The Land Between: An Examination of Ground and Chipped Stone Artifacts from Garden Canyon Village

By

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B.A. Colorado College, 2011

A thesis submitted to the

Faculty of the Graduate School of the

University of Colorado in partial fulfillment

of the requirements for the degree of

Master of Arts

Department of Anthropology

2016

This Thesis Entitled:

The Land Between: An Examination of Ground and Chipped Stone Artifacts from Garden Canyon Village

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The Land Between: An Examination of Ground and Chipped Stone Artifacts from Garden Canyon Village

Thesis directed by Dr. Catherine Cameron

Garden Canyon Village (AZ EE:11:13 [ASM]) is a large multi-component site located in southeastern Arizona on the Fort Huachuca military installation. The main occupation dates to the late Formative Period (A.D. 1150 – A.D. 1450), but the rich resources of the Huachuca Mountains drew ancient people to the site from Preceramic (Pre- A.D. 1) times through the end of the Prehistoric Period (A.D. 1450). Located 10 miles north of the U.S.-Mexico Border and 65 miles southeast of the Tucson Basin, Garden Canyon Village was located on the frontier of the Hohokam, Mogollon, Casas Grandes, Rio Sonora, and Trincheras culture areas. This paper presents an analysis of chipped and ground stone artifacts from the site. The sample consists of artifacts from two excavation areas: the E75 complex, a residential area with two adobe-walled structures, and the E100 complex, a courtyard with two adobe-walled rooms. The analyses demonstrate that the residents of Garden Canyon Village engaged in a wide variety of activities, including intensive agriculture, the exploitation of wild plant foods, pottery manufacture, spinning and weaving, hunting, and other gaming or ritual activities. Additionally, this thesis presents evidence that Garden Canyon Village had diverse connections to the cultures around them- particularly the Hohokam, Mogollon, and Casas Grandes areas. However, these broad, interregional connections were balanced with strong local traditions.

ACKNOWLEDGEMENTS

I am eternally grateful for the opportunities that have allowed me to work in the Huachuca Mountains- the place I was born, raised, and have loved deeply for all my life. I was no more than 8 or 9 years old the first time I visited the Garden Canyon Village site, and, 15 years later, I feel truly privileged to have made that site the focus of my research.

This thesis would not have been possible without the help of many people. Martyn Tagg, cultural resource manager at Fort Huachuca, made this project possible and gave me the freedom to run with it. Summers spent at Fort Huachuca have been some of the most educational of my life, and I credit Marty with teaching me much of what I know about field archaeology. Dr. Catherine Cameron provided generous support, wise critique, and invaluable guidance. I would not have gotten this project off the ground without her, and having her for an advisor made my graduate school experience an excellent one. Thanks are also due to the various agencies and organizations that provided financial support, including the Oak Ridge Institute for Science and Education, the Center to Advance Research in the Social Sciences, and the CU Boulder Graduate School.

Dr.'s Gerardo Gutierrez and Scott Ortman, the other two members of my thesis committee, have each been great sources of knowledge and guidance. Dr. Gutierrez helped me begin my graduate career at CU, and Dr. Ortman pushed me to expand my horizons out of my southern Arizona comfort zone into the northern Southwest. This thesis was also made possible by the rest of the faculty, staff, and students at the University of Colorado, Boulder. No amount of thanks to Valerie and Lesa will ever be enough. Thanks also to the colleagues and friends who contribute to such a supportive and inspiring department.

I also owe thanks to scholars at other institutions. Steve Gregory at the Fort Huachuca Museum granted me access to historical documents and photos. Dr. Arthur Vokes at the Arizona State Museum helped me access the necessary collections and paved the way for my project. Dr. Jenny Adams and Jane Sliva assisted me with artifact identification. Dr.'s Steven Shackley and Alyson Thibodeau were an enormous help in the sourcing portion of my thesis, and the data they produced is, I think, one of the most valuable contributions of this thesis. Additionally, Nina Rogers and Sara Cullen were a constant source of feedback and humor during this process. When my eyes were crossing from hours of staring at non-diagnostic, fragmentary ground stone, they provided an additional set of eyes and a valuable outside opinion. I would also like to thank all the other scholars who have worked on the Garden Canyon Village site. Many others have risen to the challenges of a poorly documented and neglected site and managed to produce wonderful data that made this thesis possible. Among those scholars are Jon Nathan Young, who first recognized its importance, and, more recently, Stephanie Whittlesey, Dennis Gilpin, David Barr, Suzanne Griset, Arthur Vokes, Patricia Cook, Steven Shelley, Jeffrey Altschul, and many others.

