for the History of Chemistry*, 26 (2001), 15-23.

“Celebrity Culture in Nineteenth-Century Parisian Chemistry,” Dexter Award Address, *Bulletin for the History of Chemistry*, 26:2 (2001), 81-91.

“Chemical Atomism and the Evolution of Chemical Theory in the Nineteenth Century,” in Ursula Klein, ed., *Tools and Modes of Representation in the Laboratory Sciences* (Boston: Kluwer, 2001; in *Boston Studies in the Philosophy of Science*, no. 222, ed. Kostas Gavroglu and Jürgen Renn), pp. 1-11.

“Bromine, Brines, and Beaches [Balard bicentennial retrospective],” *Chemistry in Britain*, **38**:3 (March, 2002), 50-51.

“Telling True Lives: Chemistry, History, and Biography,” lead chapter (Festvortrag) in *Chemie, Kultur, Geschichte: Festschrift für Hans-Werner Schütt anlässlich seines 65. Geburtstages*, ed. Burghard Weiss and Astrid Schuermann (Berlin: Diepholz, 2002), pp. 11-28.

“The Theory of Chemical Structure and its Applications,” chapter 13 in vol. 5 (*Modern Physical and Mathematical Sciences*, ed. M. J. Nye) of *The Cambridge History of Science*, ed. D. C. Lindberg and R. L. Numbers (New York: Cambridge University Press, 2003), pp. 255-71.

“La formazione e la professione del chimico,” chapter 47 of vol. 7 (*L'Ottocento*) of *Storia della scienza*, 10 vols. (2001-04), ed. Sandro Petruccioli (Rome: Istituto della Enciclopedia Italiana, 2003), pp. 512-20.

“Origins and Spread of the ‘Giessen Model’ in University Science, 1826-1876,” *Ambix*, **50** (2003), 90-115. Republished in *Berichte der Justus-Liebig-Gesellschaft*, 8 (2005), 209-35.

“Éloge: Frederic Lawrence Holmes, 1932-2003,” *Isis*, **94** (2003), 661-65 (by A. J. Rocke and John Harley Warner).

“Restaging Liebig: A Study in the Replication of Experiments,” *Annals of Science*, **62** (2005), 1-55 (by M.C. Usselman, A. J. Rocke, C. Reinhart, and K. Foulser).

“In Search of Eldorado: John Dalton and the Origins of the Atomic Theory,” *Social Research*, **72:1** (Spring 2005), 125-58.

“Material Culture and Professionalization of European Science: The Role of Liebig and German Laboratory Practice,” in I. Malaquias et al., eds., *Proceedings of the Fifth International Conference on the History of Chemistry* (Lisbon: SPQ, 2006), pp. 292-300.

“The Chemical Society of France in its Formative Years, 1857-1914: Disciplinary Identity and the Struggle for Unity,” in A. Kildebæk Nielsen and S. Štrbáňová, eds., *Creating Networks in Chemistry: The Founding and Early History of Chemical Societies in Europe* (London: Royal Society of Chemistry, 2008), pp. 92-113. Co-authored with Ulrike Fell.

“Academic Chemical Laboratories in Paris, 1823-1894,” in Marta Lourenço and Ana Carneiro, eds., *Spaces and Collections in the History of Science: The Laboratório Chimico Overture* (Lisbon: Museum of Science of the University of Lisbon, 2009), pp. 25-31.

“En busca de El Dorado: John Dalton y los orígenes de la teoría atómica,” in *El atomismo en química*, ed. Inés Pellón González (Publicaciones de la Universidad de Alicante, 2012), pp. 105-146; this is a revised and translated version of the second 2005 paper, above.

“Buckeyes, Corncrackers, and Suckers: Culinary Episodes in Ohio History,” posted 6 February 2013 on the website of the Greater Midwest Foodways Alliance, at the URL: <http://www.greatermidwestfoodways.com/index.php/page/BuckeyesAlanRocke.html>

“The Quaker Rustic as Natural Philosopher: John Dalton and His Social Context,” in Gary Patterson and Seth Rasmussen, eds., *Characters in Chemistry: A Celebration of the Humanity of Chemistry* (Washington, D.C.: American Chemical Society Symposium Series, 2013), pp. 49-59.

“What Did ‘Theory’ Mean to Nineteenth-Century Chemists?,” *Foundations of Chemistry*, **15** (2013), 145-56. Associated “Response to a Letter to the Editor,” *Foundations of Chemistry*, **16** (2014), 169-70.

“Vinegar and Oil: Materials and Representation in Organic Chemistry,” in Carsten Reinhardt and Ursula Klein, eds., *Objects of Chemical Inquiry* (Sagamore Beach MA: Science History Publications, 2014), pp. 47-60.

“Eloge: Mark Russell Finlay (1960-2013),” *Isis*, **105** (2014), 617-20.

“Es begann mit einem Tagtraum: zum 150-jährigen Jubiläum der Benzolformel,” *Angewandte Chemie*, **127:1** (2015), 46-51; “It Began with a Daydream: The 150<sup>th</sup> Anniversary of the Kekulé Benzene Structure,” *Angewandte Chemie International Edition*, **54:1** (2015), 46-50.

“The ‘Indifferent Hypothesis’ Redux: The Dilemmas of Pierre Duhem,” *Historical Studies in the*

*Natural Sciences*, 46 (2016), in press.

“Women and Chemistry in Regency England: New Light on the Marcet Circle” (with G.J. Leigh), *Ambix*, 62 (2016), in press.

53 papers

### C. Encyclopedia Articles and Miscellaneous

“George Barger” and “Walter Jacobs,” *Dictionary of Scientific Biography*, XV, 10-11 and 252-53 (New York, Scribner’s, 1978).

“The Cole Collection in the History of Chemistry,” *U. W. Library Friends Messenger*, no. 16 (Madison, 1978), pp. 1-5.

Editorial essays in the *Cleveland Plain Dealer*: 25 June 1979, 30 July 1982, and 8 October 1986.

“Kekulé’s Dreams: Separating the Fiction from the Fact,” *Chemistry in Britain*, **20** (December 1984), 1093-94 (with O. B. Ramsay). Related letter to the Editor by the same authors, *Chronicle of Higher Education*, 21 November 1984.

“Wilhelm Ostwald,” “William Henry Perkin,” “Philosopher’s Stone,” “Carl Auer von Welsbach,” and “Karl Ziegler,” *Encyclopedia Americana* (Danbury: Grolier, 1987).

