

## EDUCATION

Master of Architecture, Massachusetts Institute of Technology, 1978  
Honors: AAUW Professional Fellow, Graham Fund Traveling Fellowship.  
AIA School Medal,  
Masters' Thesis: *Thermal Delight in Architecture*. Published by MIT Press 1979.

B.Sc., Conservation of Natural Resources, UC Berkeley, 1973,  
Honors: Summa Cum Laude, Phi Beta Kappa

## PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Architect: State of California #C 019296 1984-2013  
NCQLP: Lighting Certified, 1999-2005

## HONORS

Fellow, Illuminating Engineering Society of North America, 2015  
(in recognition for technical contributions to knowledge in the field of lighting and illumination)

James Haecker Award for Distinguished Leadership in Architectural Research, 2011,  
Architectural Research Centers Consortium (the highest honor awarded by ARCC, with  
66 member Universities and Non-profits devoted to architectural research)

AIA School Medal, MIT Department of Architecture, 1978

Phi Beta Kappa, UC Berkeley, 1973

First Place, California State Fair, Architectural Design, Industrial Arts Exposition, 1966.  
(First female high school student to receive this award )

## OVERVIEW

Lisa Heschong was a licensed architect for 30 years, balanced a successful career across design, research, consulting and writing. She was Founding Principal and Executive Officer of the Heschong Mahone Group (HMG), a consulting firm specializing in energy efficiency, which grew to 45 employees over 20 years. In 2013 HMG joined TRC, a national environmental consulting firm, where upon she became Vice President and Chief Building Scientist of the Energy Services Group, and then retired from consulting in 2015. She is an acknowledged expert in daylighting and building science research, particularly as it applies to human and environmental factors. She continues to speak on these topics nationally and internationally.

She was awarded the 2011 James Haecker Award for Distinguished Leadership in Architectural Research, and in 2014 was elected a Fellow of the Illuminating Engineering Society, in recognition of her contributions to the field of lighting knowledge.

She has published continuously over the course of her career. Her research reports on daylighting are read and cited internationally, and cited as the basis of new green building standards. She is perhaps best known for her early book of essays, *Thermal Delight in Architecture*, which is used as a standard text in many architecture schools. It is on the AIA's recommended green building reading list, and is considered one of their enduring 'classics' by the MIT Press, after 40 years of continuous publication. She recently followed up with a much larger

companion book, *Visual Delight in Architecture: Daylight, Vision and View*, which combines current research findings on the physiological and cognitive effects of daylight with stories from 40 years of architectural experience.

Ms. Heschong has taught thousands of professional architects and engineers for the federal government energy programs, via utility sponsored training courses and conference workshops. Her university-level teaching experience includes four years of teaching architectural design and seminars as a lecturer for graduate students and undergraduates in the School of Architecture at UC Berkeley, an undergraduate course on Green Buildings at UC Santa Cruz, and three years as a teaching assistant for graduate studio design and building science courses at MIT, along with serving on departmental admissions and search committees.

## EMPLOYMENT AND EXPERIENCE

**TRC (formerly HMG or the Heschong Mahone Group) – Sacramento, CA** (Founding Principal and CEO: 1993 – 2012, Vice President, Chief Building Scientist, 2013-2014, VP Emeritus 2015)

As Principal at HMG, Ms. Heschong planned, developed and implemented building energy efficiency research projects for a wide variety of clients, including utilities, state and national agencies, non-profits, industry associations and blue-ribbon corporations. She mentored and directed the efforts of a talented staff of architects and engineers, and oversaw business operations for over 20 years. Ms. Heschong also led the Technical Review Committee, providing oversight on the technical infrastructure needs, methodologies and quality of all projects.

Ms. Heschong has led numerous large field research projects, including monitoring the performance of photocontrols in 123 daylight spaces, plus eight separate studies of the effects of daylighting on productivity and performance in school, retail, and office environments. She served as the Principal Investigator for the four-year Daylight Plus Research Program funded by the California Energy Commission's Public Interest Energy Research (PIER) program, along with (3) other multi-million-dollar research programs.

Most recently she led an international team to develop a new set of annual simulation-based daylight performance metrics, resulting in the adoption and publication of a new technical standard for the Illuminating Engineering Society, LM-83. She has also led large studies assessing the performance of innovative daylighting products for 3M Corporation and the US Department of Defense, for SMUD and PG&E, and to assess the energy savings potential across all office buildings in the state of California.

