man" assemblage needed only pottery to make it Yuman II. He described this pattern as containing "the shallow-basined metate, unshaped mano, small round mortar, triangular knife, triangular arrowpoint, and bone awl" (Rogers 1945: 174), and noted that trade with the Pacific Coast was reflected in the occurrence of shell ornaments and pelican bone whistles. The Oro Grande site appears to be a local expression of Rogers' "non-ceramic Yuman" pattern. Questions might be raised regarding its relationship to the spread of the Hakataya (Patayan, if you prefer) as well as to the protohistoric remains of Takic-speaking Serrano on the Mojave River.

Rogers (1945) also claimed the Mojave Sink was a "climax area" because the people there were middle men in a trade network between the California coast and the Southwest. The quantity of beads and ornaments at Oro Grande appear to support Rogers' contention and could be used to address questions regarding the nature of the trade network.

Archaeological Studies at Oro Grande is an appropriate title—these studies rarely extend beyond the boundaries of the site. This is a descriptive report that contains a large quantity of data that are of major importance to Mojave Desert archaeology. It may be unfair to criticize this report for not being the report the reviewer would like to have seen. However, it is my opinion that it is unfortunate that the high standards applied to the descriptive archaeology in this report were not extended to analysis and/or synthesis. The data from the Oro Grande site certainly warrant it.

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In a recent overview of California prehistory, the archaeology in north-central California was characterized as follows:

> much of the archaeology so far performed in northeastern California has had cataloging as its chief inspiration. There have, however, been a number of instances in which the decision to excavate a site has been preceded by the phrasing of specific questions in order to resolve identified problems in understanding. When that has happened, the results almost always have been exciting [Raven 1984: 459].

During the summer of 1983, INFOTEC Development, Inc., tested seven prehistoric sites 25 to 30 miles north of Redding along the upper Sacramento River as part of a proposed re-alignment of Interstate 5 (I-5). The resulting report, *Archaeological Investigations in the Sacramento River Canyon*, was completed in 1984. This review considers whether or not the results were particularly exciting.

The report is organized in a fairly traditional manner, with several introductory chapters (e.g., Research Context, Research Design, Research Methods, Data Categories), followed by site descriptions and a concluding chapter. About one-half of the volume is appendices, detailing specialist studies (e.g., geomorphology, obsidian sourcing, radiocarbon dating, etc.). The introductory and concluding chapters were written largely by Christopher Raven, while the intervening site summaries were authored by six different individuals.

Some discussion of the preliminary chapters is warranted since they set out INFOTEC's expectations and method of approach, against which their results can be measured. Chapter 2 (Regional Context) discusses four "areas of inquiry," including "environmental parameters," "the ethnographic record," "archaeological investigations," and "the historical record." The following chapter presents "research domains, objectives, and questions." For example, the Sacramento River Canyon is treated as a research domain, with four principal "objectives" (e.g., "define the Sacramento River Canyon as an ecological setting for hunter/gatherers during the Holocene epoch") and 23 questions (e.g., "what observations can be made on the geomorphic, hydrologic, faunal, and floral stability of the Canyon ecosystem throughout time"). Altogether, there are three research domains, 11 research objectives, and 44 research questions. These are followed by some 10 data requirement categories and 50 subcategories. The final introductory chapter describes research methods.

While very detailed, these preliminary chapters have several shortcomings. First, no mention is made of recent work by Sonoma State University at high elevations in nearby Trinity and Humboldt counties which resulted in the generation of several important hypotheses regarding regional prehistory. Most germane to INFOTEC's I-5 project is the proposition of Hildebrandt and Hayes (1983) that during the "Middle Period" (ca. 500 B.C. to A.D. 500) use of the higher elevations was mostly abandoned due to environmentally related resource depletions, resulting in major relocations to low-elevation riparian areas. The hypothesized settlement shift was accompanied by related changes in subsistence practices, foremost among them being development of an economy focused on acorns and anadromous fish. The I-5 project, involving excavations along the Sacramento River, would seem to have provided an ideal test case for these ideas. Also disappointing is the absence of any explicit models that link research questions with data expectations. For instance, one of INFOTEC's research objectives entailed contrasting Wintu (Penutian) and Okwanuchu (Hokan) histories in the Sacramento Canyon. While an interesting problem, no mechanism is developed that would provide the investigators with a means to discriminate between these two groups protohistorically, or between their ancestors prehistorically. In other words, how would the data pattern archaeologically such that one population could be distinguished from the other? What is missing from this, and other research questions put forth in Chapter 3, are the test implications and corresponding proofs.

