

*Helm & Kyle  
Gila  
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# **POWERPOINT PRESENTATION**

**BY**

**D.C. JACKSON**

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# **Lower Gila River Navigability**

**ANSAC Lower Gila River Hearing  
November 16, 2005**

**Donald C. Jackson, Ph.D  
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## **The Equal Footing Doctrine and the Lower Gila River**

- Is the Lower Gila River Navigable in context of “equal footing doctrine”?
- Yes, I believe it is navigable.
- How have I come to this conclusion?

## Procedure Followed to Determine Navigability

- Determine the Standard of Navigability to be applied for the Equal Footing Doctrine
- Review historical data relevant to navigability on the Lower Gila
- Assess how historical data relates to the appropriate Standard of Navigability
- Make determination of navigability

## What is the Standard to be used?

- Must battleships and aircraft carriers be able to navigate year round? NO.
- Must large-scale commercial barges ply the waters year round? NO.
- Must it meet the standard of navigability applied by the US Supreme Court in the *Daniel Ball* decision? YES.

The *Daniel Ball* (1870)  
Standard of Navigability

- “Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact...” [cont. next slide]

The *Daniel Ball* (1870)  
Standard of Navigability

- [cont. from previous slide] “...when they are used or are susceptible of being used in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water...”

### *U.S v. Holt Bank* (1926)

- States that: “navigability does not depend on the particular mode in which such use is or may be had – **nor on an absence of occasional difficulties in navigation**”
- *Daniel Ball* definition expanded to: “**natural and ordinary condition**”
- Refers to “**channel for useful commerce**”

### Utah v. US (1971)

- Clarifies definition of “useful commerce”
- Commerce does *not* need to be commercial in terms of formalized, public transportation between far flung cities, ports or harbors.
- Case relates to navigation on the Great Salt Lake.

## Utah v. US (1971)

- Ferrying of sheep to islands in Great Salt Lake as part of local farming/agriculture operations is sufficient to demonstrate navigability.
- The furtherance of local farming operations on the shores of the Great Salt Lake was sufficient to meet the standard of **“useful commerce”**

## Utah v. US (1971)

- Specifically, the Supreme Court stated that: **“The hauling was apparently done by owners of the livestock, not by a carrier for the purpose of making money. Hence it is suggested that this was not the use of the lake as a navigable highway in the customary sense of the word...”** [cont.]

## Utah v. US (1971)

- [cont. from previous slide] **“...That is to say, the business of the boats was ranching and not carrying water-borne freight. We think that is an irrelevant detail. The lake was used as a highway and that is the gist of the federal test.”**

## Utah v. US (1971)

- Furthermore: **“It is suggested that the carriage was also limited in the sense of serving only the few people who performed ranching operations along the shores of the lake. But that again does not detract from the basic finding that the lake served as a highway and it is that feature that distinguishes between navigability and non-navigability.”**

## Defenders of Wildlife v. Hull (2001)

- Court of Appeals of Arizona case affirming that the *Daniel Ball* standard of navigability is necessary for adjudicating the Equal Footing Doctrine.
- Affirms that:  
**“Navigable in fact is navigable in law.”**

## Natural and Ordinary Condition of the Lower Gila River 1846-1912

- During the latter 19<sup>th</sup> century enormous quantities of water were diverted from the Salt and Gila Rivers for irrigation.
- In the early 20<sup>th</sup> century construction of the Roosevelt Dam commenced on the Upper Salt River; water storage in Lake Roosevelt started by 1909, prior to completion of dam in 1911.



### Natural and Ordinary Condition of the Lower Gila River 1846-1912

- As ascertained by Win Hjalmarson in his report on the hydrology of the Lower Gila River, the natural and ordinary flow of the river in the period 1846-1912 was tremendous, but the actual flow was significantly diminished by irrigation diversion and storage.
- Any application of the *Daniel Ball* standard must address the natural and ordinary flow.

### Natural and Ordinary Condition of the Lower Gila River 1846-1912

- A member of the Kearney Expedition in 1846 described the Lower Gila River as about 100 yards wide and flowing along a sandy bottom.

### Natural and Ordinary Condition of the Lower Gila River 1846-1912

- Diversions of the Salt and Gila commenced by the late 1860s
- However, as reported in a 1923 USGS Water Supply Paper, a rancher in 1889 described the river between Buckeye and the Gillespie Dam site as having a well-defined channel with hard, sloping banks lined with cottonwood and bushes.

