
Constructing a Research Design

GENERAL STEP	ARE THERE BURIED PALEOINDIAN SITES AROUND TULARE LAKE, CENTRAL CALIFORNIA?
1. Formulate a general hypothesis from existing data.	It is known that Paleoindian people occupied North America by at least 12,000 years ago and that some of these early sites have been found on the surface of the shorelines of Pleistocene lakes, including Lake Tulare. Thus, it is hypothesized that buried Paleoindian sites also exist around Pleistocene Lake Tulare.
2. Explain the background of the hypothesis.	In the 1950s, a Paleoindian site was discovered at Lake Tulare, and some Clovis points were found. In the 1990s, more material was found in the same vicinity, suggesting a substantial Paleoindian occupation of the region. Unfortunately, all of the known sites have been damaged by agriculture and vandals.
3. Explain the theoretical approach to be used.	A standard scientific, processual, materialist approach.
4. Detail the specific hypotheses derived from the general hypothesis.	Some Paleoindian sites are exposed on the present surface whereas other Paleoindian sites lie buried beneath recent alluvium. These sites are undamaged and contain a detailed record of human occupation of the region during the Pleistocene.
5. List and explain the kinds of data needed to address the hypothesis.	To address the hypothesis, it will be necessary to determine the locations of buried shorelines, then locate buried sites on those shorelines, and then ascertain whether those sites are Paleoindian in age.
6. State the research methods to be employed in seeking the data to address the hypothesis.	To locate buried shorelines, GIS software will be used to analyze the elevation, slope, and angles of the terrain from existing map data to tease out possible locations of buried fossil shorelines. Backhoe trenches will be excavated at promising locations to locate buried sites. Archaeological materials exposed in the trenches will be collected for analysis.
7. Detail the methods to be used to analyze the data.	Recovered artifacts will be examined to determine whether they are Paleoindian in age. If possible, materials suitable for dating (e.g., organic material for radiocarbon dating) will be obtained and processed. Depending on the nature of the sites found, new questions and a new research design for excavation will be generated.

The processual archaeology of the 1960s revolutionized approaches to archaeological method and theory. Practitioners of this "new archaeology" were very optimistic about the ability of archaeology to contribute to anthropology as a whole. They advocated the use of explicit research designs, which included statistical methods and the rigorous scientific testing of hypotheses using formal scientific methods. One of the best examples of the applications of the methodology of new archaeology is provided by James N. Hill's excavations at Broken K Pueblo, Arizona (1968). The Broken K site is a 95-room stone pueblo that was occupied by Native Americans from about A.D. 1150 to 1280. Hill's objective was to explain the patterning of cultural features at the site with regard to prehistoric residence patterns.

Preliminary trenching and clearing of surface levels were used to reveal most of the rooms at the site. As the pueblo was fairly large, the site could not be entirely excavated, so Hill excavated a random sample of forty-six rooms (Figure 3.5). In the course of excavation, Hill observed three different kinds of rooms. These were described in a clear and rigorous fashion, the variables noted, and the data analyzed using the chi-square test of association and the Fisher Exact Test. The variables Hill considered were room size, masonry style, and the height of the door sill, as

well as the presence or absence of firepits, mealing bins, ventilators, and doorways. He also examined the number of each type of room relative to the others. Analogies with modern Zuni and Hopi pueblos allowed Hill to interpret the Broken K rooms as habitation rooms, storage rooms, and specialized rooms for rituals (*kivas*).

With these analogies in mind, Hill then developed sixteen hypotheses predicting the kinds of artifacts that would be present in the various types of rooms, which he then tested in light of the archaeological data recovered. For example, the habitation rooms would be expected to contain a wider variety and larger number of materials than other rooms, while the smaller rooms and ritual areas would contain fewer artifacts with less variation, reflecting the specialized activities that took place there. These observations also allowed Hill to estimate the number of households that likely resided at the settlement.

The clear statements of hypotheses enabled Hill to verify the analogies made, as well as to raise further hypotheses about why some expectations were not validated by the archaeological data. For example, the fact that large numbers of undecorated storage pots were not recovered from the storage rooms may suggest that the storage practices of seven hundred years ago were slightly different from those in ethnographically observed pueblos.

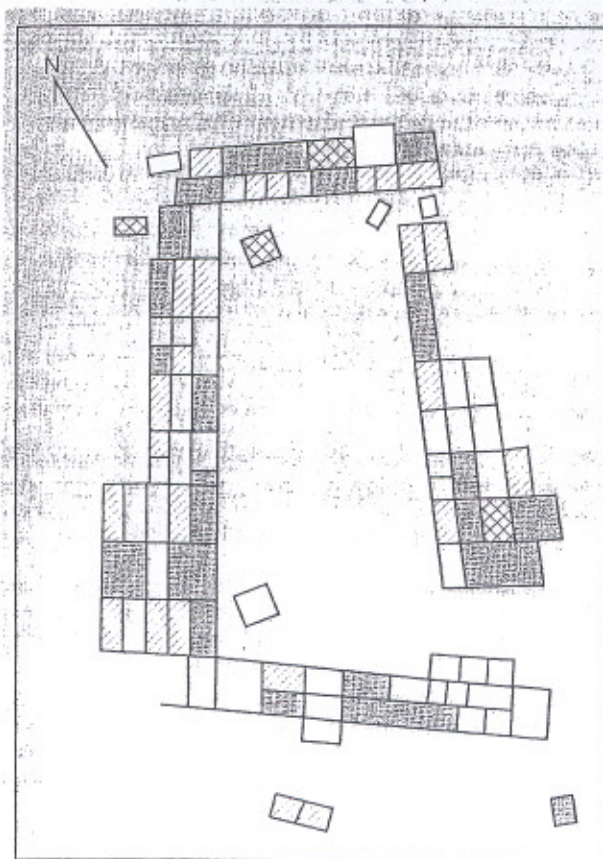


Figure 3.5 Different kinds of rooms at Broken K Pueblo. Black areas represent "large rooms"; hatched areas are "small rooms"; and crosshatched areas are "special rooms." Blank areas were not excavated. James Hill developed a number of testable hypotheses about the types of artifacts that would be recovered from the different rooms.

Source: Based on James N. Hill, "Broken K Pueblo: Patterns of Form and Function." In Lewis and Sally Binford, eds., *New Perspectives in Archaeology*, pp. 103-42.