

Cities Designed to Track the Heavens: Chaco Canyon, New Mexico

Astro-Archaeology Series

In the desert of New Mexico are the remains of a major center of ancestral Puebloan culture. Within the Chaco Canyon region, several places of incredible architecture and complex cultural life have been identified, called Great Houses. It is suggested that over 150 Great Houses were constructed between the 9th and 12th centuries and connected by intricate road systems. Famous sites in the Chaco Canyon region include Pueblo Alto and Pueblo Bonito, which showcase the incredible architectural feats of the culture.

Interestingly, scholars have deduced that the Great Houses were not only built to support the forming society, but the details of construction were specific for another reason: astronomy. Often, the structures were oriented according to at least one of three following ways:

The south-southeast direction: Researchers suggest that the south-southeast orientation originates from a Snake Myth, which describes the use of a staff and the stars to facilitate migration in the southeast direction.

Aligned with the cardinal directions: A great example of this is Pueblo Alto. Built in the 11th century, its main wall aligned within 5° of the EW latitude. Hungo Pavi is less than 5° offset from true NS.

Built at horizon calendrical stations: Calendrical stations are often natural structures that, when viewed at a particular location, the sun can be seen in a memorable relation to it. For example, Figure 1 shows the sun between two prominent rock formations. Imagine this occurred only once per year. The event would mark the same day and thus would denote the annual occasion. Many of the ancestral Puebloan Great Houses are understood to have been built near such calendrical stations that operate for different events like the solstices.

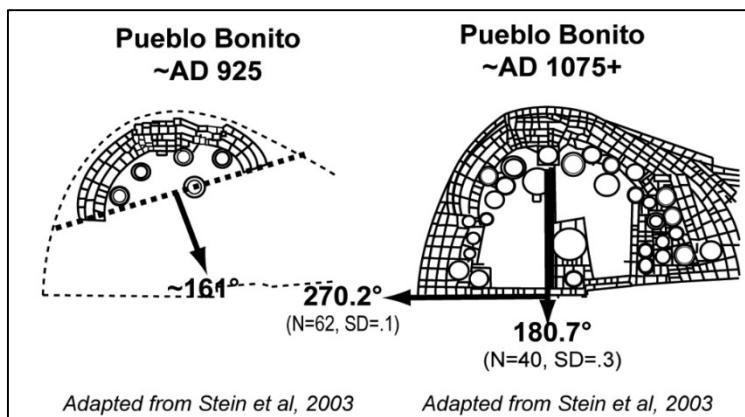
Although the ancestral Puebloan culture may not have used physics and astronomy as we do now, it was built into the fundamentals of their society, and central to their community.

Resources:

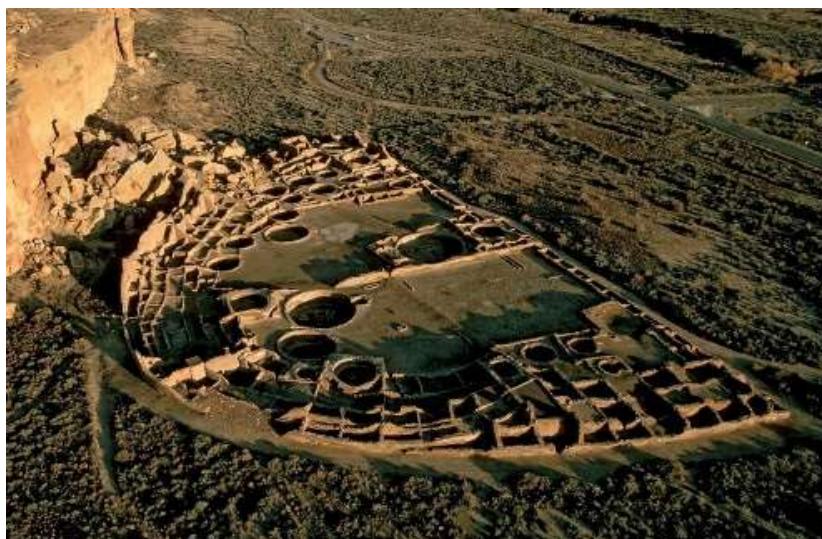
“History and Culture: The Center of Chalcoan Culture.” Chaco Culture, *National Park Service*. Accessed May 2024. <https://www.nps.gov/chcu/learn/historyculture/index.htm>.

Munro, Andrew M., and J. McKim Malville. “Ancestors and the Sun: Astronomy, Architecture and Culture at Chaco Canyon.” *Proceedings of the International Astronomical Union* 7, no. S278 (2011): 255–64. <https://doi.org/10.1017/S1743921311012683>.

Images from nps.gov



Taken from Munro and Malville's paper, this depicts different stages of Pueblo Bonito's development, noting the incredibly accurate NS/EW orientation of the overall structure and main wall.



An overhead view of a Pueblo in Chaco Canyon.