She was responsible for providing both technical and managerial oversight to a constellation of multi-family residential efficiency implementation programs in California over the course of twelve years, addressing both retrofit and new construction issues. While at HMG and TRC she conducted or oversaw hundreds of individual projects, including market research, survey research, and energy efficiency program impact evaluations. She has created and directed programs to increase market uptake of Sustainable Development, Zero Net Energy, and other Emerging Technologies. She led efforts to develop strategic plans for major non-profit efficiency organizations, first for the Northwest Energy Efficiency Alliance (NEEA) in 2000, and most recently in 2014 for the Design Lights Consortium managed by the Northeast Energy Efficiency Partnership (NEEP).

She conducted over one hundred (100) face-to-face trainings for the US Department of Energy FEMP Lights program, and then transitioned the course to an innovative distance learning system via email from 2001-2006. She has taught numerous professional education courses for utilities, professional associations, and universities around the country. She has also organized symposia

on Lighting and Health, Daylight Performance, and Software Tool Development, and published her research findings in scholarly and professional journals.

**ADM Associates – Sacramento, CA** (Senior Associate: 1991 – 1993)

As Project Manager, Ms. Heschong managed the Designed for Efficiency program impact evaluation for Southern California Edison. She developed and taught the Federal Lighting Energy Management Program (DOE FEMP) Training Workshops; developed a database search tool for ASHRAE energy efficiency research projects; reviewed school plans for efficiency measures funded by the California Office of Public School Construction; and provided editorial services for the California Title 24 manual and publications of Lawrence Berkeley National Lab.

**Stafford King and Associates – Sacramento, CA** (Architect: 1989 – 1991)

As a planner and architect, Ms. Heschong led a number of large and small public school design projects, including full campuses for Laguna Creek High School in the Elk Grove School District, and LeRoy Greene Middle School for the Natomas School District, and additions to Sierra Community College, Union Elementary School, and Paradise Elementary School.

**Lisa Heschong, Architect – Albany, CA** (1983 – 1989)

While working as a self-employed architect, (and raising two small children) Ms. Heschong designed, and oversaw the construction of several residential, small commercial and private school projects. She also served as the job captain through design development for a new high-rise office building for the University of California Office of the President (UCOP) in Oakland, Ca.

**UC Berkeley: Department of Architecture – Berkeley, CA** (Lecturer: 1983 – 1987)

Ms. Heschong taught studio design classes for both entering graduate students and undergraduates. Special topics include Universally Accessible Design (ADA) standards, passive solar design techniques, and a seminar on kinesthesia in design.

**DMJM Architects – San Francisco, CA** (Job Captain: 1983)

Produced design and construction documents for high rise office building at 455 Market in San Francisco, subject to historic district design requirements. Integrated first use of CADD by this office.

**Robbins & Reams Architects – San Francisco, CA** (Job Captain: 1982)

Planned, managed client relations, and conducted schematic design for large mixed-use redevelopment project in San Francisco, including a church, pre-school, housing and retail.

**Total Environmental Action – Harrisville, NH** (Designer and Research Assistant: 1978 – 1981)

Participated on a number of innovative passive solar design projects. One of these projects, the Brookhaven House for US DOE, was recently featured on the cover of Home Energy Magazine (May 2015) as an exemplary precursor to today's green building research and design. Another project for US HUD in 1979, nicknamed "Solar Sewers 2000," described the then state of art for integration of renewable energy, water and resource conservation for residential design. Ms. Heschong also served on US AID team to Thailand for a renewable energy assistance program, reaching out to village women to support local, micro-economic development.

**Donlyn Lyndon, Architect. Boston, MA.** (Drafter, 1979).

Prepared drawings for a custom home designed by a renowned architect.

**Edward Allen, Architect. Natick, MA.** (Carpenter,.1978)

Gained hands-on experience as a carpenter for an architect's personal handcrafted solar home, "The Beech Tree House".

**MIT Lab of Architecture and Planning, Cambridge, MA.** (Videographer, 1976)

Worked with then MIT Professor Edward Allen to develop a series of four instructional videos documenting historical wood working techniques, such as water powered saw mills.

