

CHAPTER ELEVEN

Using Residue Analysis to Confirm Trade Connections at Pella, Jordan H.A. Hoekman-Sites

Hanneke Hoekman-Sites; Department of Anthropology, Florida State University; 1847 West Tennessee Street; Tallahassee, FL 32306; USA; <hah04@garnet.acns.fsu.edu>. This research was done while I was a student at the College of Wooster (Ohio) as part of the college's Senior Independent Study program. Many thanks are due to my faculty advisors P. Nick Kardulias and Paul Edmiston, whose guidance and support helped me to complete this project successfully. Several others made valuable contributions to this project, including Robert H. Smith, Ruth Beeston, William Parkinson, Marilyn Loveless, Walter Zurko and Brian Sites. Thanks also to Wooster's Copeland Fund for financial support.

Residues on ceramic samples from 43 separate vessels from Pella, Jordan, were analyzed for the presence of residues, focusing specifically on identifying biomarkers in the samples, in order to investigate trade during the Late Byzantine and Medieval Periods. The results provide information about diet and trade in this city that was an important part of the complex commercial network at the western terminus of Asian caravan routes. The ceramic samples were soaked in dichloromethane to extract the residues, which were then analyzed using gas chromatography-mass spectrometry (GC/MS). The resulting spectra were compared to the National Institute of Standards and Technology (NIST) 1998 Mass Spectral Library to find matching compounds. From the identity of individual compounds, the contents of the original pottery vessels were tentatively inferred.

The site of Pella in Jordan was excavated by a joint team from the University of Sydney (Australia) and the College of Wooster (Ohio, USA) starting in the late 1960s. The goal of this study was to learn more about the population of ancient Pella by uncovering specific organic substances, both local and imported, used in daily life. These substances may be foodstuffs or other compounds like perfumes or body oils. The study described in this chapter focused on ceramic pieces from the Late Byzantine and Medieval Periods, although Pella was occupied long before these times.

Pella was destroyed by the Hasmonean leader Alexander Jannaeus in 83/2 BCE (Smith 1981, 48). During the Roman Period, Pella was rebuilt after Pompey liberated it from Jannaeus (Smith 1973, 39). By the 6th century CE, towards the end of the Byzantine Period, Pella was at the height of its prosperity and size (Smith and Day 1989, 7-9). After the earthquake in 747 CE, Pella was never again a major city. However, it seems that several small villages have continued sporadic occupation of the site, from medieval herders to today.

Previous archaeological evidence, primarily based on ceramic styles, suggests that Pella was a major commercial center during the Byzantine Period (4th-7th centuries CE), trading with North Africa, Cyprus and

Phocaea (Smith and Day 1989, 103). The evidence supports the view of Pella as a bustling trade center during the Byzantine Period, suggesting trade connections with China. Specific plant species were identified to support this: *Schisandra chinensis* (wu wei zi) and possibly *Camellia sinensis* (theaceae). In the Medieval Period (8th-13th centuries CE),¹ Pella had lost its position as a long-distance trade center. Only local goods were found on medieval sherds: *Micromeria fruticosa* subsp. *barbata* (tasnanesi), *Phoenix dactylifera* (date palm), and possibly *Pimpinella anisum* (aniseed).

Trade at Pella

Pella is uniquely located on the edge of the Arabian Desert at a crossroad of cultures with Europe to the north, the Mediterranean to the west, China to the east and the Arabian Peninsula and Africa to the south (Figure 1). This location made it a major commercial center during many periods of its history. Recent archaeological research has shown trade connections with Cyprus, Rhodes, Egypt, Asia Minor, Palestine, Syria and North Africa (Smith 1981).

Trade has been modeled in many ways, including Central Place Theory (Christaller 1966), World System's Theory (Gunder Frank 1993; Kardulias 1999) and Peer Polity Interaction (Renfrew and Cherry 1986). Pella was positioned at the edge of the Byzantine Empire, far from its core (Byzantium/Constantinople, modern day Istanbul). However, it was not functioning as a typical peripheral location, but instead as a major market center. The idea of peer polity interaction applied to empire-level organization has been dubbed Dual Empire Interaction (Libby 2003). Illustrated by the interaction between Monte Alban and Teotihuacan, Dual Empire Interaction occurs when two neighboring elite groups develop and maintain their positions of power through the trade of exotic goods back and forth. However, Pella was an important trade location on the fringe of an

¹ The Byzantine and Medieval Periods are separated by the Umayyad Khalifate (611-750 CE) which had its capital in Damascus (Syria).

