and entries, making it possible to follow certain intellectual threads. The annotations are uniformly succinct and well-conceived. Readers will find it exciting to review the volume, discovering many new sources to add to their libraries (I found quite a few, particularly on religion, collections abroad, plant uses, and linguistics). Every chapter seems complete, accurate, and virtually error-free. Chapter 6 (First Contacts: 1542-1780) is a particular delight, bringing a listing of all of the early diaries, accounts, and translations together in one place for the first time. Indeed, a similar section focused on resources pertaining to the Mission and early American eras (1780s to 1890s), which Johnson would be uniquely qualified to produce, would be a welcome addition.

In addition, perhaps it would be feasible to add a listing of images (early photographs, drawings) of the Chumash and their art and technologies. There are roughly 100 rock art entries in the bibliography—which would be nicely complemented by a reference guide to art images and to institutional resources such as rock art archives in the state—and about 60 linguistics entries, including quite a few immediately forthcoming works on current investigations. These sections appear to be very comprehensive. Review of the physical anthropology chapter led to the surprising and historically interesting discovery that there are fewer than 40 entries, most of which date either to the 1920s (and earlier) or to the period 1978-1998, during the era that Phillip Walker and his students have been active in their wide-ranging research on health, disease, stature, and conflict. And last but not least, the education-related annotations are a great source for primary and secondary teachers and museum personnel who want to guide schoolchildren and nonprofessionals to these resources. The reviews section directs readers to multiple, interesting, and sometimes divergent professional opinions about many of the book-length works on the Chumash published over the past 40 years.

This volume is quite an achievement and will no doubt find a prominent place on the shelves of most scholars, educators, and libraries throughout the state. I suspect that the future will witness updated versions on CD-ROM or on the web. My suggestions for new sections should not be misconstrued as criticisms in any sense. To the contrary, this volume is so good that readers' appetites will be whetted for much more. It would be all too easy to underestimate just how much careful scholarship went into this volume. Holmes and Johnson are to be thanked and congratulated by the entire academic community in California for an outstanding contribution.

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Unit Issues in Archaeology: Measuring Time, Space, and Material. Ann F. Ramenofsky and Anastasia Steffen, eds. Salt Lake City: University of Utah Press, 1998, 245 pp., 53 figs., 18 tables, index, $55.00 (hard cover), $25.00 (paper).

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The common theme that runs through the eleven papers in this book is a critical examination

of the classificatory units used in the analysis and synthesis of archaeological data. Most of the papers discuss specific classificatory systems and applications. Although only two of the papers directly address California and/or Great Basin data in a substantive manner, many of the issues addressed throughout the book have parallels in problems inherent to the study of prehistoric archaeological issues of regional concern. The comments I offer here are intended to draw attention to those issues and papers that are of the most immediate regional interest.

In the introductory chapter (Part I) the volume editors discuss the importance of examining how and why units of analysis and synthesis are created, evaluated, and function in particular applications. There is much in this chapter that can, and should, serve as the foundations for further discussion, even beyond the contributions of the remainder of the volume. Undoubtedly, the most important of these issues, in the introduction and throughout the volume, are the concepts of reliability (are the units in a system consistent and replicable?) and validity (is a particular system of units relevant to the goals of the research project?) as the basis of evaluating the adequacy of any system of classification.

The remainder of the volume is divided into three "Parts" (Parts II through IV). As indicated in the book title, the parts are time, space, and material. The contributions in Part II address determination of the age of archaeological phenomena through the classification and analysis of artifacts. Beck's is the first paper, and is one of the two papers in the volume that directly addresses materials of regional interest: Great Basin projectile point types as temporal indicators. She discusses the distinction between style and function in the creation and use of historical types. After years of debate, sometimes acrimonious, regarding the validity of projectile points as time markers and the time span represented by some of the traditional Great Basin projectile point types, Beck's approach is refreshing and informative. She shifts the scale of analysis and looks at the spatial-temporal distribution of traits used to define the types, rather than the types themselves, to ascertain if the *traits* meet the test of historical distribution necessary for an artifact type to be temporally diagnostic. Beck demonstrates that, although most of the traits used to define the types are subject to deterministic forces (they are functional rather than stylistic, as most historical types are), they do meet the test of historical distributions and are consequently valid temporal markers.

Reed and Stein's paper, a test of the Pecos Classification of Southwestern cultures, is a review of what the impact of historical events in the development of archaeological theory and method has had on how we continue to view the record. They discuss the research background into which the Pecos Classification was introduced, and what the numbered stages of cultural development were intended to provide for archaeologists at the time of their construction. They conclude that, although the system has been recognized as flawed for decades, many still use the labels as shorthand generic units. Their conclusion that the structure of the units continues to influence the questions and possible explanations addressed in current research should be a familiar theme to those who face the same issues with the "Desert Culture" concept, and will hopefully serve as a reminder to avoid becoming trapped in the subliminal effects of terminology. The Desert Culture was proposed as a unit to define the post-Paleoindian, pre-Numic occupation of the Great Basin some 20 years after the Pecos Classification was defined, but its initial definitions retained concepts and terminology clearly reminiscent of stage-based units. Despite the fact that Jennings translated many of the concepts into current terminology during the course of his career, the concept has never allowed for distinguishing among archaeological assemblages of different ages or cultures within the Archaic stage in the Great Basin. Al-

though it is not always easily recognized, the effect of defining the Desert Culture in terms of cultural uniformity underlying Numic occupations persists in many current explanatory models, even those based on evolutionary ecology.