**MIT Lab of Architecture and Planning, Cambridge, MA** (Ecologist. 1975)

Identified trees, ecological systems, soil and climatic conditions at the *Pequannnock* Watershed, supplying water to Newark, New Jersey, in support of a novel 'ecological development' proposal.

**VTN Engineers, Inc. Irvine, CA.** (Environmental Research Assistant, 1974) Assembled and wrote environmental impact reports on development proposals in California and Oregon, including interstate transmission lines and new developments.

**The Center for Environmental Structure, Berkeley, CA.** (Planning Assistant, 1973)

Researched and planned a large new tourist development in Canary Islands, Spain, based on Christopher Alexander's Pattern Language. Effort included a site visit to the Canary Islands, and research in Spain and Morocco with the Spanish and American design teams.

**UC Berkeley Library, Government Documents Department.** (Assistant: 1970-1972)

Worked at the reference desk, for a national and international government document depository.

**Ecology Camp, Eagle Lakes, CA. The Rex Foundation** (Councilor: 1971).

Resident ecologist at a summer camp funded by the Grateful Dead for inner city children.

**PROFESSIONAL AFFILIATIONS**

- The Daylight Academy, View Committee member (transdisciplinary committee devoted to advancing understanding of daylighting, funded by the Velux Foundation) 2021
- Ecology Action, Board of Directors, 2017 to current <https://ecoact.org/>
- International Dark Sky Association, member and local treasurer, 2018 to present
- The Neutra Institute for Survival by Design, Advisory Board Member, 2020 to present
- IESNA: Illuminating Engineering Society of North America
  - Chair, Medal Award Committee, 2020-2021, member 2018-2021
  - Fellow, 2015 to present
  - Board of Directors, 2009-2011
  - Chair, Daylighting Metrics Committee, 2007-2013, and current member
  - Member, Daylighting Committee
- AERC, Attachments Energy Rating Council (window attachments)
  - Board of Directors, 2015-2016
- NEMA, Daylight Management Council
  - Member, codes working group, 2013-2018
- ACEEE, American Council on an Energy Efficient Economy
  - Panel Leader, Behavior, SS 2014
  - Panel Leader, Human Factors, SS 2006
- CHPS: Coalition for High Performance Schools
  - Member, Technical Advisory Committee, 2002-2012
  - Chair, Daylighting Subcommittee
- SBSE: Society of Building Science Educators, member
- Women in Energy, member
- Citizens for East Shore Parks
  - Member, helped to stop planned development of "Albany Bulb" 1985-1990

**PUBLICATIONS and PRESENTATIONS<sup>1</sup>****Books**

*Visual Delight in Architecture: Daylight Vision and View*, Routledge, 2021

*Thermal Delight in Architecture*, MIT Press, 1979; French 1981; German 1985, Arabic 1986. Estonian 2017. In continuous print for 40+ years. Considered a 'classic' by MIT Press.

**Co-author of Books and Guidelines:**

*Routledge International Handbook of Resilient Thermal Comfort*, ed Fergus Nicol, Hom Bahadur Rijal, Susan Roaf, Routledge, 2022 Chapter 3: "Why occupants need a role in building operation: A framework for resilient design," with Julia Day

*The Urban Climate as Artifact*, Roesler S, and Kobi M ed., Birkhauser Verlag, Basel, CH 2018 co-author of chapter "Between Laboratory and Sea Ranch"

*LM-83, Approved Method: Spatial Daylight Autonomy (sDA) and Annual Sunlight Exposure (ASE)*, Technical standard for annual daylight simulation modeling, Illuminating Engineering Society of North America, 2013, (Chair, lead author and editor)

*Advanced Lighting Guidelines*, New Buildings Institute, 2001, 2003, 2010. Co-author, editor and project manager, Print and web-based guidelines for energy efficient lighting design. <https://algonline.org/>

*Residential Windows, A Guide to New Technology and Energy Performance*, Co-author, with John Carmody, Stephen Selkowitz and Dariush Arasteh. W.W. Norton & Co., First edition 1996, Second edition 2000, Third edition, 2007.

*The Retail Green Agenda: Sustainable Practices for Retailers and Shopping Centers*, R Milian, ed. International Council of Shopping Centers, 2008 Pages 253-261.

*Creating the Productive Workplace*, Derek Clements-Croome ed., Taylor and Francis, Pub. 2005 and 2007. Author of Chapter 17.