Finally, I would like to thank my parents for their unconditional love and unwavering support. They have always supported my love for archaeology and trusted me to follow my passions wherever they take me, from digging up the backyard in elementary school to graduate school. I never would have reached this point without their love and encouragement- I credit them with all my accomplishments.

A doodle from Di Peso's Babocomari Village Report (1951), capturing my own confusion during much of the thesis process.

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Introduction

Over the past century of research in the American Southwest and Mexican Northwest, archaeologists have thoroughly investigated the particular character of the Hohokam, Mogollon, and Casas Grandes culture areas. However, the frontiers and boundaries between these well-defined areas have been neglected.

In this thesis, I present an analysis of ground and chipped stone artifacts from a frontier region: the Garden Canyon Village site in southeastern Arizona (Figure 1.1). Ten miles north of the modern U.S.-Mexico Border and 65 miles southeast of the Tucson Basin, Garden Canyon Village was on the frontier between the Hohokam, Mogollon, Trincheras, Rio Sonora, and Casas Grandes (Paquimé) culture areas. With its arable land, abundant water, and access to resources from a variety of ecosystems including the Huachuca Mountains and the San Pedro River Valley, Garden Canyon was an ideal location and ancient farmers gathered here from pre-ceramic times (Pre-A.D. 1) through the end of the prehistoric period (A.D. 1450).

Figure 1.1 Location of Garden Canyon Village

While excavation has been limited and our picture of Garden Canyon Village is incomplete, it is clear that Garden Canyon Village was an important and persistent place on the landscape. Over the course of its long occupation, numerous people came and went, living first in pit houses and later aboveground adobe structures. Centuries of artifacts and structures are superimposed over each previous occupation. At its height in the Late Formative period (A.D. 1150 – A.D. 1450), Garden Canyon Village appears to have been a circular group of surface structures. No population estimates have been developed, but the site is believed to have been fairly large, and possibly even one of the major population centers of the Huachuca Mountains (Whittlesey et al 2009a)

The goals of this analysis are to address two general questions. First, what can the lithic assemblage tell us about prehistoric activities at Garden Canyon Village? Second, can the assemblage provide insights into interregional interaction and Garden Canyon Village's place in the greater Southwest? Ground and chipped stone artifacts are used in a broad range of activities, and will provide insight into these questions. Southeastern Arizona and Garden Canyon Village in particular have been chronically understudied, and this analysis will attempt to fill a gap in our knowledge of the prehistoric southern Southwest. I believe that Garden Canyon Village was part of a cultural crossroads between the American Southwest and the Mexican Northwest. Due to its location and the natural travel corridor formed by the San Pedro River Valley, the area may have been a melting pot for people and material goods. As the analyses presented in Chapters 5 and 6 will make clear, there is strong evidence that Garden Canyon Village had diverse connections to the cultures around them- particularly the Hohokam, Mogollon, and Casas Grandes areas. However, these broad, interregional connections were balanced with strong local traditions.

In this introductory chapter, I will begin with an overview of ground and chipped stone

research, focusing on the importance of these artifact categories and what can be learned through their examination. I will also discuss some of the limitations of the Garden Canyon Village collection, and how it affected the questions that could be addressed in this thesis. Next, I will introduce the theoretical orientation of this thesis. In order to more fully explore Garden Canyon Village's location on the boundary between numerous culture areas, I will employ frontier theory- a body of theory that has great potential for archaeology but has not been widely utilized. Finally, I will provide an outline of the chapters that will follow my introduction.

Ground and Chipped Stone Research

Ground and chipped stone artifacts represent a wide range of prehistoric activities. At Garden Canyon Village, ground and chipped stone are both the most prolific and the most understudied artifact categories. The portion of the lithic assemblage that my thesis focuses on was excavated in the 1990's and never analyzed.