“Herbert C. Brown,” “William N. Lipscomb,” “Giulio Natta,” “Georg Wittig,” and “Karl Ziegler,” in T. Wasson, ed., *Nobel Prize Winners* (New York: H. W. Wilson, 1987).

“Chemistry at Case Western Reserve University: An Academic Genealogy,” *The Legacy of Edward W. Morley: 100 Years of Chemistry at Case Western Reserve University* (Cleveland: CWRU, 1987), pp. 19-24.

“Stopping the Bomb: New Dangers, New Opportunities,” *City Reports*, 30 July 1992, p. 7.

“Waking up to the Facts,” *Chemistry in Britain*, **29** (1993), 401-2.

“Adolphe Wurtz: L’historien et le chimiste,” *Club d’histoire de la chimie: Bulletin de liaison*, **2** (1993), 20-27.

“The Chemical Goddess of Christian Friedrich Schönbein,” *Chemistry and Industry*, 7 November 1994, p. 871.

Section author for “Chemistry” and “History of Philosophy of Science” for the *American Historical Association’s Guide to Historical Literature* (New York: Oxford University Press, 1995), s.v.

“Atomic Theory,” *Macmillan Encyclopedia of Physics*, **1** (New York: Macmillan, 1996), s.v.

“A. Kekulé,” *Macmillan Encyclopedia of Chemistry*, **3** (New York: Macmillan, 1997), s.v.

“H. Kolbe,” in D. K. Buse and J. C. Doerr, eds., *Modern Germany: An Encyclopedia of History, People, and Culture, 1871-1990* (Hamden, CT: Garland), 1997, s.v.

“Frankland’s Hessian Connection,” *Newsletter of the Historical Group of the Royal Society of Chemistry*, July 1998.

“T. W. Richards,” *American National Biography*, **18** (New York: Oxford University Press, 1999), 444-45.

“The Historian at Work,” *Chemical Heritage*, **17**:2 (1999), 22.

“History of Chemistry,” “H. Kolbe,” “A. Kekulé,” “F. Wöhler,” and “S. Cannizzaro,” *Encyclopedia Britannica Online*, 2000.

“H. W. Kendall” and “J.C. Kendrew,” *World Book Encyclopedia*, “K”, pp. 258-259 (2002).

Consultant for the *Oxford Companion to the History of Modern Science* (Oxford University Press, 2003). Also authored 20 articles: alchemy, analytical chemistry, atom & molecule, atomic weight, Bunsen burner, carbohydrates & fats, chemical bond & valence, chemical equivalent, John Dalton, dyestuffs, Emil Fischer, food preservation, August Kekulé, organic chemistry, periodic table, pH, polymer, chemical radical, stereochemistry, and Robert Woodward.

“A. W. Williamson” and “A. W. Hofmann,” *Oxford Dictionary of National Biography* (Oxford University Press, 2004).

Supervising editor for Bernard Lightman, gen. ed., *The Dictionary of Nineteenth-Century British Scientists*, 4 vols. (University of Chicago Press, 2004): responsible for commissioning and editing 76 biographical articles, and writing four articles (on J. Dalton, W. Higgins, A. W. Hofmann, and M. Simpson).

“Chemistry,” *Encyclopedia Britannica Online*, posted 2008 (co-authored with Melvyn Usselman).

Consulting editor for the *New Dictionary of Scientific Biography* (New York: Charles Scribner’s Sons, 2008); available as an e-book in the Gale Virtual Reference Library under the title *Complete Dictionary of Scientific Biography*. Author of Kolbe, Wurtz, and Berzelius, and editor of many other articles.

“Du bon usage de Wikipédia,” *La jaune et la rouge: Revue mensuelle de l’association des anciens élèves et diplômés de l’École Polytechnique*, March 2010, no. 653, pp. 18-19.

“John Dalton” and “August Kekulé,” in Andrew Robinson, ed., *The Scientists: An Epic of Discovery* (London: Thames & Hudson, 2012), pp. 118-25 and 132-35.

Principal historical consultant and on-camera commentator for “Mystery of Matter,” a three-part PBS film, funded by NSF, and broadcast in 2015.



General Editor (with Peter Morris) of a 6-volume *Cultural History of Chemistry* (Bloomsbury Press, schedule for publication in 2019).

D. Book Reviews

Joe D. Burchfield, *Lord Kelvin and the Age of the Earth* (New York: Science History Publications, 1975), in *Journal of the Franklin Institute*, **303** (1977), 223-24.

Herman Skolnik and Kenneth M. Reese, eds., *A Century of Chemistry: The Role of Chemists and the American Chemical Society* (Washington, D. C.: American Chemical Society, 1976), in *Isis*, **68** (1977), 466-67.

Wyndham D. Miles, ed., *American Chemists and Chemical Engineers* (Washington, D.C.: American Chemical Society, 1976), in *Isis*, **68** (1977), 466-67.

Seymour H. Mauskopf, *Crystals and Compounds: Molecular Structure and Composition in Nineteenth-Century French Science* (Philadelphia: American Philosophical Society, 1976), in *Isis*, **68** (1977), 493-94.

Peter Borscheid, *Naturwissenschaft, Staat und Industrie in Baden (1848-1914)* (Stuttgart: Ernst Klett, 1976), in *Isis*, **70** (1979), 181-82.

Reinhard Löw, *Pflanzenchemie zwischen Lavoisier und Liebig* (Stuttgart/Munich: Donau-Verlag, 1977), in *Isis*, **70** (1979), 330-31.

Otto Krätz, *Historische chemische und physikalische Versuche: Eingebettet in den Hintergrund von drei Jahrhunderten* (Cologne: Aulis Verlag Deubner, 1979), in *Isis*, **72** (1981), 119.

Jonathan Schell, *The Fate of the Earth* (New York: Knopf, 1982), in *Plain Dealer*, April 18, 1982, p. C-32

Solly Zuckerman, *Nuclear Illusion and Reality* (New York: Viking, 1982), in *Plain Dealer*, April 18, 1982, p. C-32.

Evan M. Melhado, *Jacob Berzelius: The Emergence of His Chemical System* (Stockholm: Almqvist & Wiksell/Madison: University of Wisconsin Press, 1981), in *Bulletin of the History of Medicine*, **57** (1983), 460-61.