*Best Practices Manual, Collaborative for High Performance Schools*, 2000. Author of Daylighting Chapter and Case Studies. [www.CHPS.net](http://www.CHPS.net)

*Skylighting Guidelines*, with McHugh, J., et al., 1999. a web-based publication on skylighting design. [www.energydesignresources.com](http://www.energydesignresources.com) .

*Sustainable Building Technical Manual, Green Building Design*. Abraham, Loren E., et al. Public Technology Inc, U.S. EPA & DOE, pub. 1996. Authored chapter on Solar Energy.

*Housing for the Pequannock Watershed*. MIT Laboratory of Architecture and Planning, 1976. Provided ecological and microclimatic analysis, co-wrote and edited monograph.

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<sup>1</sup> Lisa Heschong is sole or primary author, unless otherwise noted.

**Research Reports**

*Daylight Metrics*. California Energy Commission Public Interest Energy Research (PIER) program 2012. Pub: CEC-500-2012-05

*Office Daylight Retrofit Potential*. California Energy Commission Public Interest Energy Research (PIER) program. Pub: CEC-500-2013-02

*Retail Revisioning*. California Energy Commission Public Interest Energy Research (PIER) program. Pub: CEC-500-2013-06

*Daylighting Plus Research Program Final Report*. California Energy Commission Public Interest Energy Research (PIER) program 2012. Pub: CEC-500-2013-05

*Windows and Offices: A Study of Office Worker Performance and the Indoor Environment*, CEC's Public Interest Energy Research (PIER) program, 2003. CEC- 500-03-082-A-9

*Windows and Classrooms: A Study of Student Performance and the Indoor Environment*, CEC's Public Interest Energy Research (PIER) program, 2003. CEC-500-03-082-A-7

*Daylight and Retail Sales*, California Energy Commission's Public Interest Energy Research (PIER) program sponsored study, 2003. CEC-500-03-082-A-5

*Daylighting in Schools: Re-analysis Report*. California Energy Commission's Public Interest Energy Research (PIER) program sponsored study, 2003. CEC-500-03-082-A-3

*Daylighting in Schools*, for Pacific Gas and Electric Company, 1999.  
<https://www.cashnet.org/resource-center/resourcefiles/127.pdf>

*Skylighting and Retail Sales*, for Pacific Gas and Electric Company, 1999.  
<http://www.pge.com/includes/docs/pdfs/shared/edusafety/training/pec/daylight/RetailCondensed820.pdf>

*Integration of building and energy technology with on-site waste management in the year 2000*. (a.k.a. "Solar Sewers") Deese, P. L., Heschong, L., & Fuller, W. (1985). *Final report, October 1979-September 1980* (No. PB-85-180479/XAB). Urban Systems Research and Engineering, Inc., Cambridge, MA (USA).

*The Brookhaven House*. Report, brochure, video. 1979. Environmental Energy Technologies Technical Documents, US Department of Energy, Accession Number 434-02-193 ARO 4652

**Peer Reviewed Journal Articles**

*Ten questions concerning well-being in the built environment*, Altamonte, S, et al, Building and Environment, Vol 180, August 2020, <https://doi.org/10.1016/j.buildenv.2020.106949>

*Daylight Metrics and Energy Savings*. Mardaljevic, J., Heschong, L., & Lee, E. (2009). *Lighting Research and Technology*, 41(3), 261-283. (most highly cited paper in LR&T's 50 year history, as of 2019)

*Scoping Study for Daylight Metrics from Luminance Maps*, Howlett, O., Heschong, L., & McHugh, J., LEUKOS: The Journal of the Illuminating Engineering Society of North America, Volume 3, Issue 3, 2007 pages 201-215

*Daylighting and Human Performance*, ASHRAE Journal, June 2002, Vol. 44, No. 6, pp. 65-67.

*Daylighting Impacts on Human Performance in Schools*, Journal of the Illumination Engineering Society, Summer 2002, Vol. 31, No. 2, pp. 101-114, with R. Wright.

*Daylighting Impact on Retail Sales Performance*, Journal of the Illumination Engineering Society, Summer 2002, Vol. 31, No. 2, pp. 21-25, with R. Wright.