### Historical navigation of the Lower Gila River 1846-1912

- Cooke/Mormon Battalion journey in January 1847 from Gila Bend vicinity to Yuma.
- Members of the battalion fashioned a boat out of two wagons. Suffered difficulties with low water, but reached Yuma in several days and successfully navigated the Lower Gila River

### **Historical navigation of the Lower Gila River 1846-1912**

- Mrs. Howard/Pancoast journey fall 1849; child (“Gila”) born during trip down the river. Trip noted in later histories of Arizona although details are not always consistent.

### **Historical navigation of the Lower Gila River 1846-1912**

- Letter sent from “Camp Salvation” to the *New York Tribune* in February 1850 indicating use of Gila River by westward travelers. Reported that travelers reaching the Colorado River had made use of boats on the Gila River to lighten loads pulled by wagon teams.

### **Historical navigation of the Lower Gila River 1846-1912**

- A river trip by Cotton and Bingham from Phoenix to Yuma announced in *Arizona Gazette* as scheduled to leave the next day Feb 1881; journey to be made in an 18-foot long skiff.
- No subsequent report on the impending trip published.

### **Historical navigation of the Lower Gila River 1846-1912**

- William “Buckey” O’Neil journey down the Gila from Phoenix in Nov-Dec. 1881 is noted in two issues of the *Phoenix Gazette*. Reports indicate that at times the boat had to be pushed by men wading in water “up to their knees” and the newspaper indicated that the voyage, while scheduled to reach Yuma, may have concluded in Gila Bend.

## Historical navigation of the Lower Gila River 1846-1912

- The O'Neil voyage – with crew members wading up to their knees – may have encountered difficulties in the journey to Gila Bend, but as stipulated by the US Supreme Court in *U.S. v. Holt Bank* “navigability does not depend on the particular mode in which such use is or may be had – nor on an absence of occasional difficulties in navigation”

## Historical navigation of the Lower Gila River 1846-1912

- Amos Adams/J.W. Evans journey down the full-length of the Gila River to Yuma in a boat “3 1/2 x 18 feet of the flat bottomed type.” The trip was described in three separate newspaper articles (*Arizona Sentinel* and *Phoenix Herald*) in Feb/March 1895.
- The reach from Phoenix to Gila Bend is described by Adams as “we found **nothing unusual on our journey down the Salt and Gila Rivers except that ducks were plentiful...**”

### **Historical navigation of the Lower Gila River 1846-1912**

- The Adams/Evans journey and its notice in three newspaper accounts provides – in and of itself – convincing evidence of how the Lower Gila River was susceptible for use as a navigable waterway.

### **Historical navigation of the Lower Gila River 1846-1912**

- Navigability of the Lower Gila River is further substantiated by a report of Jack Shibley setting out on a voyage from Phoenix to Gila Bend. As reported in the April 3, 1905 *Arizona Republican*, his boat apparently capsized once but made it to Gila Bend.

### **Historical navigation of the Lower Gila River 1846-1912**

- Gustavus Streitz testified in a March 1911 hearing related to the case of *Enterprise Land and Water Company and Gila Water Company v. Frank Heresford and James-Bent Irrigation Company*.

### **Historical navigation of the Lower Gila River 1846-1912**

- Streitz testified under oath that he was “county surveyor” in 1893 and made surveys and “locations” near the Wolfley Dam site (future site of Gillespie Dam)
- Streitz described using “Dougherty’s skiff” to cross the river as part of his work. Dougherty was a local rancher/farmer near where Streitz and his men camped.

### **Historical navigation of the Lower Gila River 1846-1912**

- Q. Were you there before the Gila Bend Dam was built?
- A. [George Streitz]: Oh, yes, we made two surveys.
- A: Two surveys. Whereabouts was the channel of the Gila River, that is, the water channel, when you first saw it? [cont.]

### **Historical navigation of the Lower Gila River 1846-1912**

- A: [Streitz] On the extreme east bank, almost opposite the Halpai Butte.
- Q: How close was it to what is now known as the headgates of the Gila of the damsite Water Company?
- A: As near as I can recollect, the location was below where we landed, back and forth, with our outfits to get across. I will explain a little if you will permit me. [cont.]