Otto Krätz and Claus Priesner, eds., *Liebigs Experimentalvorlesung: Vorlesungsbuch und Kekulé's Mitschrift* (Weinheim: Verlag Chemie, 1983), in *Isis*, **75** (1984), 395-96.

Mario Morselli, *Amedeo Avogadro: A Scientific Biography* (Dordrecht: D. Reidel, 1984), in *Isis*, **75** (1984), 767-68.

R. F. Bud and G. K. Roberts, *Science Versus Practice: Chemistry in Victorian Britain* (Manchester:

Manchester University Press, 1984), in *Isis*, **76** (1985), 643-44.

Heinz Cassebaum, *Carl Wilhelm Scheele* (Leipzig: Teubner Verlagsgesellschaft, 1982), in *Pharmacy in History*, **27** (1985), 177-78.

C. A. Russell, ed., *Recent Developments in the History of Chemistry* (London: Royal Society of Chemistry, 1985), in *Isis*, **77** (1986), 163-64.

William H. Brock, *From Protyle to Proton: William Prout and the Nature of Matter, 1785-1985* (Bristol: Hilger, 1985), in *Bulletin of the History of Medicine*, **60** (1986), 127.

William H. Brock, ed., *Justus von Liebig und August Wilhelm Hofmann in ihren Briefen (1841-1873)* (Weinheim: Verlag Chemie, 1984), in *Isis*, **77** (1986), 380-81.

Frederic Lawrence Holmes, *Lavoisier and the Chemistry of Life: An Exploration of Scientific Creativity* (Madison: University of Wisconsin Press, 1985), in *Bulletin of the History of Medicine*, **60** (1986), 254.

D. S. and A. T. Tarbell, *Essays on the History of Organic Chemistry in the United States, 1875-1955* (Nashville: Folio, 1986), in *British Journal for the History of Science*, **21** (1988), 130-31.

Bettina Haupt, *Deutschsprachige Chemielehrbücher (1775-1850)* (Stuttgart: Deutscher Apotheker Verlag, 1987), in *Pharmacy in History*, **30** (1988), 53.

G. Pattendon, ed., *A Centenary Tribute to Sir Robert Robinson, 1886-1975* (London: Royal Society of Chemistry, 1987), in *Ambix*, **35** (1988), 111.

Jeremy Adler, 'Eine fast magische Anziehungskraft': Goethes 'Wahlverwandtschaften' und die Chemie seiner Zeit (Munich: Beck, 1987), in *Annals of Science*, **45** (1988), 109-10.

Emil Heuser and Regina Zott, eds., *Justus von Liebig und August Wilhelm Hofmann in ihren Briefen: Nachträge, 1845-1869*; Emil Heuser, ed., *Justus von Liebig und Emil Erlenmeyer in ihren Briefen von 1861-1872* (Mannheim: Bionomica Verlag, 1988), in *Isis*, **80** (1989), 186-87.

Kathryn Olesko, ed., *Science in Germany: The Intersection of Institutional and Intellectual Issues* (Philadelphia: History of Science Society, 1989), in *Science*, **248** (4 May 1990), 614-15.

F. F. Runge, ed. H. H. Bussemas and G. Harsch, *Hauswirtschaftliche Briefe* (Weinheim: VCH Verlagsgesellschaft, 1988), in *Isis*, **81** (1990), 364.

Deutsches Museum, ed., *Wissenschaftliches Jahrbuch 1990* (Munich: Deutsches Museum, 1990), in *Bulletin for the History of Chemistry*, **10** (1991), 42.

Jeffrey Johnson, *The Kaiser's Chemists: Science and Modernization in Imperial Germany* (Chapel Hill: University of North Carolina Press, 1990), in *Isis*, **83** (1992), 339-40.

Fred Aftalion, *A History of the International Chemical Industry* (Philadelphia: University of Pennsylvania Press, 1991), in *Pharmacy in History*, **34** (1992), 175-76.

James Reardon-Anderson, *The Study of Change: Chemistry in China, 1840-1949* (New York: Cambridge University Press, 1991), in *Journal of Chemical Education*, **69** (1992), A60-A63.

Hans-Werner Schütt, *Eilhard Mitscherlich: Baumeister am Fundament der Chemie* (Munich: Oldenbourg, 1992), in *Isis*, **84** (1993), 596-97.

David Knight, *Ideas in Chemistry: A History of the Science* (New Brunswick, New Jersey: Rutgers University Press, 1992), in *Bulletin of the History of Medicine*, **67** (December 1993), 746-47.

Anthony S. Travis, *The Rainbow Makers: The Origins of the Synthetic Dyestuffs Industry in Western Europe* (Bethlehem, PA: Lehigh University Press, 1993), in *Technology and Culture*, **35** (1994), 405-7.

Marco Beretta, *The Enlightenment of Matter: The Definition of Chemistry from Agricola to Lavoisier* (Canton, MA: Science History, 1993), in *Centaurus*, **37** (1994), 272-73.

Deutsches Museum, ed., *Wissenschaftliches Jahrbuch 1992/93* (Munich: Deutsches Museum, 1993), in *Bulletin for the History of Chemistry*, **15** (1994).

Colin Russell, *Edward Frankland: Chemistry, Controversy, and Conspiracy in Victorian England* (Cambridge University Press, 1996), in *Chemistry in Britain*, **32**:12 (1996), 55.

Marika Blondel-Mégrelis, *Dire les choses: Auguste Laurent et la Méthode chimique* (Paris: Vrin, 1996), in *Annals of Science*, **54** (1997), 623-24.

Michael Shortland and Richard Yeo, eds., *Telling Lives in Science: Essays on Scientific Biography* (Cambridge University Press, 1996), in *American Historical Review*, **103** (1998), 856-57.

Lawrence M. Principe, *The Aspiring Adept: Robert Boyle and His Alchemical Quest* (Princeton University Press, 1998), in *Chemistry in Britain*, **34**:11 (1998), 67.

David Knight and Helge Kragh, eds., *The Making of the Chemist: The Social History of Chemistry in Europe, 1789-1914* (Cambridge University Press, 1998), in *Ambix*, **46** (1999), 59-60.

*The Philosopher's Tree: A Selection of Michael Faraday's Writings*, compiled with commentary by Peter Day (Bristol: IOM Publishing, 1999), in *Chemistry in Britain*, **35**:9 (1999), 69.

William Brock, *Justus von Liebig: The Chemical Gatekeeper* (Cambridge University Press, 1997), in *Journal of the History of Medicine*, **53** (1998), 427-28.

