been concerned with the spatial response of the emergence and development of canal irrigation. It is clear that bureaucratic requirements of canal irrigation fostered the emergence of centralization and, subsequently, Cultural anthropologists have been regarding the linkages between irrigation, organizational structure, and production that technology, and the role of hydraulic organizations and others not directly concerned with the former class of linkages. We establish, but the latter has its difficulties. In any case, establishing socio-political effects of water provides powerful support for a model of cultural change.

As these theoretical considerations show, it becomes apparent that agrarian societies have empirical resolution of these pet-project information. Subsequently, sociopolitical projects have been aimed at reformulating some visible aspects of the issue (the Tehuantepec, Dzitya, and Uruat, and Suxentown Projects). To a lesser degree, the discussions have also moved to more cautious, case-by-case approach:

of both types of study map: the 1983-1984 project by Gibson and Theodore Downing on Society (University of Arizona, Lee’s research on canal irrigation, and the major contribution). Evidence and debate. Lee was the ethnographer of the Oaxaca Paleoecology Project. This is the perspective by Kent Flannery, an image of Mesoamerican prehistoric reports have been published. To work in an area, the Valley of Oaxaca, a natural laboratory for testing hypotheses. Its hundreds of small villages practice several types of agriculture, each community grows its own culture. The demographic situation for control.

over, Oaxaca is one of the hot-world known to have had a "time in the Lam Formative," a period that occurred. Settlements: a number, expanding out of the many of the numerous tributary systems. A more settled, state-like society to dominate the Valley and develop into these events being related? In this ideal setting, Lee in 20 canal irrigating villages, for investigation of these, and several archaeological excavations. Work on these rich data and interdisciplinary research are presented: Sociopolitical Aspects of Canal of Oaxaca. The "aspects" are...
been concerned with the spatial and temporal correspondence of the emergence of the state and the development of canal irrigation. Some have suggested that bureaucratic requirements of the development of canal irrigation fostered the emergence of political centralization and, subsequently, social stratification. Cultural anthropologists have been synchronized, searching for linkages between irrigation technology and the organizational structures and processes necessary to operate that technology, and they have expanded this inquiry in order to understand the linkages between hydraulic organizations and other sociopolitical structures not directly concerned with water management. The former class of linkages was relatively easy to establish, but the latter has proved fraught with difficulty. In any case, establishment of the derivative, sociopolitical effects of water management would provide powerful support for a cultural materialist model of cultural change.

As these theoretical considerations crystallized into testable hypotheses, it became apparent that an empirical resolution of these problems required more information. Subsequently, several well-known archaeological projects had been accumulating data and systematically reformulating some of the more highly visible aspects of the issues (the Oaxaca, Chan Chan, Teotihuacan, Diquis and Uruk, Valley of Mexico, and Smokwakan Projects). To a lesser extent, ethnographic discussions have also moved from speculation to a more cautious, case study approach. Recent examples of both types of studies may be seen in McGuire Gibson and Theodore Dawson's "Irrigation's Impact on Society" (University of Arizona Press, 1974).

Lee's research on canal irrigation had the potential of being a major contribution to this accumulating evidence and debate. Lee was fortunate to be an ethnographer in the Oaxaca Pre-history and Human Ecology Project. This interdisciplinary project, inaugurated by Kent Flannery, has transformed our image of Mesopotamian prehistory even before its final reports have been published. Lee was also fortunate to work in an area, the Valley of Oaxaca, which is a natural laboratory for testing irrigation related questions. In hundreds of small Zapotec-peasant communities practice several types of irrigation. With few exceptions, each community constructs, maintains, and allocates its own water, creating an ideal ethnographic situation for controlled comparison. Moreover, Oaxaca is one of the half dozen areas in the world known to have had a "Prestate State." Sometime in the Late Formative, a remarkable cluster of events occurred. Settlements increased in size and number, expanding out of the alluvia and up along the numerous tributary streams which intersect the valley floor. A more stratified, state level organization began to dominate the valley and canal irrigation was developed. Are these events causally or causally related? In this ideal setting, Lee interviewed officials in 25 canal irrigating villages, focusing on an in-depth irrigation of three, and 14 others participated in several archaeological excavations. The results of her work on these rich data and opportunities for multi-ethnic studies are presented in her book, "Sociopolitical Aspects of Canal Irrigation in the Valley of Oaxaca." The "aspects" are presented in five closely related essays which will be conveniently taken up in turn.