### **Historical navigation of the Lower Gila River 1846-1912**

- Q. Go ahead.
- A: [Streitz] We passed back and forth, to get from our camp which was on the west side of the river, near Dougherty's, and walked down to the river and made turns in getting across the river in Dougherty's skiff, and one man had to make the return, and that's how I got these locations noted...

### **Historical navigation of the Lower Gila River 1846-1912**

- Streitz uses Gila River as a highway for commerce in a simple yet direct way.
- Just as importantly, the testimony indicates that Dougherty had a skiff as part of his farm/ranch equipment.

### **Historical navigation of the Lower Gila River 1846-1912**

- Recall the Supreme Court ruling in Utah v. U.S:
- **“It is suggested that the carriage was also limited in the sense of serving only the few people who performed ranching operations along the shores of the [Great Salt] lake. But that again does not detract from the basic finding that the lake served as a highway and it is that feature that distinguishes between navigability and non-navigability.”**

### **Historical navigation of the Lower Gila River 1846-1912**

- Boating along the Gila River by Dougherty was apparently a part of his activity as a farmer/rancher. This is directly analogous to the use of the Great Salt Lake by local Utah farmers to ferry to islands as part of the business of being a sheep rancher.

## Conclusion

- Evidence is clear that the Lower Gila River was susceptible for use as a highway for commerce in the period 1846-1912.
- “Natural and ordinary conditions” of flow were dramatically altered by river diversion and storage prior to 1912.
- Nonetheless, navigation of the river and portions thereof was undertaken by a range of travelers in this period.

## Conclusion

- Natural and ordinary conditions and use along the Lower Gila River in the period 1846-1912 provide clear evidence that the *Daniel Ball* standard of navigability was met.
- The Lower Gila River is navigable in the context of the Equal Footing Doctrine and should be recognized as such.

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**EDUCATION:**

Ph.D. University of Pennsylvania, 1986  
M.A. University of Pennsylvania, 1982  
B.S. Swarthmore College, 1975  
Registered Engineer-in-Training (EIT)  
Commonwealth of Pennsylvania, 1975

**FELLOWSHIPS:**

Fellow: Visiting Scholar, Hagley Museum and Library, Spring 1998  
Fellow: Dibner Institute for the History of Science and Technology,  
Massachusetts Institute of Technology, Fall 1997  
Fellow: Fletcher Jones Research Fellow, The Huntington Library,  
San Marino, CA., Spring 1993  
Fellow: Philadelphia Center for Early American Studies  
University of Pennsylvania, 1988-89  
Fellow: Pre-doctoral fellow, National Museum of American History  
Smithsonian Institution, 1985-86

**HONORS AND AWARDS:**

Outstanding Academic Book for 1996, selected by *CHOICE*, the official publication of the Association of College and Research Libraries. [awarded for *Building the Ultimate Dam: John S. Eastwood and the Control of Water in the West*, referenced below]

1994 recipient of Ray A. Billington Award from the Western History Association for the best article on the history of the American West. [awarded for "Engineering in the Progressive Era: A New Look at Frederick Haynes Newell and the U.S. Reclamation Service," referenced below]

**BOOKS:**

Editor, *DAMS*, Volume 4, Studies in the History of Civil Engineering (Aldershot, England: Ashgate/Variorum Press, 1998).

*Building the Ultimate Dam: John S. Eastwood and the Control of Water in the West* (Lawrence: University Press of Kansas, 1995).

*Great American Bridges and Dams* (New York: John Wiley, 1988).

**RECENT PROFESSIONAL SERVICE:**

Senior Historian, "History of Federal Dams" Project sponsored by the National Park Service, Bureau of Reclamation, and Corps of Engineers. [Professor David Billington, Princeton University, Principal Investigator]

Senior Research Fellow, Center for the History of Business, Technology and Society, Hagley Museum and Library, Wilmington, Delaware.

Member, Public Awareness Committee 2002-03, United States Society on Dams.

Advisor/consultant for PBS documentary on "Building Big: Dams" produced by WGBH-TV in association with the National Science Foundation; 1999-2000.

Advisor/consultant for video documentary on "The St. Francis Dam Disaster" being prepared by Wilkman Productions, Los Angeles, California. 2001-2003.