*Skylights: Calculating Illumination Levels and Energy Impacts*, Journal of the Illumination Engineering Society, Winter 2000, Vol. 29, No. 1, pp. 90-100, with J. McHugh.

*California Residential Lighting Baseline*, Journal of the Illuminating Engineering Society, Volume 27, Number 1. 1998. with D. Mahone, K. Parris, J. Sugar, and F. Berryman.

### Peer Reviewed Conference Papers

*Understanding Behavior Potential: The Role of Building Interfaces, Day*, J and Heschong, L (2016) Proceedings of the ACEEE 2016 Summer Study on Energy Efficiency in Buildings

*What's the Hold Up? Are Existing Office Buildings Ready for Daylight Retrofits?* Heschong, L (2014) Proceedings of the ACEEE 2014 Summer Study on Energy Efficiency in Buildings.

*Improving Prediction of Daylighting Performance.* Heschong, L., Saxena, M., & Higa, R. (2010). Proceedings of the ACEEE 2010 Summer Study on Energy Efficiency in Buildings.

*61 Flavors of Daylight.* Saxena, M., Heschong, L., Van Den Wymelenberg, K., & Wayland, S. (2010). In Proceedings of the ACEEE 2010 Summer study (pp. 15-20).

*Dynamic Radiance—Predicting annual daylighting with variable fenestration optics using BSDFs.* Saxena, M., Ward, G., Perry, T., Heschong, L., & Higa, R. (2010). Proceedings of SimBuild, 11-13.

*Linking daylight and views to the reduction of sick building syndrome.* Heschong, L., & Roberts, J. E. (2009, September). In Proceedings of Healthy Buildings.

*Photocontrols and daylighting savings from skylights: urban myths and realities from a field study.* Pande, A., Heschong, L., Jon McHugh, P. E., Gregg Ander, F. A. I. A., & Melnyk, J. (2006). In *Proceedings of the National Conference on Building Commissioning*.

*Daylighting and Productivity: Elementary Schools Studies.* Heschong, L., Wright, R., & Okura, S. (2000). In Proceedings of the ACEEE 2000 Summer Study on Building Conference, Asilomar, CA.

*Skylighting and Retail Sales.* Okura, S., Heschong, L., & Wright, R. (2000). In Conference Proceedings ACEEE 2000 Summer Study.

*Potential productivity benefits from high quality lighting in Federal buildings* Harris, L., Heschong, L., Heerwagen, J. H., & Jones, C. C. (1998). (No. CONF-980815--). Dept. of Energy, Washington, DC (US). In Conference Proceedings ACEEE 2000 Summer Study

*California lighting model*, Kolderup, E., Eley, C., & Heschong, L. (1998). (No. CONF-980815--). Eley Associates, San Francisco, CA (US). In Conference Proceedings ACEEE 1998 Summer Study

*What are the next steps for lighting efficiency policy? Reporting on a statewide California study*  
Heschong, L., Sugar, J., & Benya, J. (1998). (No. CONF-980815--). ACEEE 1998 Summer Study

### **Other Journal and Magazine Articles**

*Thought Leaders: Access to View is Essential for Human Beings.* Building Design and Construction. Vol 47, #12. November 2006.

*Daylighting Makes a Difference.* Heschong, L., & Knecht, C. (2002). Educational Facility Planner, 37(2), 5-14.

*Thermal Necessity.* Natural History Magazine. Vol 90, #10. October 1981

*The Egrets Are Back* (1986). *Places*, Issue: 3 (1).

*An Interview with William Lam.* Solar Age Magazine. Vol 5, #8, August 1980

### **Invited Speaker, Awards Juries**

LightFair 2021, New York City, Oct 28, 2021, in person, "Why Views are Essential for Visual Quality"

Podcast interview, Design the Future, 'Episode #54, 40 min interview with Lindsay Baker and Kira Gould, Recorded September 29, 2021 [Episode 54: Lisa Heschong — Design the Future podcast](#)

GreenBuild 2021, Global Health Summit, Sept 9, 2021, virtual conference, with Nancy Clanton "Views May be More Important than We Previously Thought"

IES Annual Conference, virtual Aug 9, 2021, with Nancy Clanton "Should The Quality of the Visual Environment Include Window Views?"