Ground stone refers to a class of artifacts that were either manufactured by grinding, utilized in grinding tasks, or both. Ground stone artifacts are often associated with vegetal food processing, but grinding technology was used for many other purposes, including pottery production, tool manufacture, and production of ritual or decorative items. The question of how ground stone artifacts were used prehistorically has been answered through both experimentation and ethnographic analogy (Adams 2002). In recent decades, ground stone experiments have shed light on motor habits and the creation of use-wear patterns. Archaeologists such as Adams (2014) have borrowed from the research of tribologists in order to identify wear mechanisms that occur when stone and other surfaces come in contact. Ethnographic works describe the use of stone tools in the historic period, providing insight into the variety of stone tools that existed,

their manufacture and use, and who used them. Additionally, the manufacturing complexity and degree of use documented in ground stone artifacts can indicate how intensive production and manufacturing activities may have been. By assessing the variety of ground stone artifacts in the Garden Canyon assemblage, it is possible to identify activities that took place there. For example, an abundance of beads and associated tools such as drills and a lapstone suggest that jewelry production may have been a major activity at Garden Canyon Village- an idea that will be expanded upon in Chapter 5.

Chipped stone artifacts are perhaps the most ubiquitous artifact category in the archaeological record. Chipped stone tools are made by removing flakes from a stone core using an instrument of percussion or pressure. Lithic assemblages include both completed tools resulting from the manufacturing process, as well as debris created during the manufacturing process. Chipped stone sheds light on 2,000,000 years of technological progress in the production of tools and weapons made from stone (Crabtree 1982). Projectile points, in particular, have been used to categorize culture areas and grouped into types to approximate technological and cultural changes over time. Chipped stone tools can provide insights into both hunting and the procurement and processing of plant products. Like ground stone, the variety of chipped stone forms present in an assemblage can shed light on the types of activities that took place. Additionally, discarded debitage can be used to understand manufacturing activities. For example, projectile points at Garden Canyon Village illustrate regional connections through their style and also- due to the presence of non-local obsidian- through their material type.

Both ground and chipped stone can be examined in terms of raw material, and discard and deposition into the archaeological record. Non-local raw materials allude to trade and regional connections, and modern sourcing methods such as isotope analysis and x-ray fluorescence can

trace these connections across the landscape. In collections with well documented provenience, the spatial distribution of ground and chipped stone within the archaeological record can be used to identify specific activity areas, or identify differences and similarities between activities in different portions of the site. Finally, styles and manufacturing techniques of both ground and chipped stone can speak to regional or cultural affiliations. Cumulatively, the information that can be gained from ground and chipped stone analysis will help answer the questions I have posed regarding activities and interregional interaction at Garden Canyon Village

It is important to note that while, in general, ground and chipped stone research can produce large amounts of information, its research potential is also often limited by the nature of the collection at hand. A history of mismanagement at Garden Canyon Village- which will be described in Chapter 2- limits the analyses that can be done with this particular chipped and ground stone collection. For example, issues with provenience mean that the identification of specific activity areas, except in one tentative case, will not be possible in this thesis. Additionally, I am only able to relate artifacts to a general time period, as chronological control of the site is poor. However, despite the wounded nature of the collection, it is possible is look generally at the types of ground and chipped stone found at the site in order to understand what types of activities took place at Garden Canyon Village. Additionally, the assemblage can shed light on raw material acquisition and some aspects of manufacture. While this thesis emphasizes tools and the activities that can be inferred from them, a preliminary debitage analysis involving material type and size provided information about chipped stone use at the site. Finally, special attention was paid to artifact and material types that can shed light on interregional interaction. While this thesis was limited by the nature of the collection, I hope that it demonstrates the sorts of information that can still be gained from problematic collections, and emphasizes the

importance of working with existing collections that might otherwise remain ignored and neglected.

Frontier and Boundary Theory

One of the overarching goals of this project is to clarify Garden Canyon Village's regional affiliations and its position within the larger southwest. Flanked by the Hohokam, Mogollon, Trincheras, Rio Sonora, and Casas Grandes culture areas, Garden Canyon Village existed in a geographically and culturally intermediate space that can be understood as a frontier. Traditionally, the heartlands of various cultural areas have received more archaeological attention than their peripheral counterparts. However, frontiers and boundaries can be important laboratories for studying questions of culture change, contact, interaction, and exchange. Frontier and boundary theories form the theoretical basis of this thesis and will be expanded upon in Chapter 3. After presenting my ground and chipped stone analysis, I will return to frontier theory in Chapter 6 to explore how frontier theory can be utilized at Garden Canyon Village and adapted to better fit the nature of the prehistoric archaeological record. Ultimately, I will present my formulation of criteria for a frontier settlement based on what has been observed at Garden Canyon Village.