Historical Consultant for the Flood Control District of Maricopa County, [Arizona concerning the navigability of the Gila River and the Gillespie Dam. 2000-2003

Historical Consultant for United States Postal Service, Stamp Series, 2003

Chair, Melvin Kranzberg Dissertation Fellowship Prize Committee, Society for the History of Technology; Member of committee 1998, 1999; Chair of committee 2000.

Chair, Rachel Carson Dissertation Prize Committee, American Society for Environmental History; Member of committee 1998; Chair of committee 1999.

**ARTICLES AND REVIEWS:**

- "Boulder Dam: Origins of Siting and Design," *Bureau of Reclamation Historical Symposium Proceedings* (CD-ROM, June 2002)
- "Private Initiative - Public Works: Ed Fletcher, the Santa Fe Railway and the Cave Creek Flood Control Dam" in Char Miller, ed. *Fluid Arguments: Water Development in the American Southwest* (Tucson: University of Arizona Press, 2001): 251-275.
- "Bulk Does Not Mean Strength: John Eastwood and the Multiple Arch Dam," *United States Society on Dam Newsletter* (July 2002): 20-23.
- "Engineering in the Progressive Era: A New Look at Frederick Haynes Newell and the U.S. Reclamation Service," *Technology and Culture* 34 (July 1993): 539-574 .
- "Considering the Multiple Arch Dam: Theory, Practice and the Ethics of Safety in a Case of Innovative Hydraulic Engineering," *Natural Resources Journal* 32 (January 1992): 77-100.
- "Dams," article in *Microsoft Encarta 2001 CD-ROM Encyclopedia* (Redmond, WA.: in press)
- "Dams" in Paul Boyer, ed., *The Oxford Companion to United States History* (New York: Oxford University Press, 2001)
- "Hydroelectric Power," in Paul Boyer, ed., *The Oxford Companion to United States History* (New York: Oxford University Press, 2001)
- "Dams" article in Rudi Volti, ed., *The Encyclopedia of Science, Technology and Society* (New York: 1999)
- "Water Policy in the American West," article in *Microsoft Encarta 2002 Encyclopedia* (Redmond, WA.: 1998)
- "Dams and Environment in the American West," article in *Microsoft Encarta Encyclopedia Yearbook* (Redmond, WA.: 1998)
- Book review of *Industrial Cowboys: Miller and Lux and the Transformation of the Far West* (Berkeley: University of California Press, 2001) for *American Historical Review* (December 2002): 1565-1566.

Book review of Mark Fiege, *Irrigated Eden: The Making on an Agricultural Landscape in the American West* (Seattle: University of Washington Press, 1998) for *Business History Review* (Autumn 2002): 603-605

Book review of Robert Kelley Scheinder, *Unruly River: Two Centuries of Change Along the Missouri* (Lawrence: University Press of Kansas, 1999) in *Pacific Historical Review* (scheduled for publication Fall 2000)

Book review of Jay Brigham, *Empowering the West: Electrical Politics Before FDR* (Lawrence: University Press of Kansas, 1998) in *Environmental History Review* (Fall 1999)

Book review of Robert Richter, *Wind Energy in America: A History* (University of Oklahoma Press, 1997) in *American Historical Review* (1998)

Book Review of Harvey H. Jackson III, *Putting Loafing Streams to Work: The building of Lay, Mitchell, Martin, and Jordan Dams, 1910-1929* (University of Alabama Press, 1997) in *The Alabama Review* (1998)

Book review of Doyce B. Nunis, Jr., ed., *The St. Francis Dam Disaster Revisited* (Los Angeles: Ventura County Museum of Art and History, 1996), in *IA: The Journal of the Society for Industrial Archeology* (1998)

Book review of Donald J. Pisani, *Water, Land, and Law in the West: The Limits of Public Policy, 1850-1920* (Lawrence, KS: University Press of Kansas, 1996) in *Journal of the West* 1997

Book review of Donald E. Wolf, *Big Dams and Other Dreams: The Six Companies Story* (Norman, OK: University of Oklahoma Press, 1996), in *Pacific Historical Review* 66 (November 1997)

Book review of Carol Sheriff, *The Artificial River: The Erie Canal and the Paradox of Progress, 1817-1862* (New York: Hill and Wang, 1996), for *American Historical Review* (June 1997)