Britta Görs, *Chemischer Atomismus: Anwendung, Veränderung, Alternativen im deutschsprachigen Raum in der zweiten Hälfte des 19. Jahrhunderts* (Berlin: ERS-Verlag, 1999), in *Isis*, **91** (2000), 372-73.

Arthur Greenberg, *A Chemical History Tour: Picturing Chemistry from Alchemy to Modern Molecular Science* (New York: Wiley-Interscience, 2000), in *Bulletin for the History of Chemistry*, **25** (2000), 133-34.

Anders Lundgren and Bernadette Bensaude-Vincent, eds., *Communicating Chemistry: Textbooks and Their Audiences, 1789-1939* (Canton, MA: Science History, 2000), in *Isis*, **91** (2000), 764-65.

Ulrike Fell, *Disziplin, Profession und Nation: Die Ideologie der Chemie in Frankreich vom Zweiten Kaiserreich bis in die Zwischenkriegszeit* (Leipzig: Leipziger Universitätsverlag, 2000), in *Ambix*, **47** (2000), 202-3.

Simon Garfield, *Mauve: How One Man Invented a Colour that Changed the World* (London: Faber and Faber, 2000), in *Chemistry in Britain*, 2001.

Hans-Werner Schütt, *Auf der Suche nach dem Stein der Weisen: Die Geschichte der Alchemie* (Munich: Beck, 2000), in *Bulletin for the History of Chemistry*, 26:2 (2001), 140-41.

Sharon McGrayne, *Prometheans in the Lab: Chemistry and the Making of the Modern World* (New York: McGraw Hill, 2001), *Isis*, **49** (2002), 315-16.

Georg Schwedt, *Liebig und seine Schüler: Die neue Schule der Chemie* (Berlin: Springer, 2002), in *Angewandte Chemie International Edition*, **42** (2003), 1-2.

Joseph S. Fruton, *Methods and Styles in the Development of Chemistry* (Philadelphia: American Philosophical Society, 2002), in *Chemical Heritage*, **21**:3 (2003), 49-50.

Arthur Greenberg, *The Art of Chemistry: Myths, Medicines, and Materials* (Wiley Interscience, 2003), in *Bulletin for the History of Chemistry*, **28** (2003), p. 121.

Peter Ramberg, *Chemical Structure, Spatial Arrangement: The Early History of Stereochemistry, 1874-1914* (Aldershot: Ashgate, 2003), in *Hyle: International Journal for Philosophy of Chemistry*, **10** (2004), 53-55.

John Buckingham, *Chasing the Molecule* (Sutton Publishing, 2004), in *Nature*, **430** (15 July 2004), 295.

Maurice Crosland, *Gay-Lussac: Scientist and Bourgeois* (Cambridge University Press, new ed. 2004), in *Bulletin for the History of Chemistry*, **30**:1 (2005), 53-54.

Michael Gordin, *A Well Ordered Thing: Dmitrii Mendeleev and the Shadow of the Periodic Table* (New York: Basic Books, 2004), in *Isis*, **96** (2005), 289-91.

Robin Keen, ed. J. Büttner, *The Life and Work of Friedrich Wöhler (1800-1882)* (Nordhausen: Verlag Traugott Bautz, 2005), *Ambix*, 53 (2006), 177-78.

Jonathan Simon, *Chemistry, Pharmacy, and Revolution in France, 1777-1809* (Aldershot: Ashgate,

2005), *Bulletin for the History of Chemistry*, **31** (2006), 91.

David P. Miller, *Discovering Water: James Watt, Henry Cavendish, and the Nineteenth-Century 'Water' Controversy* (Aldershot: Ashgate, 2004), in *American Historical Review*, 111 (2006), 1250-51.

Christine Nawa and Christoph Meinel, eds., *Von der Forschung gezeichnet: Instrumente und Apparaturen in Heidelberger Laboratorien* (Regensburg, 2007), *Ambix*, 55 (2008), 179-80.

Christine Stock, *Robert Wilhelm Bunsens Korrespondenz vor dem Antritt der Heidelberger Professur (1852): Kritische Edition* (Stuttgart: Wissenschaftliche Verlagsgesellschaft, 2007), in *Bulletin for the History of Chemistry*, 33 (2008), 114-15.

Katja Schmiederer, *Das Dictionnaire de Chymie von Pierre Joseph Macquer (1718-1784)* (Stuttgart: Wissenschaftliche Verlagsgesellschaft, 2008), in *Bulletin for the History of Chemistry*, 34 (2009), 156-57.

William H. Brock, *William Crookes (1832-1919) and the Commercialization of Science* (Aldershot: Ashgate, 2008), in *Ambix*, 56 (2009), 273-74.

Colin A. Russell, *From Atoms to Molecules: Studies in the History of Chemistry from the Nineteenth Century* (Farnham: Ashgate, 2010), in *Ambix*, 58 (2011), 175-76.

Eric Scerri, *A Tale of Seven Elements* (Oxford University Press, 2013), in *Times Higher Education*, 15 August 2013, p. 44.

Andrew Robinson, ed., *Exceptional Creativity in Science and Technology* (Templeton Press, 2013), in *Los Angeles Review of Books*, 30 December 2013.

John Parascandola, *King of Poisons: A History of Arsenic* (Washington, D.C.: Potomac Books, 2012), in *Isis*, 104 (2014), 829.

Peter J. T. Morris, *The Matter Factory: A History of the Chemistry Laboratory* (London: Reaktion, 2015), in *Angewandte Chemie International Edition*, 54 (2015), 2.

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#### E. Papers Presented

“Kekulé’s Benzene Formula Reconsidered,” Midwest Junto for the History of Science, Bloomington, Indiana, 12 April 1974.

“Justus Liebig als Vorläufer für die Strukturtheorie der organischen Chemie,” University of Munich, 9 December 1974.

“Subatomic Speculations Among Early Structural Chemists,” History of Science Departmental Colloquium, Madison, Wisconsin, 29 October 1975.

“The Use of Atomic and Equivalent Weights in the Nineteenth Century,” History of Science Society Annual Meeting, Atlanta, Georgia, 29 December 1975.

“A Reassessment of Williamson’s Water Type,” Midwest Junto for the History of Science, Madison, Wisconsin, 11 April 1980.

“Nuclear Proliferation,” Ohio Energy Conference, Huron, Ohio, 25 March 1983.

