

peers have been! He evidently had in fair measure the seemingly prevalent attitude of the friars that he was dealing with creatures "of the brute creation," or children, when he was attempting to minister to the Mission Indians. Nowhere, or at least rarely, does the reader clearly get the idea that the Indians, in Boscana's notion, had any redeeming qualities in their pagan beliefs, or possibly any rational explanations for their apparently peculiar actions while engaged in their native rituals. This becomes almost ludicrous in light of the idea tentatively held by A. L. Kroeber and surely not too difficult to apprehend in Boscana's writing, that the Indians could possibly have been emulating or reinterpreting some Christian beliefs when they were observed by Boscana, perhaps most intensely around 1822, fifty years or so after the appearance of the Spanish missionaries. By this date, and under the unusual circumstances, they certainly had enough time to absorb a few ideas from the Spanish into their original spiritual concepts.

It seems in retrospect that A. L. Kroeber, another of the rivals in scholarship appointed as such by Harrington himself, would never in his lifetime have desired (apart from the linguistics) to produce the kind of annotations that Harrington does here. Kroeber's mind ostensibly was on a different plane when it came to reporting details, and it is surprising that in his 1959 monograph about Boscana, Kroeber did not at least hint that Harrington could be accused of a kind of voluminous overkill and sometimes even triviality among all the gems of sleuthing.

Despite these few qualifications, it is plain that anyone interested in California Indians or in world religions cannot afford to be without this basic volume. The Malki Museum Press is to be commended for making such a handsome edition available, and it is to be hoped that some day the few remaining missing pieces of the entire story may be pro-

duced, resulting in definitive comparisons of the original Boscana manuscripts with their several reprintings and translations.

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Late Prehistoric Human Ecology at Lake Cahuilla, Coachella Valley, California.
Philip J. Wilke. Berkeley: University of California Archaeological Research Facility Contributions No. 38, 1978. 168 pp., 5 appendices, 26 figs., 14 tables. \$6.75 (paper).

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This volume is the result of carefully executed research which forms part of a much more extensive research program for the Coachella Valley. In fact, the most impressive feature of this report is the amount of information generated from the analysis of such limited primary data. Wilke's ability to achieve this so successfully relates no doubt to his clearly stated problem-oriented approach. The oral tradition of the Cahuilla and Kamia, relating to the formation and desiccation of Lake Cahuilla, is taken as the beginning point for the development of a model of the late prehistory of the Coachella Valley. From this oral tradition, together with earlier paleo-environmental, geological, archaeological, and historical investigations, Wilke creates a

carefully structured model of culture history. This model is necessarily based on incomplete and inconsistent data, but as Wilke states (p. 13) ". . . without some kind of framework it is difficult to raise or in any way consider questions of changing human ecology in the basin."

Wilke views the formation and desiccation of Lake Cahuilla as a primary causal factor in the late prehistory of the Coachella Valley. This prehistory incorporates two distinct periods: (1) period of lacustrine adaptation to Lake Cahuilla, and (2) period of adaptation to the return of the desert.

Wilke follows the development of the model with a description of the aboriginal environment of the Coachella Valley. This can be considered in two parts. First a rather traditional description of the geology, geography, climate, and vegetation, with considerable space devoted to the description of plant communities. The second part is a description of Lake Cahuilla and is necessarily more interpretive. The formation of Lake Cahuilla obviously created conditions that are no longer present in the Coachella Valley. There were apparently extensive freshwater marshes that supported economically important plants along some portions of the lake shore. Behind the marshes the shoreline graded into the mesquite covered shoreline dunes. Shellfish (*Anodonta dejecta*), waterfowl, and five species of fish were also supported by the lake.

The chronological placement of Lake Cahuilla involves the evaluation of a large body of radiocarbon data, historical records, and cross-dating with selected artifact types. The radiocarbon dates and historical records are not consistent, in that 13 of 31 radiocarbon dates for Lake Cahuilla fall within the last 400 years, yet the 17 accounts by early explorers between 1539 and 1774 fail to report any lake in the basin. However, a map of John Rocque (ca. 1762) in the cartographic archives of the British Museum clearly shows

the Colorado flowing into a lake north of the Colorado Delta that had no outlet to the sea.

Wilke carefully evaluates these data and in the end rejects the late radiocarbon dates. With these changes his historical data, radiocarbon dates, and cross-dating of artifacts support an interpretation of three lacustral intervals of Lake Cahuilla during the last 2000 years: (1) 100 B.C. to A.D. 600; (2) A.D. 900 to 1250; and (3) A.D. 1300 to 1500.

The recession of Lake Cahuilla began about A.D. 1500 and the basin had returned to essentially desert conditions by the time the first Spanish arrived about 1540. This transition from aquatic to desert conditions is thought by Wilke to have taken only 55 to 60 years, with a lag of several decades for the establishment of the desert vegetation.

The ecology of lakeside adaptation at Lake Cahuilla during its most recent high stand is examined. The data are drawn from analysis of human coprolites and midden deposits obtained from four shoreline campsites: Myoma Dunes, Wadi Beadmaker, Bat Caves Buttes, and Travertine Rock.

Myoma Dunes, located on the northwest shore of Lake Cahuilla near La Quinta, is an "almost continuous belt of archaeological sites, including shallow middens of *Anodonta* shell, vast scatters of ceramic sherds, burned rocks, and other artifacts, and bones of birds, fish, and other animals." Three beds of coprolites and two collections of bird bones from the surface of a deflating midden are the material analyzed from this site.

Wadi Beadmaker is located on the northeast shore of Lake Cahuilla 30 miles southeast of Myoma Dunes. Excavation here yielded about 70 coprolites, a considerable amount of faunal remains, and a fair collection of ceramics and other artifacts. Only the analysis of the coprolites and the faunal remains (which included large quantities of fish bones as well as some remains of terrestrial fauna) are considered here.