Book review of Gene Rogge, et al, *Raising Arizona's Dams: Daily Life, Danger, and Discrimination in the Dam Construction Camps of Central Arizona* (Tucson: 1995) in *Technology and Culture* 37 (April 1996)

Book review of *The Great Road: The Building of the Baltimore & Ohio, The Nation's First Railroad, 1828-1853* (Palo Alto: 1994), in *Journal of the Early Republic* 16 (Fall 1996)

"As We Saw It: Construction of the Colorado Aqueduct Tunnels, 1934," *Westways* (October 1996)

Book review of John A. Jakle and Keith A. Sculle, *The Gas Station in America* (Baltimore: 1994) in *Technology and Culture* 36 (October 1995)

Book review of Nicholas Schnitter, *A History of Dams: The Useful Pyramids* (Rotterdam: 1994) in *Technology and Culture* 36 (January 1995)

Book review of Simon W. Freese and Deborah Lightfoot Sizemore, *A Century in the Works: Freese and Nichols Consulting Engineers, 1894-1994* (College Station, TX: 1993); in *Journal of the West* (1996)

Book review of Wiebe E. Bijker and John Law, eds.; *Shaping Technology: Studies in Technological Change* (Cambridge, MA: 1992), in *Journal Of Interdisciplinary History* 25 (Winter 1995)

"Roads Most Traveled: Turnpikes in Southeastern Pennsylvania in the Early Republic," in Judy McGaw, ed., *Early American Technology: Essays in the History of Making and Doing Things From the Colonial Era to 1850*, (Williamsburg, VA.: Institute of Early American History and Culture, 1994), pp. 197-239. [Published in association with the University of North Carolina Press]

Annotated bibliography for "Structural Engineering" and "Hydraulic Engineering," in Mary Beth Norton, ed., *The American Historical Association's Guide to Historical Literature* (New York: 1994)

Book review of John Bowie, *Workshop of the World: A Selective Guide to the Industrial Archeology of Philadelphia* (Philadelphia: 1991) in *technology and Culture* (January 1993)

Book review of Albert P. Heiner, *Henry J. Kaiser, American Empire Builder: An Insider's View*, in *Technology and Culture* 22 (July 1991)

Book review of Mark S. Foster, *Henry J. Kaiser: Builder in the American West* in *Technology and Culture* 22 (July 1991)

Book review of Daniel Sperling, *Alternative Transportation Fuels: An Environmental and Energy Solution* in *Environmental History Review* 15 (Spring 1991)

Book review of Ross Holland, *Great American Lighthouses* in *The Public Historian* 12 (Summer 1990)



"Horseshoe Dam," Historic American Engineering Record Report, 1991, File# HAER AZ-24, Prints and Photographs Division, Library of Congress, Washington, D.C.

"Stewart Mountain Dam," Historic American Engineering Record Report, 1990, File# HAER AZ-12, Prints and Photographs Division, Library of Congress, Washington, D.C.

"Roosevelt Dam," Historic American Engineering Record Report, 1990, File# HAER AZ-6, Prints and Photographs Division, Library of Congress, Washington, D.C.

Book review of Joseph Stevens, *The Hoover Dam: An American Adventure*, in *Technology and Culture*, 30 (October 1989).

Exhibit review of "The Fairmount Waterworks, 1812-1911" (Philadelphia Museum of Art), in *Technology and Culture* 30 (July 1989).

"19th Century American Bridge Failures: A Professional Perspective," in *Proceedings of the Ohio State University Historic Bridge Symposium* (Columbus: Ohio State University and the Ohio Historical Society, 1988): 113-125.

Book review of Graham West, *Innovation and the Rise of the Tunneling Industry* in *Science*, July 29, 1988.

Book review of Michael Welch, *A Mission in the Desert*, in *Technology and Culture* 28 (April 1987).

Book review of Margaret Latimer, Brook Hindle, Melvin Kranzberg, eds., *Bridge to the Future: A Centennial Celebration of the Brooklyn Bridge*, in *IA: The Journal of the Society for Industrial Archeology* 12 (1986).