LeTourneau's discussion of the "Folsom Problem" is likewise an insightful historical account of the formation of a unit utilized for building culture history, in this case the Folsom type. He readily concedes that Folsom is a valid and reliable historical type, but he distinguishes the Folsom type as a synthetic unit defined as a temporal marker and the Folsom type as an analytic unit for the study of culture. His critique of the analytical unit for addressing issues such as Folsom subsistence is thorough and clearly addresses some critical problems inherent in many studies of early sites in western North America; in particular, how to recognize the full range of variability in sites of a certain age when the marker we are using to identify them may be limited to a select segment of that variability. As with the Pecos Classification, the Folsom problem has parallels in California and Great Basin archaeology, especially in Paleoindian and early Archaic period research.

The final paper in Part I departs from the preceding three in that it does not address a specific classification defined to partition a particular kind of phenomenological data into chronologically interpretable units. Instead, Ramenofsky addresses the relationship between time as an issue in theoretical physics and chronology as an archaeological goal. While I found this departure from the general flow of the volume intriguing and thought provoking, I found I disagreed with much of it. One thing that was especially unclear was the relevance of the issue of the nonlinearity of time from the perspective of theoretical physics at the spatial-temporal scale of the universe, when the main theme of the volume is to create units of analysis and synthesis that are appropriate to the research questions they are used to address. Nonetheless, the paper is fun to read and reminded me that it is easy to become so engrossed in the question at hand that it is difficult to see the bigger picture.

Part III of the volume consists of three papers addressing units constructed for the study of prehistoric use of space. In the first paper in this section, Wandsnider discusses the formation and analysis of archaeological landscapes, which she indicates are formed by both natural and human activities and processes. Noting that most units used to discuss archaeological landscapes fall into two domains (form and space), and that the processes responsible for them vary with both temporal and spatial scale, Wandsnider offers a series of suggestions to guide the design of the units for studying the spatial distribution of archaeologically relevant phenomena.

The next two papers really bring home the differences between the theoretical and methodological approaches of archaeologists and researchers trained in the physical sciences. Hughes' elegant presentation of how obsidian sources are identified and delineated from a geochemical perspective, and how those units relate to questions of archaeological interest, is delightfully straightforward and understandable. Without requiring that the reader understand the geochemical nature of strontium, or any of the other components of the analysis, Hughes makes it clear what the limitations and benefits of obsidian sourcing are in terms of units of geographic space associated with specific obsidian compositions. This is the second paper in the volume that addresses Great Basin and California archaeology in a substantive manner and, like Beck's contribution, is a "must read" for prehistoric archaeologists dealing with those ubiquitous surface lithic scatters so characteristic of the archaeology of the Desert West.

Neff's discussion of geochemical source analysis of materials used in the manufacture of ceramic artifacts is likewise elegant and understandable. Although the problems with determining the sources of the materials that are com-

bined and altered in the course of the manufacture and use of ceramic artifacts are more complex than those involved in identifying the source of obsidian, Neff's treatment of the issues is straightforward in providing clear statements of the problems and how the units of ceramic provenance analysis (geographic coordinates on the one hand and geochemical composition of artifacts on the other) can be related in archaeologically meaningful terms.

In Part IV, the last three papers address the construction of units for the analysis of particular kinds of materials that were not clearly defined in their original formation for the purpose of constructing culture histories or tracing spatial movements. Were I the one giving title to the parts of this volume, I probably would have used terms like "technology" and/or "function" as the label for this part, given that most of the papers in the preceding parts of the volume also deal with classificatory units partitioning the variability in materials in some manner. The preceding papers discuss units created for temporal analysis or movement in space; in the final set of papers, the units of analysis are designed to investigate artifact manufacture and use. Steffen, Skinner, and Ainsworth discuss debitage in terms of reduction technology, Pierce discusses Poverty Point objects in terms of manufacture and function of clay balls, and Lambert demonstrates that the spatial distribution of Prescott Gray Ware pottery in the Flagstaff area conforms more closely to expectations based on ceramic vessel function as manifest in vessel form than on stylistic attributes of surface decoration. Probably the most relevant of these last three papers for California and Great Basin archaeology is the discussion of debitage, given that is the most common material found in prehistoric sites in this area.

Although at times *Unit Issues in Archaeology* is not easy reading, it is clear that many of the authors have put some thought into making it reader friendly. Most authors are careful to explicitly define the terms that are crucial to their discussions and to compare and contrast their usage with other published usages. Throughout, there are clearly constructed and nicely reproduced maps, charts, and flow diagrams providing visually simplified access to concepts detailed in the text. Most of the authors have also included in their discussions verbal maps outlining the structure of their arguments, and have recapped their points in their concluding remarks. Editorial errors generally are rare and minor. All papers are well referenced with citations compiled in the back of the book rather than at the end of each paper, resulting in a bibliography that is almost 20% of the book. Even if you do not agree with some of the papers in the volume, you cannot help but find the book worthwhile for the effort that went into compiling this list of references on the literature pertinent to the issues involved in the most basic of archaeological theory and method: formation and use of units of analysis and synthesis.