In the first essay, Lee turns to her survey of 20 Oaxaca communities for answers to these questions: Will communities with similar water sources or irrigation technologies display similar solutions to problems of water management? Will similar water management arrangements have any notable effects on non-water-related social or political organization? Although she has adequate data to perform a controlled comparison, she opts for a general description of village community organization and problems of water control. She argues that a general theme of equality and the sharing of community obligations pervades village community organization. Moreover, villages have been, until recently, relatively autonomous, controlling their internal affairs. These arguments are general, made without reference to specific communities. The methodology is reminiscent of an earlier period in American ethnography when pan-cultural generalizations were supported by reference to a few illustrative examples. How is one to determine the validity of the generalizations? Likewise, the treatment of water control problems and solutions suffers from the same lack of a systematically stated comparative methodology. Lee argues that the construction and maintenance of irrigation has no discernible, systematic influence on the organizations need to manage canal irrigation. Therefore, it follows that community management of canal irrigation can have little effect on any other sociopolitical structures. She feels that the general themes of equality and community organization dominate the organization of irrigation tasks. If true, Lee's argument would have serious negative implications for those espousing cultural materialism. Unfortunately, the three tables of ethnographic evidence seem neither to support nor refute the argument. Modern ethnographic comparisons demand at least some systematic comparative or statistical proof of generalizations. Lee concludes that "variations in population size, type of water resource, type of irrigation device (except for large government dams), or even village status ... do not seem to affect the nature of the office in charge of water control" (p. 40) is unsupported, although it might be correct.

Having shown herself strongly on the side of those who discount the powerful causal effects of water management on a regional level, Lee then attempts to negate any relationship between water control and political organization at the intra-village level in the next essay. To discover if the control of water has any derivative consequences on political organization, she searches the ethnographic evidence on three canal irrigating villages for answers to the following questions: Do upstream irrigators have any political power over downstream irrigators? No. People hold rights to nonconiguous parcels of land which may be upstream and downstream. Can political officials manipulate the allocation system in their favor? No. Since the office is held on a rotating basis with no reelection, it is impossible for an official to manipulate the allocation system in his favor or for any length of time. Wealth and political power accrue to those who are older and have more land, not to those with access to the
management of the water system. Thus, her conclusions are perfectly consistent with the first essay. Casual irrigation itself has little, if any, effect upon community political organization (p. 81). Once again, this conclusion may be correct, but the manner in which the problem has been stated militates against any final evaluation. One conceptual problem concerns Lees' decision to use office holding in the civil-religious hierarchy as an indicator of political power. This is too narrow a definition of the concept. John Corbett, Eva Hunt, and others have established that sustained political power may be in the hands of Oaxacan villagers who seldom hold a formal political office such as local level PRI committee and caciques. Lees' decision to use only data on the formal political structure as an indicator of political power weakens the conclusion, since the question remains whether wealthy individuals may manipulate the water control system to their political and economic advantage without formally holding an elected office. Eva and Robert Hunt have shown such manipulation is possible in the Cuicatec region of Oaxaca, but Lees does not test the real issue as to whether differential control of irrigation water influences the local, informal system of power distribution. If I am interpreting Lees' information correctly, it appears that gaining political power depends more on access to land than water. Access to land is determined by the systems of marriage and inheritance. If this is the case, water control may be a force that sustains power and wealth inequalities that are ultimately a consequence of inheritance processes. We just don't know.

At this point, Lees strays into the materialist camp and (reversing her field) argues that local political organization can be affected by decisions regarding water control not made at the local level. In the next essay, it is claimed that the state may gain access to the village's political system by introducing an irrigation project which is complex or expensive that the village alone could not build or support it. As in the earlier essays, critical evidence to support the argument seems wanting. Although she shows that the intervention of state agencies in village water projects leads to a loss of village autonomy in decisions affecting the allocation of water, she fails to provide a single example of how this loss of autonomy in water control leads to a subsequent loss of a village's political autonomy in other non-water related social and economic spheres. Moreover, it appears that there are several other potential resources, other than irrigation water, which Mexico is using to reduce the political autonomy of Oaxacan villages. These alternative resources include portable water, electricity, federal schools, and roads. In may be that strategic control of another resource results in the same sociopolitical ends that are hypothesized for irrigation water. The argument might be that the state emerges when a centralized authority is able to penetrate the system of local control of a region by effectively controlling (or mediating among) a variety of resources, one of which may be irrigation water. The list of alternative resources includes salt, military support routes, and social or economic mobility into higher strata. Rather than toss out the materialist baby with the anti-Wittfugelian bath, we should be more concerned that a materialist explanation of cultural change receives a fair test. Otherwise, the reaction of Wittfogel may twist many, like Lees, into awkward theoretical positions. The archaeological implications of this emerging modification of the pro-Wittfogelian position, if it can still safely be called that, remain to be worked out.

