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Review of *Ogallala: Water for a Dry Land: A Historical Study in the Possibilities for American Sustainable Agriculture* By John Opie

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Ogallala: Water for a Dry Land: A Historical Study in the Possibilities for American Sustainable Agriculture. By John Opie. Lincoln: University of Nebraska Press, 1993. Illustrations, preface, introduction, appendix, notes, index. xxi + 412 pp. \$35.00.

John Opie has considerably advanced the practice of environmental history in his study of the Ogallala Aquifer. Between ten and twenty thousand years ago the runoff from Rocky Mountain glaciers collected as nearly a quintillion gallons of water contained in gravel 150 to 300 feet thick and 50 to 300 feet below a surface area of 174,000 square miles of the Great Plains. This non-renewable natural resource now sustains one of the world's most sophisticated hydraulic societies, a society dominated by pump-irrigation farmers. Their economic production contributes significantly to U.S. exports, undergirds U.S. beef processing, and fills supermarket shelves with inexpensive goods for consumers who largely have no idea about the origins of their food.

Opie houses his study within the framework of nonlinearity and sustainability. He derives nonlinearity from chaos theory, which stresses how systems—in this case irrigation systems in a living High Plains environment—work dynamically and can fluctuate prodigiously as a result of even small changes. Nonlinearity implies that the way a game is played also changes the rules of the game. Opie carefully demonstrates the role of nonlinearity by showing how farmers, through their

exploitation of the aquifer, have undercut the very technology and economy they initially employed. In essence, Great Plains farmers have failed to produce a sustainable farming system “that meets the needs of the present without compromising the ability of future generations to meet their own needs” (p. 303).

Focusing on the old dust bowl region of southwest Kansas and northwest Oklahoma, Opie meticulously describes its natural history, the early—and largely failed—attempts at farming the region, the technological developments in irrigation pumping that made the Ogallala assessable as an economic commodity, the work of Plains farmers to conserve their irrigated farms, and the future prospects for changing agricultural production on the Plains. Clearly, Opie has done conscientious research and presents a compelling story that many should read and heed.

Opie's work represents a decided advance over previous studies of the Ogallala aquifer and farming dependent on it. Nevertheless, nagging questions still arise about his story. Why, for example, does it exclude Nebraska, one of the leading irrigation states in the nation? So long as fuel prices remain affordable, Nebraska farmers are likely to continue their current rate of depleting the Ogallala for the next couple of hundred years. Opie also struggles between head and heart over how he sees farmers. Are these people greedy capitalists who view water solely as an economic commodity, or are they republican-minded yeomen with a strong affinity for the land? Can they be both at the same time? Is water a commodity? The Kansas Water Act of 1945 clearly intended to make water an economic commodity subject to market trends, and Kansas farmers certainly work within this legal structure. Opie also struggles with a fundamental dualism: are people *in* nature, or are they apart from it? Sometimes he sees them one way, then shifts to another. Resolving these ambiguities remains difficult for even practiced environmental historians such as Opie and certainly should not deter anyone from reading this work.

Opie presents a compelling story of maladaptation on the Great Plains, along with great sympathy and understanding of the region's people. He draws his conclusions from a keen understanding of those who have used, and presently use, the aquifer, of the land and aquifer themselves, and of the economics and ecology encompassing and enveloping the region. His thoroughly researched book will stand as model for others to emulate and expand upon.

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