“Theoretical Styles in Organic Chemistry During the Nineteenth Century,” Mardi Gras Symposium in Organic Chemistry: The History of Organic Chemistry, Louisiana State University, 5 March 1984.

“Die Geschichte der organischen Chemie im neunzehnten Jahrhundert: Einige Themen und Beziehungen,” University of Munich, 23 July 1984.

“Cannizzaro and the Second Chemical Revolution,” American Chemical Society, Divisions of History of Chemistry and Chemical Education, Symposium on John Dalton and the Rise of Chemical Atomic Theory, Philadelphia, Pennsylvania, 29 August 1984.

“Avogadro and Cannizzaro: Some New Perspectives,” Chemistry Department, University of Missouri-St. Louis, 29 October 1984.

“Aufklärer as Historians of Chemistry,” Symposium on Historiography, 1750-1850, History of Science Society annual meeting, Bloomington, Indiana, 1 November 1985.

“Kolbe Versus Kekulé on the Nature of Organic Chemistry,” Midwest Junto for the History of Science, annual meeting, Cleveland, Ohio, 7 March 1986.

“Kolbe Versus the Transcendental Chemists: The Emergence of Classical Organic Chemistry,” Symposium on the Rise of Classical Organic Chemistry, American Chemical Society semiannual meeting, New York City, 14 April 1986.

“The Rise of Classical Structure Theory in the Nineteenth Century: Epistemological and Methodological Issues in the History of Chemistry,” opening lecture, International Symposium on the Development of Chemical Theory from the Nineteenth Century to the Present, University of Palermo, Italy, 2 June 1986.

“Cannizzaro and the Second Chemical Revolution,” University of Florence, 12 June 1986.

“The Development and Reception of Kekulé’s Benzene Theory: An Empirical Test of Models of Theory Testing,” Conference on the Testing of Theories of Scientific Change, Virginia Tech, Blacksburg, Virginia, 21 October 1986

“Continuity and Creativity in Chemical Theory: A Herpetological Case Study,” Oesper Memorial Lecture, University of Cincinnati, 30 May 1987.

“Kolbe, Wurtz, and the Second Chemical Revolution,” German-American Summer Institute in History of Science, Leipzig, German Democratic Republic, 29 June 1988

“Wurtz, Kolbe, und die zweite chemische Revolution,” Sektion Chemie der Karl-Marx-Universität, Leipzig, 30 June 1988.

“Chemical Dreams and Theories in the Nineteenth Century,” University of Western Ontario, 3 March 1989.

“Chemical Dreams and Theories in the Nineteenth Century,” John Carroll University, 5 April 1989.

“Methodology and its Rhetoric in Nineteenth Century Chemistry,” Midwest Junto for History of Science, Ames, Iowa, 28 April 1989.

“Antisemitism and the Ideal of Wissenschaft: The Experience of Jewish Chemists in Nineteenth-Century Germany,” public lecture, University of Oklahoma, 6 October 1989.

“The Origins of Publish or Perish: The Rise of the Research Ethic in the German Universities,” graduate colloquium, Department of History of Science, University of Oklahoma, 7 October 1989.

“Pride and Prejudice in Chemistry: Kolbe, Hofmann, and German Antisemitism,” O. T. Benfey Festschrift session, South East Regional Meeting, American Chemical Society, Winston-Salem, NC, 10 October 1989.

“Chauvinism and the Pursuit of Science,” Kekulé Centenary, 199th American Chemical Society National Meeting, Boston, MA, 23 April 1990.

“The Quiet Revolution of the 1850s: Scientific Theory as Social Production and Empirical Practice,” Conference on Chemistry and the Modern World, sponsored by the Center for the History of Chemistry, Philadelphia, 18 May 1990.

“Antisemitism and the Ideal of Wissenschaft,” Conference on the Intersection of Jewish and Scientific Cultures, University of Montreal, 5 June 1990.

“Liebig and the Origins of Agricultural Research,” Department of Horticulture, University of Arkansas, Fayetteville, 21 November 1990.

“Some Reflections on the Practice of History and Philosophy of Science,” Ohio University, Athens, Ohio, 22 February 1991.

“The State of Chemical Knowledge in 1841,” opening address to the Historical Group at the Sesquicentennial Celebration of the Royal Society of Chemistry, London, 9 April 1991.

“The Relevance of the History of Chemistry for the Philosophy of Science,” University of Notre Dame, 14 November 1991.

“The Chemists and the Word Revisited: Textbooks and Research in Mid-Nineteenth Century Organic Chemistry,” Anglo-North American History of Science Meeting, Toronto, 27 July 1992.

“Hypotheses, Dreams and Experiments: The Origins of Kekulé’s Benzene Theory,” American Chemical Society, Columbus Section, 21 April 1993.

“Adolphe Wurtz as Historian and Chemist,” *Écrire l’Histoire d’une Science, Un Colloque International*, University of Paris, 28 May 1993.

“Rival Visions, Rival Styles: Synthetic Chemistry in France and Germany, 1845-1869,” History of Science Society annual meeting, 12 November 1993.

“Styles in History, Science, and History of Science: The Case of France in the Nineteenth Century,” graduate colloquium, Program in History of Medicine and Science, Yale University, 4 February 1994.

“Adolphe Wurtz and the Development of French Chemical Theory: The Alsatian Connection,” Colloque “La Chimie et l’Alsace, 1850-1920,” Mulhouse, 2 June 1994.

“C. F. Schönbein and the Discovery of Ozone,” BOC Priestley Conference, Bucknell University, 26 June 1994.

“Radical Types and a Quiet Revolution: Organic Chemistry in the Nineteenth Century,” graduate colloquium, University of Minnesota, 24 February 1995.

“The Chemists and the Word Revisited: Pedagogy and Research in Nineteenth-Century Europe,” graduate colloquium, Harvard University, 9 May 1995.

“Radical Types and a Quiet Revolution: Organic Chemistry in the Nineteenth Century,” New York Academy of Sciences, 27 September 1995.

“Disposal of High-Level Nuclear Wastes: Problems and Prospects,” Rotary Club of Cleveland, 5 October 1995.

“Organic Analysis in Comparative Perspective: Liebig, Dumas, and Berzelius, 1811-1840,” Dibner Institute Conference on the History of Chemistry, Cambridge, Mass., 13 April 1996.

“The Politics of Laboratory Education and the Revolution of 1848,” Fourteenth Biennial Conference on Chemical Education, Clemson, SC, 4 August 1996.