Bat Caves Buttes is a rocky outcrop atop Durmid Hill, at the Riverside-Imperial County line. This prominence formed the only island of significance in Lake Cahuilla. On a spit extending out from the buttes were many fragments of eggshells and bones of immature large aquatic birds in what had been a large cooking fire, and potsherds from what appeared to be a single cooking vessel. This all appears to have been the result of aboriginal hunters raiding an island bird rookery just prior to the young birds leaving the rookery.

Travertine Rock projects into the Salton Basin from the Santa Rosa Mountains on the Riverside-Imperial County line. These rocks formed tiny islets just off the west shore of Lake Cahuilla. Hubbs and Miller (1948:107) reported fish bones in midden in the crevices on top of this rock.

Wilke's analysis of coprolites and floral and faunal remains from these sites provides a surprisingly detailed picture of the prehistoric living conditions at Lake Cahuilla during the most recent stand. The inventory of faunal and floral remains at the Myoma Dunes included heavy representation of wetlands resources (shellfish, fish, and aquatic birds, as well as freshwater marsh plants), but also included animals and/or plants from nearby lowlands, the Creosote Bush Scrub community, and adjacent uplands. Cattail pollen in some coprolites indicated spring occupation, while *Dicoria* seeds in others indicated winter occupation, and a variety of plant and animal remains indicated summer and fall occupation. Also, co-occurrence of *Dicoria* seeds with other fall and summer seeds indicate storage of the latter for winter consumption.

Wilke notes that the coprolite analysis is biased in that large game animals and certain plants (e.g., Agave) are not likely to be represented in the coprolites even though they were undoubtedly part of the diet. Evidence for consumption of these resources must come

from the midden refuse, which Wilke also analyzed.

From these analyses Wilke postulates a settlement model for the period of lake adaptation with permanent year round occupation of certain lakeside sites and seasonal occupation of others, including small hunting and fishing stations at lakeside and temporary hunting and gathering sites in the uplands where Pinyon, Agave, and Bighorn Sheep can be obtained. During the period of high lake stand between A.D. 900 and 1500 a large population was supported along the lake shore. It is clear that the lacustrine adaptation provided a majority of the resources, even though the economic pattern included the utilization of other ecological zones.

This was an effective subsistence pattern, but it ended rather abruptly with the desiccation of the lake. The necessary adjustment to the changing lake can be seen along the receding shorelines of the lake where fish weirs appear in 15 construction episodes recording the lake recession. As the lake resources declined, the population must have moved elsewhere. Wilke reviews the data accumulated from neighboring regions. These data suggest an increase in intensity of land use, and presumably population, in these regions at about the same time the lake began to recede. These sites, including temporary camps, milling stations, mescal pits, and the like, represent a range of activities and reflect a diversified food quest pattern typical of the historic Cahuilla. The final phase of adaptation to desert conditions came with the revegetation of the lake bed with desert plants. The Cahuilla also record an oral tradition of returning to the valley from the mountains which apparently represents this final phase of adaptation to the desert.

Another critical point made by Wilke is that there is no indication that agriculture was practiced by the occupants of the lakeside sites. A few squash seeds were recovered from

the Myoma Dunes sites, but the coprolites there produced no pollen of domestic plants. Therefore, the squash probably were not grown locally. Wilke notes, however, that agriculture has some antiquity among the Cahuilla; it figures prominently in myth and ritual and there are Cahuilla terms for crop plants and planting methods. The crops themselves derive from the Lower Colorado agricultural complex.

From this Wilke concludes that agriculture is best viewed as but one aspect of Cahuilla Indian subsistence that had arisen by early historic times.

Late Prehistoric Human Ecology at Lake Cahuilla is of major importance to scholars of California Desert prehistory. It provides the first clear picture of the changing lake stands in the Salton Basin and the probable cultural changes and population movements that followed. The catastrophic changes in Lake Cahuilla must have had far-reaching influence over a wide area of southern California. The significance of these changes for the late prehistory of adjacent areas should be apparent to the reader.

Wilke is to be commended for providing a carefully constructed and well-executed model of the late prehistory of Coachella Valley. Not only is it relevant to current research in the California deserts, but it is so constructed as to stimulate hypotheses that will test its validity. Those who wish to disagree with Wilke will find that he has cleared the way for easy debate—provided the dissenter is in command of appropriate data.

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The Ancient Californians: Rancholabrean Hunters of the Mojave Lakes Country.

Emma Lou Davis, ed. Natural History Museum of Los Angeles County, *Science Series* 29, 1978. \$10.00 (paper).

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“The Mojave Desert is among all things contradictory” are the opening lines of an archaeological report that, like its subject matter—the reconstruction of prehistoric lifeways in the lacustrine basins of the north-west Mojave Desert—is both controversial and contradictory, speculative yet factual, tangible but agonizingly illusive. The author clearly states that this book is “experimental” and those of us who know her agree—the book is experimental—life is experimental—and she is to be commended for saying what she believes and believing in what she says.

The book (site report? monograph?) may be divided into three parts. First, an introduction by Davis and her co-author Carol Panlaqui of the Maturango Museum, Ridgecrest, California, to the locale—the basin of ancient Lake China which at 12 thousand years ago and from two to six thousand years ago formed one of the lakes comprising the runoff system along the eastern edge of the Sierran escarpment. Second, a detailed archaeological study of approximately fifteen “sites” or, more precisely, concentrations of archaeological material spatially associated with a series of long transects and exhaustively mapped quadrats coinciding with the east shore of the now vanished lake. Third, a trilogy of supportive papers dealing with Holocene palynological history (P. J. Mehringer, Jr.),