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empire, or between several bordering empires, rather than a powerful center. Borderland markets are market centers located on the fringes of major city-states of empires. States and their rulers are especially interested in such borderland markets, and often this type of market is under state control (Berdan 1985, 354). Their interest stems from the fact that borderland markets promote the flow of exotic goods to the ruling class. These goods, which are not locally available, help secure the power of the ruling class through their scarcity. Along with acting as a buffer between the empire and the lands outside of its control, Pella also functioned as a borderland trade center. Many of the exotic goods entering the empire from the east came through Pella, or another of the Decapolis cities. The Decapolis, a confederation of cities on the northern Transjordanian Plain, was formed to

promote commerce by maintaining political stability (Smith 1981, 48-51).

The formation of the Decapolis illustrates how trade can contribute to the development of larger governmental groupings (Earle 1997). The logic behind the Decapolis is clear: the instability caused by its location on the fringe of the Roman Empire, and later the Byzantine Empire, needed to be negated by local stability in order to promote commerce. Pella joined the Decapolis after the Romans subdued the Hasmonean Revolt that had disrupted much of the Levant. During its time as part of the Decapolis, Pella enjoyed a relatively secure political situation which led to its most prosperous time in the 6th century CE.

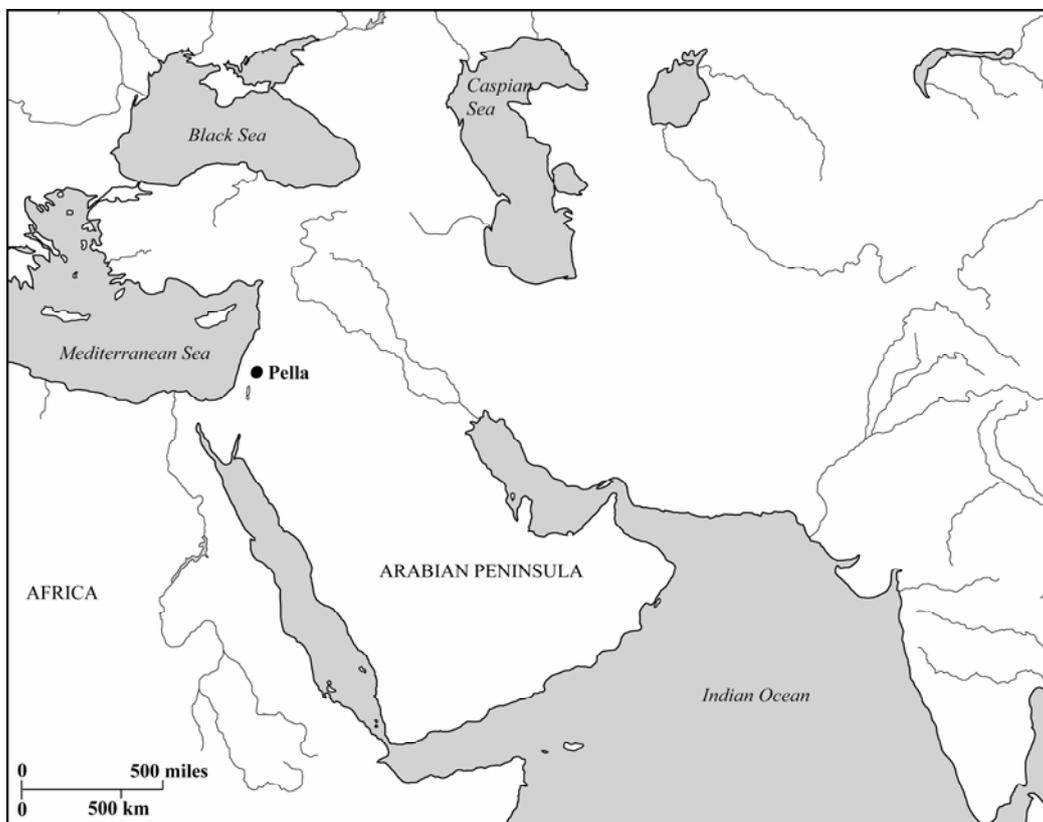


Figure 1: Map showing the location of Pella.

Pella and the other cities in the Decapolis functioned as borderland market exchange centers. Market exchange involves a central location where goods are exchanged for other goods (Renfrew 1984, 93). Pella most likely employed a market exchange system because no storage facilities have been found, although a redistribution system is also possible. In his description of market exchange, Renfrew (1984) notes that it involves a social

relationship between people exchanging goods and people controlling the central market location. Those who control the central market location provide a secure location for trade usually in exchange for a tax of some kind.