“History of Chemistry Roundtable,” organizer and participant, History of Science Society annual meeting, 9 November 1996.

“The Rise and Fall of Empires of Science in Europe,” University of Western Ontario, London, 11 March 1998.

“The Search for Superior Frenchmen: Science and the Franco-Prussian War,” American Chemical



Society semiannual meeting, Boston, 25 August 1998.

“Giessen on the Seine: French Academic Chemical Laboratories, 1830-1870,” Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, 5 May 1999.

“Organic Analysis in France, ca. 1832: Method, Style, Theory, and Place,” History of Science Society annual meeting, Pittsburgh, 5 November 1999.

“Chemical Atomism and the Evolution of Chemical Theory in the Nineteenth Century,” Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, 2 December 1999.

“Organische Chemie im Wandel: Der Einzug des Liebig’schen Apparats in französische Laboratorien,” Forschungsinstitut des Deutschen Museums, Munich, 6 December 1999.

“Quiet Revolutions in Chemistry,” ACS National Meeting, San Francisco, 28 March 2000.

“Visions of the Chemical Future in Nineteenth-Century France: Marcellin Berthelot and Jules Verne,” ACS National Meeting, San Francisco, 28 March 2000.

“Celebrity Culture in Parisian Chemistry,” Dexter Award Address, ACS National Meeting, Washington, D.C., 22 August 2000.

“Betrachtungen über die historische Rolle chemischer Instrumente und Apparate,” Festvortrag zum Hans-Jenemann-Symposiums, Jahrestagung der Gesellschaft Deutscher Chemiker, Würzburg, 25 September 2001.

“Investigating Investigative Pathways,” invited colloquium presentation in honor of Frederic L. Holmes, Yale University, 27 September 2002.

“Buckeyes, Corncrackers, and Suckers: Episodes in Ohio Food History,” Western Reserve Symposium, 18 October 2002.

“Telling True Lives: Chemistry, History, and Biography,” Festschrift for Hans-Werner Schütt, Technische Universität Berlin, Festvortrag (keynote address), 15 November 2002.

“Comparative Observations on the Scientific Communities of France and Germany in the Nineteenth Century,” Colloquium for the Department of History of Science, University of Wisconsin, Madison, 28 March 2003.

“The Discovery of Oxygen: Untangling the Web,” Oxygen Symposium (Wisconsin Initiative for Science Literacy), Madison, 29 March 2003.

“Nationalizing Science: Comparative Reflections on European Scientific Communities in the Nineteenth Century,” invited colloquium, Program in Science and Technology Studies, Virginia Tech, Blacksburg VA, 18 April 2003.

“Origins and Spread of the ‘Giessen Model’ in University Science, 1826-1876,” Liebig Bi-Centennial Celebration, Universität Giessen, 16 May 2003.

“Origins and Spread of the ‘Giessen Model’ in University Science, 1826-1876,” keynote address at the annual meeting of the Society for the History of Alchemy and Chemistry, London, 22 May 2003.

“Nationalizing Science: Was Chemistry French or German in its Origins?” Institut für Geschichte der Naturwissenschaften, Universität Hamburg, 19 May 2003.

“Origins and Spread of the ‘Giessen Model’ in University Science, 1826-1876,” Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, 3 June 2003.

“Continental Chemistry in the Public Sphere: A Comparative Case Study of the 1840s,” American Chemical Society semiannual meeting, History Division, New York City, 9 September 2003.

“Double Crossings: National Identity and the French Reception of Music, Psychoanalysis, and Art,” Session Chair, American Historical Association annual meeting, Washington, 9 January 2004.

“Eureka Moments and the Progress of Chemistry,” American Chemical Society, Cleveland Section, 18 February 2004.

“Pasteur and the ‘Prepared Mind’: The Role of Chance Events in Scientific Research,” Canadian Society for Chemistry annual meeting, London, Ontario, 29 May 2004.

“Eureka Moments and the Progress of Chemistry,” Iota Sigma Pi (National Honor Society for Women in Chemistry), keynote for Cleveland Section annual meeting, 7 April 2005.

“Educating Citizens for the 21st Century: The Role of Science Studies,” public lecture, Oberlin College, 27 April 2005.

“Making History: The Heuristics of Historical Reconstructions Across the Disciplines,” Canadian Society for the History and Philosophy of Science annual meeting, London, Ontario, 31 May 2005.

“The Société Chimique (de Paris) in the Second Empire,” Workshop on European Chemical Societies: Comparative Analyses of Demarcations, Lisbon, Portugal, 6 September 2005.

“Material Culture and Professionalization of European Science: The Role of Liebig and German Laboratory Practice,” Fifth International Conference on History of Chemistry, Lisbon, Portugal, 8 September 2005.

“The Birth of Chemical Atomism: Untangling the Web,” Study Day on Alchemy and Matter Theory, University of Notre Dame, 7 October 2005.

“Buckeyes, Corncrackers, and Suckers: Episodes in Ohio Food History,” Hiram College Friends of the Library, Hiram OH, 9 October 2005.

“The Birth of Chemical Atomism: Untangling the Web,” Departmental Colloquium, Department of History and Philosophy of Science, Indiana University, Bloomington, 18 November 2005.

“The Role of Cannizzaro in the Quiet Revolution in Chemistry,” invited keynote lecture, University of Palermo bicentennial symposium, 16 March 2006.

“Pasteur and the ‘Prepared Mind’: The Role of Chance Events in Scientific Research,” Dipartimento di Chimica Inorganica e Analitica, Università Palermo, 17 March 2006.

“Imagining the Molecular World: The Nature and Role of Eureka Experiences,” American Chemical Society, History Division, San Francisco, 11 September 2006.

“Imagining the Molecular World: Visual Images and the History of Chemistry,” ACS 2006 Edelstein Symposium, San Francisco, 12 September 2006.

“Imagining the Molecular World,” invited colloquium, Program in History of Science and Technology, University of Minnesota, 13 October 2006.

“Academic Chemical Laboratories in Nineteenth-Century Paris,” Nineteenth-Century Chemistry: Spaces and Collections, University of Lisbon, Portugal, 1 February 2007.

“Imagining the Molecular World: Visual Images and the History of Chemistry,” invited plenary lecture, Det 18. Landsmøte i Kjemi (Eighteenth Triennial National Chemical Congress), Oslo, Norway, 16 October 2007.

“Liebig’s ‘Giessen Model’ for Scientific Research and University Pedagogy,” Department of History, University of Oslo, Norway, 18 October 2007.