Podcast interview: New Books Network with Brian Toepfer, recorded July 23, 2021, 25 minutes [New Books Network | Lisa Heschong, "Visual Delight in Architecture:...](#)

Podcast interview: Radio BE-Ex: 'Social Equity and Daylighting with Lisa Heschong' 40 min interview with Yutseh Frank, Recorded June 29, 2021 [Radio BE-Ex: Social Equity and Daylighting with Lisa Heschong — Building Energy Exchange \(be-exchange.org\)](#)

Podcast interview: US Modernist with George Smart, #206 Built Beautiful, recorded June 1, 2021, 25 min. interview with Dr. Raymond Neutra

University lectures 2020-21 UC Berkeley, U Texas A&M,; U Hawaii, U Oregon, U Idaho, U Nevada, U Waterloo,

Keynote, "The Value of View" Velux Daylight Bi-annual Symposium, Paris, 2019 <https://www.youtube.com/watch?v=1PKnR-OD5ew>

Keynote, "The Value of View" Building Health Annual Symposium, University of Oregon Department of Architecture, Portland, Or, 2019

"Valuing Daylight and View: Next Steps for Title 24," Daylight Symposium sponsored by the National Electric Manufacturers Association and the California Utilities. Sacramento, CA 2019



- Podcast interview. 99% Invisible. <https://99percentinvisible.org/episode/thermal-delight/>
- Keynote, "Beyond Thermal Delight", Center for the Built Environment Annual Symposium, UC Berkeley, 2018
- Keynote, "Valuing Views", Attachments Energy Rating Council, Window Attachments Management Council Annual Conference, Boston, Ma 2017
- Keynote, "The Biological Impacts of Light Pollution," UC Santa Cruz Earth Night Symposium, 2018
- Panel leader and presentation on "Daylight Metrics", IBPSA, San Francisco, 2018
- Invited Speaker, "The New View" IES Annual conference, Portland, OR 2017
- Invited Speaker, "The Value of View" Parsons School of Design and the Building Energy Exchange, NY City, 2017
- Keynote, "Healthy Human Habitats", 50th International Conference of the Architectural Science Association (ANZAScA), Adelaide, Australia 2016, along with related talks at the Universities of Melbourne and Sydney
- One day class: "Lighting and Human Behavior" for Pacific Energy Center, Pacific Gas and Electric Co., San Francisco, CA. 2016, 2017, 2018
- Mentor visit and ADVANCE Distinguished Lecture Series, Kansas State University, College of Human Ecology, September, 2015.
- A Light Affair, IES Annual Expo, San Francisco, June, 2015
- Light and Health Workshop, Pacific Energy Center, May 2015
- Carnegie Melon University, School of Architecture, November, 2014
- University of Texas at Austin, School of Architecture, October, 2014
- Eco-Commercial Buildings Symposium, October 2011 Pittsburg, PA. 50 construction product company executives. Sponsored by the Beyer Corporation
- Keynote "The Value of View" National Fenestration Rating Council. August 2011 San Francisco. 350 members in the building fenestration industry.
- "The Next Generation of Daylight Metrics", MIT, School of Architecture, May 2011
- Keynote: Parsons School of Design. Immaterial Environments Symposium, April 2011. <https://vimeo.com/29669761>
- AIA 2010 COTE Awards Jury. One of six jurors for national AIA awards program for green building design from the Committee on the Environment (COTE)
- Keynote: Center for the Built Environment, Annual Meeting, UC Berkeley, 2008

National Institutes of Science, Symposium on Health and the Environment, San Francisco, Ca, 2008

Daylighting Symposium: bi-annual symposium for 200-400 international daylighting experts. Sponsored by the Velux Corporation. 2013, Copenhagen, Denmark; 2011, Lausanne Switzerland; 2009, Rotterdam, Netherlands; 2007, Bilbao, Spain.

Keynote: "Daylight Matters," Illuminating Engineering Society of North America. Centennial Conference, 2006. Plus many other papers and presentations, 1998-2014.

PG&E Pacific Energy Center, 2001-2016. Numerous one hour to one day engagements, on lighting efficiency, daylighting, lighting and human health.

Light Fair International. 2001-2014. Frequent presenter on lighting efficiency, daylighting and human comfort, to lighting industry groups of 50-500.

Living on Earth. Radio interview with Steve Curwood. National Public Radio. 1999  
<http://loe.org/shows/shows.html?programID=99-P13-00049#feature8>