APPENDIX 11: COMPUTER-AIDED DESIGN MODELING: A REVIEW

More and more archaeologists are using computers to visualize ancient architecture. With the ever-increasing speed and size of computer hardware and the ever-decreasing complexities of software interfaces, obstacles to using computer graphic techniques to create three-dimensional (3D) models of ancient structures are falling. Early work in the field of computer visualization in archaeology focused on mastering the complex computerization techniques and skills needed to model even the most simple structures. Recently, efforts have extended beyond the basics of 3D modeling to take up the interpretative and theoretical questions that can be addressed in light of the wealth of information coming out of the study of computer-generated models. A brief discussion of other cases provides some methodological history of the field of visualization in archaeology.

Early efforts to master the challenges of computerizing 3D spatial data date back to the late 1980s and early 1990s. A number of architectural engineers in Britain pioneered the first efforts at detailed virtual reconstruction of architectural spaces. Some of the more notable projects included the creation of solid models of historic buildings like the Saxon Minster at Winchester (Colley and Todd 1985) and Furness Abbey in Cumbria (Delooze and Wood 1991, Wood et al. 1992). Reilly (1989, 1992) offers the best discussion of the methodological challenges facing the field in these nascent years of solid modeling in archaeology.

By the end of the 1990s a host of case studies were available that used computer graphics techniques in one form or another, with one volume (Forte and Siliotti 1997) including as many as 20 examples of computer-aided architectural modeling. Case studies in this volume come from around the world, including Egypt, the Near East, Greece and Rome, Mongolia, Japan, and North and Central America. Very few examples of architectural visualization have been developed in South America. Two fine examples of recent projects of visualization in archaeology that begin to incorporate problem oriented research come from southern Greece and British Columbia, Canada. In the first, researchers were able to recreate the 14th century AD Frankish town of Agios Vasilios in southern Greece (Kardulias et al. 1998). This settlement, located between Corinth and Argos, sits on a dramatic point in the landscape atop a hill guarded by steep cliffs. By studying a 3D model of the site from the perspective of the surrounding area, the researchers were able to better appreciate the forceful and intimidating role this settlement played in indigenous political relations when it was originally settled.

In the second example, Peterson and his colleagues created a detailed 3D model of a pithouse structure from the Keatley Creek site in British Columbia (Peterson et al. 1995, 1995). This well-known site contains over 100 cultural depressions, or pithouse dwellings, many of which have been excavated by Hayden since 1986 (1997). By visually integrating spatial data concerning the distribution of artifacts across the pithouse floor, the researchers were able to test ideas about the location of domestic activity areas in relation to ambient sun light inside the structure. As a result of these and other innovations, computer-aided reconstructions are now moving beyond the 'pretty picture' stage of research and delving into the realm of interpretation.
Looking to future and, perhaps, alternative uses of virtual reality and visualization in archaeology, CAD and other new digital technologies (e.g., webpages, CD-Roms, hypertext and multimedia reporting, and video documentation) provide unique opportunities to pursue more reflexive methods of research. According to Hodder (Hodder 1999:117-128), the interactive nature of these new technologies allows people from inside and outside academic circles to be involved in the production and interpretation of knowledge. To illustrate his point, Hodder references his own work at Çatalhöyük where data analyses that include architectural reconstructions are deliberately open to the public.