Chapter 6 presents summaries of each site excavated. The materials recovered (e.g., artifacts, ecofacts) are described separately in

Chapter 5 (Data Categories) and the various appendices. More complete site reports were supplied to CALTRANS earlier to satisfy a separate contract requirement. The various appendices include reports by a smorgasbord of specialists, including Jonathan Davis (geomorphology), Donald Grayson (faunal remains), W. Geoffrey Spaulding (botanical remains), Thomas Jackson (obsidian sourcing), Thomas Origer (obsidian hydration), and K. Morgan Banks (flaked stone artifacts). Both the appendices and the site summaries are well-written and thorough. The graphics—photographs, maps, artifact illustrations—are particularly well done.

Several interesting findings are described in these sections. For instance, a large collection of incised stones, previously unknown in north-central California, was recovered from several sites. Obsidian sourcing results are also somewhat surprising, in that 255 of 273 specimens are from the Grasshopper Flat / Lost Iron Wells source and only 11 are from the Tuscan source, whereas previously studied sites in Shasta County have a much higher percentage of the more locally available Tuscan obsidian. The appendix on geomorphological investigations, while brief, is a welcome addition to this and any excavation report for north-central California where soil and cultural histories are intertwined in ways often difficult to unravel. Two criticisms of the appendices might be mentioned here. In spite of INFOTEC's research objective concerning environmental history, pollen work was limited to on-site collection, with no samples taken from the rather common bogs and lakes that occur in the mountains just to the northwest. Second, obsidian hydration played only a minor role (fewer than 100 specimens) in the analyses. Considering the abundance of obsidian at the project sites and ongoing studies of obsidian use in prehistoric northern California, the small sample chosen for hydration analysis is difficult to explain.

Chapter 7 (Conclusions) summarizes the results within the framework of six topics (e.g., "Chronology," "Paleoenvironmental Conditions," etc.). While this chapter begins with the statement that "we were . . . looking not so much for definitive answers as for profitable questions," it is not unwarranted to expect that such a well-funded project produce more substantive results even if not contractually required. For example, with regard to projectile points and "Chronology," it is concluded that:

> three groups have been identified, although emphatically they are *not* designated as phase markers; while these point types may eventually be so designated, the small sample size, scattered provenience, and ostensively mixed stratigraphy at most of the sites make such a determination premature until further excavation and analysis of larger samples can define their relationships more precisely [emphasis in original].

Based on cross-dating the point groups, obsidian hydration results, and radiocarbon dates (2310, 900, and 700 B.P.), the authors suggest that the canyon was permanently occupied for at least 4,000 years and perhaps sporadically used for several millennia earlier. Concerning "Subsistence Orientations and Settlement," the authors state that "the realities of the apparently available data have required that we mute our original expectations regarding the area's potential for contributing to a better understanding of forager systematics." Raven (1984: 468) stated that in northeast California "excavations *coordinated with* site surveys will be required if we are to begin to understand the human geography of the area, and if the results are to be integrated with ethnographic land-use models" (emphasis in original). One wonders why in the I-5 study, no use was made of the many survey reports already completed for the upper Sacramento River drainage. Similar negative results were also encountered with

respect to "Ethnicity and Intersite Variability" and the "Shasta Complex." In both cases, the authors seem to suggest that the limitations of a testing program with 1 x 2-m. units were mostly to blame.

Taken together, the concluding remarks seem to indicate that little success was made in meeting the stated research objectives. The authors indicate that the quality and quantity of data actually available from project sites in the canyon were largely responsible. However, this reviewer feels the lack of more demonstrable results can be at least partly traced to the absence of an explicit linkage between research problems, methods, and data. Without specifying how questions would be answered and how the data should pattern archaeologically, one is left concluding, as INFOTEC seems to, that the only solution is more digging. While such a conclusion may be appropriate for a testing contract, the results –of what was, as of 1984, the largest archaeological endeavor ever undertaken in north-central California–seem to be, well, not that exciting.

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The Material Culture of the Chumash Interaction Sphere, Vol. II: ***Food Preparation and Shelter.*** *Travis Hudson* and *Thomas C. Blackburn.* Los Altos: Ballena Press *Anthropological Papers* No. 27 (Ballena Press / Santa Barbara Museum of Natural History Cooperative Publication), 1983, 461 pp., 447 figs., 3 tables, 1 map, index, $24.95 (paper), $39.95 (cloth).

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These are the first two of a five-volume series that presents the known ethnographic data concerning the material culture of the Chumash and adjacent groups. The ethnographic notes of John Peabody Harrington represent the largest portion of the data. Other ethnographic sources are also incorporated and photographs of many ethnographic and some archaeological specimens are used to illustrate many artifact types. Most of the ethnographic data presented have previously been available only as unpublished notes. Hudson and Blackburn have carefully organized these notes and incorporated most published references to artifacts used by the Chumash. Many of the numerous photographs of ethnographic specimens in these volumes have not been published and provide important documentation of Chumash material culture.

Although virtually all of the Chumash and neighboring groups to the east were incorpor-