Book review of Donald J. Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931*, in *Technology and Culture* 27 (October 1986)

Book review of William A. Myers, *Iron Men and Copper Wires: A Centennial History of the Southern California Edison Company*, in *Technology and Culture* 27 (October 1986)

Book review of John Shaw, *Water Power in Scotland, 1550-1870*, in *Annals of Science* (November 1985)

Exhibit review of "Centennial Celebrations: The 100th Anniversary of the Brooklyn Bridge" (National Museum of American History), in *Technology and Culture* 15 (April 1984)

Book review of Lawrence Lee, Reclaiming the American West, in *Technology and Culture* 24 (October 1983)

Book review of Stanley Davison, *The Leadership of the Reclamation Movement*, in *Technology and Culture* 24 (October 1983)

"Controversy in Hydraulic Design: The Littlerock Dam, 1918-1977," in *Proceedings of the American Society of Engineering Education* Vol. 2, (1982): 471-477.

Book review of Howard Newlon, *A Selection of Historic Papers American Papers on Concrete* in *Technology and Culture* 22 (July 1981)

Book review of Howard Miller and Quinta Scott, *The Eads Bridge in IA: The Journal of the Society for Industrial Archeology* 6 (1980)

"John S. Eastwood and the Mountain Dell Dam" *IA: The Journal of the Society for Industrial Archeology* 5 (1979): 33-48.

Book review of Norman Smith, *Man and Water: A History of Hydrotechnology* in *ISIS* 70 (1979).

Book review of Hunter Rouse, *Hydraulics in the United States, 1776-1976* in *Technology and Culture* 18 (October 1977).

#### CONFERENCE AND LECTURE PRESENTATIONS:

Paper: "Boulder Dam: Origins of Siting and Design," Bureau of Reclamation Historical Symposium, University of Nevada, Las Vegas, June 2002.

Paper: "Bulk Does Not Mean Strength: John S. Eastwood and the Multiple Arch Dam," United States Society on Dams Annual Conference, San Diego, California, June 2002.

Paper: "Privilege and Responsibility: The St. Francis Dam Disaster," Society for the History of Technology Conference, San Jose, October 2001.

Paper: "The Pastoral, The Monumental, and What Lies In-Between: Images of Dams and the Riparian Landscape 1900-1960," International Water History Association Conference, Bergen, Norway, August 2001.

Paper: "Knowing Nature, Knowing Culture: John R. Freeman and the Engineering of Hetch Hetchy Reservoir in Yosemite National Park, 1910-1913," *Water in History*

Conference, University of Wales - Aberstwywyth, July 1999.

Paper, "Beyond Beauty and Wilderness: Preservationist Arguments to Save Hetch Hetchy (1912-1913)" at Annual Conference of the American Society for Environmental History, Tucson, AZ., April 1999.

Paper, "Large Reservoirs a Necessity: John R. Freeman and Western Dam Building, 1906-1932" at Annual Meeting of the Western History Association, Sacramento, Ca., October 1998.

Paper: "Public Works - Private Initiative: Ed Fletcher, the Santa Fe Railway and the Cave Creek Flood Control Dam," at *Water in the Southwest Conference* sponsored by American Society for Environmental History, Trinity University, San Antonio, TX, May 1998

Paper, "Dams and the Environment," at *Environmental Research Workshop*, Georgetown University Law Center, Washington D.C., February 1998

Paper: "The Business of Power: Henry Huntington and the Pacific Light and Power Corporation," Annual meeting of the Society for the History of Technology, Pasadena, CA, October 1997.

Paper: "Hydraulic Empire: John R. Freeman and America's Massive Dam Tradition," Dibner Institute for the History of Science and Technology Colloquium, Cambridge, MA., September 1997.

Paper: "It Is Your Dam Business: Water and Power in the American West," Thomas and Lurie Jones Lecture, Lafayette College, Easton PA., November 1996.

Commentator for session: "Not Quite Modern' Technologies," Annual meeting of the Society for the History of Technology, London, England, August 1996.

Participant in National Council on Public History Roundtable on Public and Private Discourse in Water Resource History. Presentation: "Public Works - Private Interests: Alternative Views of Western Water Resources Development," Annual meeting of the Organization of American Historians, Washington D.C., April 1995.

Paper: "Surveying the Land: Topography and the Development of Water Resources in the American West," Annual meeting of the Society for the History of Technology, Lowell, Mass., October 1994.