“How a Quaker Schoolteacher Discovered Atoms: John Dalton and His Theory,” Dinner lecture to monthly meeting of American Chemical Society, Cleveland Section, 20 February 2008.

“Epistemic Status of Dalton’s Atomic Theory,” 236<sup>th</sup> National Meeting of the American Chemical Society, Philadelphia, PA, 19 August 2008.

“Biography in the History of Science: Strategies and Opportunities,” invited paper for 7 Pines II Workshop, Stillwater, Minnesota, 22 November 2008.

“The Eureka Moment: Evidence for Unconscious Cognition from the History of Science,” Cleveland Psychoanalytic Society, 6 May 2009.

“The Visual Imagination in Nineteenth-Century Chemistry,” Chemical Heritage Foundation conference “From Composition to Commerce: Chemistry, History, and the Wider World,” Philadelphia, 13 June 2009.

“The Visual Imagination in Nineteenth-Century Chemistry,” Edelstein Award Symposium, 238<sup>th</sup> national American Chemical Society meeting, Washington, D.C., 18 August 2009.

“Imagining a Molecular World: Chemistry, Distant Inference, and the Scientific Imagination,” invited colloquium, Johns Hopkins University, 1 October 2009.

“The Eureka Moment: Evidence for Unconscious Cognition from the History of Science,” History Associates of CWRU, 18 November 2009.

“Passing Through and Cutting Across: The Worlds of Hermann Kopp,” invitational workshop on “The Power of the Margins: Construction and Transformation of Disciplinary Identities in Historical Perspective,” University of Regensburg, Germany, 5 December 2009.

Cannizzaro Congress sesquicentennial in Palermo, Italy; invited plenary address, 10 May 2010, declined.

“Vinegar and Oil: Materials and Representations in Organic Chemistry,” invitational workshop on “Scientific Objects and Their Materiality in the History of Chemistry,” Max Planck Institute for the History of Science, Berlin, Germany, 24 June 2010.

“The Chemical Revolution in Karlsruhe, 1860,” keynote plenary address, 150<sup>th</sup> Anniversary Weltkongress Chemie, Universität Karlsruhe, 3 September 2010.

Karlsruhe Congress sesquicentennial in Paris, invited plenary address, 20 October 2010, declined.

“Visual Mental Images and the Scientific Imagination,” Cognitive Science Departmental Colloquium, CWRU, 6 October 2010.

“A perspective on the career of Seymour Mauskopf,” keynote address, Seymour Mauskopf Retirement Appreciation, Duke University, Durham NC, 11 December 2010.

“Celebrating the 100<sup>th</sup> Anniversary of Marie Curie’s Nobel Prize, Session Co-Organizer and chair, AAAS annual meeting, Washington, D.C., 18 February 2011.

“What Did ‘Theory’ Mean to Nineteenth-Century Chemists?” opening keynote address at the 15<sup>th</sup> summer symposium, International Society for the Philosophy of Chemistry, Bogota, 9 August 2011.

“Marie Curie (1867-1934): Centenary of Her Nobel Prize in Chemistry, 1911-2011,” Departmental Seminar, Department of Pharmacology, CWRU, 4 October 2011.

“The Role of the Visual Imagination in Chemistry: A Historical Perspective,” Departmental Colloquium, Department of Chemistry, CWRU, 13 October 2011.

“From Experimental Physical Chemistry to the Molecular World,” HSS annual national meeting, Cleveland, 4 November 2011.

“The Role of the Visual Imagination in Chemistry: A Historical Perspective,” Departmental Colloquium, Department of Materials Science, CWRU, 31 January 2012.

“What Did ‘Theory’ Mean to Nineteenth-Century Chemists?” History Department, Florida State University, 22 March 2012.

“The Role of the Visual Imagination in Chemistry: A Historical Perspective,” Chemistry Department, Florida State University, 23 March 2012.

“The Quaker Rustic as Natural Philosopher: John Dalton and His Social Context,” American Chemical Society Semiannual Meeting, Philadelphia PA, 21 August 2012.

“Vinegar and Oil: Materials and Representation in Organic Chemistry,” invitational conference “Between Material Substances and Abstract Ideas: Chemists' Objects of Inquiry, 18th-21st Centuries,” Chemical Heritage Foundation, Philadelphia PA, 4 October 2012.

“The Origins of Biochemistry and the Rise of the Research University,” departmental colloquium, Department of Biochemistry, CWRU, 28 February 2013.

“The Role of the Visual Imagination in Chemistry: A Historical Perspective,” Colloquium, Department of Chemical Engineering, Polytechnic Institute of New York University, 5 April 2013.

“Visualization and Representation in Nineteenth-Century Chemistry,” 24<sup>th</sup> International Congress of History of Science, Technology, and Medicine, Manchester, England, 22 July 2013.

Commentary to the session “Chemists and Chemistry in the Nineteenth Century: A Session in Honor of Alan J. Rocke,” History of Science Society annual meeting, Boston, MA, 23 November 2013.

“The National Historic Chemical Landmarks Program of the American Chemical Society,” Cleveland Local Section ACS, 15 January 2014.

“Episodes from Ohio Food History,” invited speaker for Senior Scholars Annual Luncheon, Siegal Lifelong Learning Program, 2 May 2014.

“The Architect of Molecules: August Kekulé and His Times,” plenary historical address, “Historische Stätte der Chemie” designation, University of Bonn, Germany, 9 May 2014.

“‘Science versus Practice’ and the German Chemist: Erlenmeyer beyond the Flask,” American Chemical Society Semiannual Meeting, San Francisco, 12 August 2014.

“The Origin of Food,” invited Origins Science Scholars lecture, CWRU, 4 November 2014.

“Pierre Duhem, Atomic Theory, and Structural Realism,” keynote address, The History of Chemistry and Scientific Realism invitational workshop, Indiana University Indianapolis, 5 December 2014.

“The ‘Indifferent Hypothesis’ Redux: The Dilemmas of Pierre Duhem,” invited presentation at Mary Jo Nye Festschrift, Oregon State University, 16 January 2015.

“Food: The Sacred and the Profane in History,” Beth El The Heights Synagogue, 28 February 2015.

“Chemistry: From Obscure Alchemical Roots to a Vital Science,” Dittrick Medical History Center, 5 March 2015.

“Science versus Practice: The German Chemist ca. 1860,” invited colloquium, Department of History of Science, University of Wisconsin-Madison, 10 April 2015.