In the fourth essay, Lees refrains from any conclusions, content to organize current knowledge and speculations concerning diachronic aspects of Oaxacan water control. There is a good reason for her caution. If she had attempted to apply the theoretical position of the preceding essays to interpreting Oaxacan prehistory, she would have had to argue that since the organization of contemporary water management is a consequence of the extra-community sociopolitical structure, then the past organization of water control is a consequence of past super-community administrative organization. Such a conclusion does little to help archaeologists who have less information on prehistoric sociopolitical structures than they have on irrigation systems.

The fifth and final essay compares aspects of irrigation in other societies. Six topics are singled out for comparison: social change, variation according to resource type, cooperative labor, water distribution, disputes, and village-state relations. Cross-cultural generalization after cross-cultural generalization abound in this short chapter. For example, the topic of water distribution is narrowed to a discussion of how six societies handle what Lees considers an intrinsic conflict situation between upstream and downstream irrigators. She looks at two tribes, two chiefdoms, and two agrarian societies and discovers variations in water distribution within each of these three levels, that is, each pair shows differences at each level. She facilely concludes that "at similar levels of complexity, different solutions to the problem of water distribution are found" (p. 116). Naturally, this conclusion supports the arguments from the earlier chapters, but what type of a comparative methodological stance stands behind these and other generalizations in this essay?

Concluding the five essays, Lees stresses the not inconsiderable implications of the book's argument. "If certain characteristics in the nature of water as an agricultural resource either require nor produce specific regular social responses in and of themselves, should we disregard these characteristics entirely when we consider the role of water resources in social organization and cultural evolution? Is the latitude for variation so great that we can discover no relationship between the nature of the resource and social responses?" Then, in an amazing two-step, "Although the discussion of the past few pages may seem to have indicated that this is true, we have reason to suspect that it is not" (p. 129). By the past few pages," she is referring to 97 percent of the book. In the last four and one-half pages, she attempts to regain her credentials as a cultural materialist by arguing that irrigation permits an increase in the "effectiveness of production." Unfortunately, the argument never defines what "effectiveness" means. Although it would take another book to clarify the confusing perspectives on Oaxacan irrigation emerging from this book, let me bring it to a close with a few words on the effects of irrigation and reorganization. Yes, Oaxacan exhibit considerable variability, but this variation is patterned. Yes, the data on control and social organization and the efforts of archaeologists and historians, but unraveling the story, the supra-structure has emerged the past two thousand years. Today when we have a good understanding of the changes, the Oaxacan Valley has witnessed changes in local human and natural environment and the society through the years. On a small hacienda system, the
from this book, let me bring up a few points to ponder
for those critics who denigrate or wholly deny the
effects of irrigation and resource control on social
organization. Yes, Oaxacan irrigation practices do
exhibit considerable variation, but we still don’t know
if this variation is patterned or random as the book
suggests. Yes, the data on prehistoric Oaxacan water
control and social organization is painfully inadequate
despite the heroic efforts of several dozen archae-
ologists and historians. But we still may anticipate an
unraveling of the story. We do now that state
supra-structure has undergone considerable changes in
the past two thousand years, not the least of which
was the subordination of the region under a colonial
structure following conquest. Subsequently, the
Oaxaca Valley has witnessed the growth and decline of
cochinit and coster beans, export industry, depopulation
and resettlement, the development and demise of a
small hacienda system, chaos and revolution, and
economic development and stagnation. Are we to
assume, based on the argument of these essays, that
we need no longer search the diachronic record of
these basic techno-environmental and economic
changes for indications of subsequent changes in
sociopolitical organization? I think the answer is not
as nihilistic as Lévi claims. If she has contributed some
cogent and appreciated arguments against the facile
hypotheses associating the control of irrigation with
political authority and the rise of the state, she has
also masked the real nature of present socio-
materialist questions. More archaeological and
ethnographic evidence, more careful analysis of data,
and more refined conceptual distinctions are needed in
the next book in this continuing debate.

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