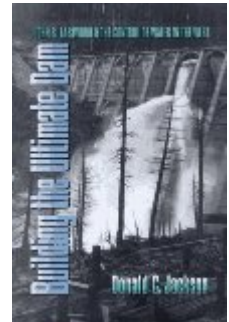


**Donald C. Jackson.** *Building the Ultimate Dam: John S. Eastwood and the Control of Water in the West.* Lawrence: University Press of Kansas, 1995. xii + 336 pp. \$45.00, cloth, ISBN 978-0-7006-0716-7.



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Controlling water has been the key to turning deserts into gardens throughout human history. The American west has provided a case study for historians examining the ways that humans have sought to manipulate their environment for personal and social gain. John S. Eastwood (1857-1924), a minor California hydraulic engineer with strongly progressive leanings, envisioned providing low-cost water storage facilities to start-up hydroelectric companies, irrigation coops, and municipalities in the form of avant garde, high tech, concrete multiple arch dams. By studying Eastwood's career, Donald Jackson carefully illuminated the role played by private corporations seeking profitable long-term investments in turn of the century arid western environments. Further, through the illustration of Eastwood's frustrating failures to flesh out his artistic structural visions in steel and concrete, how important the complex network of interpersonal relationships can be in shaping the destiny of individuals and society. In Eastwood's career, professional conflict with prominent hydraulic engineers wedded to traditional dam technology made getting approval for the construction of his designs diffi-

cult in California. According to Jackson, Eastwood's schemes failed more often than not as a result of personality conflict, social psychology, and the social control objectives of financiers and California business elites.

Jackson's study of Eastwood provides a more sophisticated view of the development of what Donald Worster called the hydraulic society that Americans constructed in the nineteenth and twentieth-century American West. Eastwood participated in constructing this society by designing low-cost concrete multiple arch dams for private corporations that significantly decreased material costs relative to traditional gravity dams. This made the capital-intensive development of large reservoirs possible for small hydroelectric companies, irrigation cooperatives, and small, but growing municipalities, whose limited access to capital made storing water behind traditional gravity dams either unfeasible or too greatly diminished profitability. According to Jackson, who utilized architect David Billington's structural artist philosophy to explain Eastwood's design style, the much less expensive multiple-arch, concrete dam

potentially enabled the little guys to compete for water resources with the California elites, who had access to the coffers of New York financiers. Thus, contrary to marxist historiographical traditions, the engineer worked to provide more democratic access to resource allocation technology.

Though Jackson does not indicate an awareness of his contribution to historiographical traditions beyond those of environmental history and the history of the American West, his study also modifies the marxist interpretation of engineering taken by historians of technology--such as David Noble's assessment of the role engineers play in the production of big technology. While he did utilize the work of some historians of technology, such as Thomas Hughes, whose work on constructing electrical power networks informed his analysis of Eastwood's early career as a hydro-electric power engineer, and those dam historians whose works informed his analysis of dams and dam building specifically, Jackson did not address the contribution his work makes to the larger philosophical arguments of historians of technology. Ironically, not doing so may have actually made the work more readable.

Jackson deserves praise for dealing with the highly technical subject of dam engineering quite lucidly. Jackson explained from the outset that one chapter explained dam design specifically for a lay audience, while another dealt with the same topic in a more technical manner. Other than a few algebraic equations, that might intimidate some readers, he wrote the technical chapter so clearly as to be understood by most reasonably intelligent readers. Those who might find themselves losing a grip on the discussion due to unfamiliarity with jargon will find the glossary particularly useful. (I did sense, however, that Jackson's attempt to be considerate of the general reader might have created some redundancy. Jackson's helpful reminders of previously discussed information tended to be too detailed, which added to the sense of redundancy. These are minor annoy-

ances, however, which, though they detract from the flow of the prose, neither diminish the clarity nor the readability of the work.)

The most troubling aspect of this work was Jackson's interpretative tentativeness. He suggested several significant conclusions regarding Eastwood's fit into the larger context of western hydraulic culture, California politics, and American culture in general. However, he failed to push them very far. For instance, Jackson suggested that Eastwood's efforts to design and build multiple-arch dams, which were less expensive alternatives to the massive gravity dams traditionally built across rivers, were stymied in part by social psychology. John R. Freeman, a prominent East Coast engineer who moved to California and was engaged as a consultant to assess the soundness of Eastwood's designs early in his career, criticized Eastwood's multiple arch dams for not looking enough like a dams. The thin arches, which ranged from several feet at the base to a mere 12 inches some 150 feet above the base seemed too fragile to hold back water and, according to Freeman, would not engender public confidence. Jackson's assessment of reasons why Eastwood's multiple arch dam concept did not live beyond him included the need for Depression-era dam designers to build massive, expensive dams to infuse more money into the economy and also to project the power of the American spirit in the face of diversity, a reaction that Jackson called a "celebration of mass" (246). Jackson seemed compelled to stay closer to Eastwood and his career and turned away from a fuller exploration of these provocative allusions.

Likewise, Jackson failed to explore Eastwood's relationship to certain other trends in California politics. He discussed, for instance, Eastwood's struggle with California's dam regulators, State Engineer Wilbur F. McClure, a proponent of massive gravity dams, whom Eastwood had unfortunately crossed early in his career, and R.W. Hawley, a friendly member of the State Railroad

Commission. However, though Eastwood designed dams for irrigation cooperatives, and Jackson attempted to deal with the notion of democratization of technology, he failed to address Eastwood's relationship with or attitude toward, if any, with agrarian populism or the California Grange. While lack of such a discussion does not undermine Jackson's argument, nor does it suggest poor scholarship—since Jackson's sources demonstrate a thorough grasp of sources—it left this reader with unresolved questions, and a lack or closure.

In summary, Jackson's work provides a clear and suggestive analysis of a lost aspect of the development of the hydraulic culture of the American west and the rather frustrated and tragic life of John S. Eastwood.

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