“The Creative Imagination in Chemical Science and Engineering: Perspectives from the History of Chemistry,” Exxon/Mobil R&D Division seminar, Baytown TX, 1 May 2015.

“The Quiet Revolution Revisited: Theoretical Chemistry in the Nineteenth Century,” American Chemical Society Semiannual Meeting, Boston, 18 August 2015.

“Graduate Chemical Education in Europe ca. 1900,” Academia Sinica, Taipei, 9 December 2015.

“Manipulating the Genome for Agriculture: Breeding versus Genetic Modification,” Park Synagogue Sisterhood Lecture Series, 15 December 2015.

“Another Look at the Kekulé-Couper Question,” 252<sup>nd</sup> American Chemical Society Meeting, Philadelphia, 21 August 2016.

“Erlenmeyer in Search of a Career: German Chemistry at the Crossroads,” 252<sup>nd</sup> American Chemical Society Meeting, Philadelphia, 23 August 2016.

“Another Look at the Origins of the Modern Research University,” History Department Colloquium, Mississippi State University, 11 November 2016.

126 papers presented

## COURSES TAUGHT

Survey of the History of Science, 2-semester sequence  
Survey of the History of Technology, 2-semester sequence  
Graduate Historiography of Science and Technology  
History of Chemistry  
History of Physics  
Science and Technology in Nineteenth-Century Europe  
Engineering in History  
Senior Engineering Seminar  
Senior Seminar in History & Philosophy of Science & Technology  
Energy in History  
Food in History  
Nuclear Weapons and Arms Control  
Science, Technology, and Government  
Natural Philosophy

European History since the Renaissance  
Modern World History  
First Seminar: The Life of the Mind

#### PROFESSIONAL MEMBERSHIPS

History of Science Society  
American Chemical Society  
Society for the History of Alchemy and Chemistry  
American Association for the Advancement of Science  
Federation of American Scientists  
Académie Internationale d'Histoire des Sciences

#### SELECTED PROFESSIONAL ACTIVITIES

Referee for many journals, presses, government granting agencies, and universities for promotion and tenure review, and for program reviews.  
Advisory Editor, *Great Engineers and Pioneers in Technology* (New York: St. Martin's Press, 1981)  
Attended Harvard/MIT Workshop on Nuclear Weapons and Arms Control, 10-22 July 1983  
Board of Advisors and Board of Directors, Physicians for Social Responsibility, Northeast Ohio Chapter, 1984-91  
Secretary, AAUP, CWRU Chapter, 1985-87; Chairman, Nominating Committee, 1987  
Co-organizer of Symposium on the Rise of Classical Organic Chemistry, 191<sup>st</sup> Annual Meeting of the American Chemical Society, Division of History of Chemistry, New York, 1986  
Invited lectures to several American Chemical Society section meetings  
Chair, Local Arrangements, History of Science Society national meeting, Cincinnati, 1988  
Member, Committee on Meetings and Programs, History of Science Society, 1987-92, 2010-12  
Member of Council, History of Science Society, 1990-92 and 2006-08  
Derek Price Prize Committee, History of Science Society, 1988-90  
U.S. Program Director, British-North American History of Science Meeting, Toronto, 1992  
Dexter Award Committee, 1993-95; chair, 1995  
Associate Editor, *Bulletin for the History of Chemistry*, 1991-95  
Program Committee, British-North American History of Science Meeting, Edinburgh, 1996  
Associate Editor, *Isis*, 1997-2000  
Board of Directors, History Associates of CWRU, 1995-98, 2004-6  
Advisory Editor, *Ambix*  
Pfizer Prize Committee, History of Science Society, 2005-07; chair, 2007  
Nominating Committee, History of Science Society, 2006-07  
Chair, AAAS, Section L (History & Philosophy of Science), 2009-11  
Member of Advisory Board, *Synthesis* book series, University of Chicago Press, 2007-  
Neville Book Prize Committee, Chemical Heritage Foundation, 2009 and 2011  
Price-Webster Prize Committee, History of Science Society, 2012-14  
General Editor, *A Cultural History of Chemistry*, Bloomsbury Press, 2015-  
Deputy Editor, *Ambix*, 2015-

Chair, ACS National Historic Chemical Landmarks Committee, 2016-

#### SELECTED UNIVERSITY SERVICE

Chair, Department of History, 1995-98; 2004-06; and 2011-12  
Director, Program in History & Philosophy of Science, 1988- 2013  
Executive Officer, History of Science and Technology Program, fall 1980  
Faculty Senate, 1984-87, 1989-92, 1999-2002, 2010-13  
Case Assembly, Humanities and Arts Representative, 1979-82  
Case Assembly, Curriculum Committee, 1981-82  
Institutional Animal Care and Use Committee, 1986-88  
Lambda Core Committee, 1988-90  
Chair, Senate Library Committee, 1990-91  
Information Resources Committee, 1990-91, 1999-2002  
Director of Graduate Studies, History Department, 1993-95, 1999-2001, 2003-4  
Chair, Undergraduate Education Subcommittee, NCA Self-Study, 1993-95  
Provost's Tenure and Promotion Committee (for the Medical School), 1994  
Director, E.W. Morley National Historic Chemical Landmark designation, 1994-95  
Faculty Senate Library Committee, 1994-98  
Medical History Advisory Committee, 1996-2005  
Ad hoc tenure standards committee, 1996  
Judaic Studies search committee, 1997-99  
Interdepartmental tenure review committees, Religion and Music, 1996 and 1999  
History Associates Board of Directors, 1996-98, 2004-6  
Member, Provost Search Committee, 1999- 2000  
Treuhaft Professor Search Committee, 2000-2001  
Chair, First Seminar Committee for SAGES, 2002-05  
Chair, NCA Re-accreditation Subcommittee on Undergraduate Development, 2003-05  
Appointments Committee, College of Arts and Sciences, 1994-97, 2007-10  
Executive Committee, Faculty Senate, 2000-2002  
Executive Committee, University Undergraduate Faculty, 2000-2001  
Executive Committee, College of Arts and Sciences, 2000-2003; chair 2000-2001  
Executive Committee, College of Arts and Sciences, 2009-11; chair 2010-11  
Executive Committee, College of Arts and Sciences, 2013-16  
Executive Committee, Faculty Senate, 2011-12  
Chair, Founding Executive Committee, CWRU Emeriti Academy



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