Paper: "The New Western History and Water Resources," Museum of American History Colloquium Series, Smithsonian Institution, Washington, D.C., January 1995.

Participant in National Archives symposium on water resources records, National Archives II, College Park, Maryland, April 1994.

Paper: "Henry Huntington and the Business of Hydroelectric Power: The Big Creek Project (1902-1913)," Seminar meeting of the Center for the History of Business, Technology and Society, Hagley Library, Wilmington, DE, December, 1993.

Paper: "Have My Hand in On Those High Boys': Personal and Professional Interrelationships Among the Western Dam-Designing Elite, 1900-1930," Western History Association Conference, Tulsa, OK, October, 1993.

Paper: "Roads Most Traveled: Early Turnpikes in Pennsylvania," Annual meeting of the Society for the History of Technology, Cleveland, OH, October 1990.

Paper: "A New Look at Progressive Era Engineering in the West: Frederick H. Newell and the U. S. Reclamation Service," Annual meeting of the Society for the History of Technology, Sacramento, CA, October 1989.

Paper: "Controversy at Big Meadows: John S. Eastwood, John R. Freeman and the "Psychology" of the Multiple Arch Dam," Annual meeting of the Society for the History of Technology Conference, Raleigh, NC, October 1987.

Paper: "Variety, Choice and Technological History: The Structural and Massive Traditions in Dam Design," Annual meeting of the Society for Industrial Archeology, Troy, NY, May 1987.

Paper: "An Economic History of Water Use and Water Storage in Western America," West Virginia University/Smithsonian Institution Symposium, Washington, D.C., April 1986.

Paper: "A History of Masonry and Concrete Bridges in America," Annual meeting of the American Society of Civil Engineers, San Francisco, CA., October 1984.

Paper: "Theory and Practice in the Development of a Technological Style: California's Early Three-Phase AC Power Systems," Annual meeting of the Society for the History of Technology, Philadelphia, PA., October 1982.

Paper: "Myth and Reality of Late 19th Century Truss Bridge Failures," Annual meeting of the Society for Industrial Archeology, Detroit, MI., June 1980.

#### PROFESSIONAL SERVICE AND ACTIVITIES:

Book Review Editor, *IA: Journal of the Society for Industrial Archeology* (1989-1994)

Scholarly referee for:

The University of Arizona Press  
 The University of Nevada Press  
 The University of Oklahoma Press  
 Texas Tech University Press  
 The MIT Press  
 Lehigh University Press  
*Technology and Culture*  
*Western Historical Quarterly*  
*Pacific Historical Review*  
*IA: The Journal of the Society for Industrial Archeology*  
*The Public Historian*

#### TEACHING AND PROFESSIONAL EXPERIENCE:

Fall 1998- Present: Associate Professor of History, Lafayette College

Fall 1997- Spring 1998: Sabbatical Leave from Lafayette College

Fellow, Dibner Institute for the History of Science and Technology  
 Massachusetts Institute of Technology, Fall 1997

Fellow, Center for the History of Business, Technology and Society at the Hagley  
 Museum and Library, Wilmington, Delaware

1989-1999: Assistant & Associate Professor of History,  
 Lafayette College, Easton, PA.

Taught courses in:

Out of the Past: Themes in American History (1607-1980)

American History Since Reconstruction (1870-1980)

Transformation of the American Environment

Progressivism in America (1870-1920)

Recent America (1930-1980)

History of Technology

Seminar on the History of American Technology

Seminar on the History of the American West (1800-1930)

Senior Colloquium on "Water and Society"

Value, Science and Technology Seminar on "Water and Society"

Spring 1993: Junior Faculty Leave, Lafayette College

Fletcher Jones Research Fellow, The Huntington Library, (Spring 1993)

1988-1989: Research Fellow,  
Philadelphia Center for Early American Studies, University of Pennsylvania

1988: Visiting Lecturer, History Department, Drexel University.

Survey course on the history of science

1987: Visiting Lecturer, History and Sociology of Science Department,  
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Taught courses in:

American Technology Since 1880 (HSS 222)

Technology and Society (HSS 003)

1985-1986

Pre-doctoral fellow, National Museum of American History, Smithsonian Institution

1981-1983

Graduate student, University of Pennsylvania

1975-1981; 1983-1985

Staff Engineer

Historic American Engineering Record

National Park Service