Thesis Outline

Six chapters follow this introductory chapter. Chapter 2 will provide background information on the site, beginning with an overview of the environment and setting of Garden Canyon Village, followed by a discussion of the prehistory of the southern Southwest and the Middle San Pedro River Valley. Next, I will outline the history of archaeological investigations

at Garden Canyon Village, starting with Jon Nathan Young's excavations in the 1960's and concluding with the most recent synthesis of data (Young 1972; Whittlesey et. al. 2009). This history will highlight some of the missteps and poor management that led to the challenges investigations of Garden Canyon Village currently face. The chapter concludes with a site description compiled from more than 50 years of excavations and research at Garden Canyon Village, and a synthesis of what is known about Garden Canyon Village.

Chapter 3 discusses the theoretical orientation of this thesis. I will first provide an overview of frontier and boundary theories. I will summarize major schools of thought spanning from early Eurocentric and colonial models to the recent postcolonial turn in frontier theory. Then, I will expand on these theories as they apply to Garden Canyon Village.

Chapter 4 discusses the research methods used in this thesis. The chapter begins by explaining how and why I selected my sample of artifacts from the Garden Canyon Village collection. I then present the attributes that were recorded, discuss how these attributes were documented and analyzed, and describe how they will help me answer my research questions. Chapter 4 will also provide a basic overview of the sourcing methods that were used to examine the origins of a sample of turquoise and obsidian artifacts.

Chapter 5 describes the results of my analysis. For both chipped and ground stone, I discuss the various activities represented by artifacts within the collection. My analysis examines the attributes of the ground and chipped stone artifacts with special attention to activities and artifacts that might signify interregional interaction. Chapter 5 also presents the results of the sourcing analysis performed on a sample of turquoise and obsidian artifacts.

Chapter 6 synthesizes the information discussed in the previous chapters in order to gain insight on larger questions about Garden Canyon Village's role in the southern Southwest. First,

I will examine the history of thought on this topic and review how previous researchers have interpreted Garden Canyon Village's cultural affiliation. Then, I will place the results of my ground and chipped stone analysis in the context of previous work done at the site. I will review the evidence for and against connections between Garden Canyon Village and each of the major surrounding culture areas. I will then discuss what these results suggest for cultural affiliation and interaction at Garden Canyon Village. Frontier and boundary theories will be used to examine what this location meant for the residents of Garden Canyon Village and our interpretation of their lifeways.

Chapter 7, the final chapter, will synthesize the information discussed in the previous chapters. I will highlight important directions for future research, and conclude by discussing what I feel are the most significant contributions from this thesis.

Chapter 2

Background

As a site with a long and complex history- both of occupation and excavation- Garden Canyon Village requires a great deal of introduction. In this chapter, I will begin by describing the environment and setting of Garden Canyon Village, which is, overall, extremely advantageous. Next- in order to set the stage for my lithic analysis in Chapter 5- I will discuss the sources of lithic raw material that were available to the occupants of Garden Canyon Village. In the following section, I will place Garden Canyon Village in its regional context by discussing the prehistory of the Southern Southwest and the Middle San Pedro River Valley. Next, I will outline the history of research at Garden Canyon Village. Numerous phases of excavation and research have taken place at Garden Canyon Village over the past 60 years, and this history is relevant to the current condition of the collection and the questions that this thesis addresses. Finally, I will conclude with a description of the site itself, as well as a synthesis of what we know about the site from previous excavations.

The Environment and Setting of Garden Canyon Village

The southern Southwest is part of the Basin and Range physiographic province. This region is marked by rugged, roughly parallel mountain ranges trending north-south with flat, low-lying basins separating them. The Basin and Range region lies in the rain shadow of California's Sierra Nevada and Mexico's Sierra Occidental mountains, and the climate is therefore arid desert characterized by less than 20 centimeters (8 inches) of average annual

precipitation (Shaw 1999). However, yearly variations in rainfall can be extreme, and the summer monsoon rain season can bring large amounts of precipitation.

The southern Southwest includes both Sonoran and Chihuahuan desert. The Sonoran Desert covers large parts of Arizona, California, Sonora, and Baja California, while the Chihuahuan desert includes much of southwestern Texas, small parts of New Mexico and Arizona, and portions of Chihuahua, Coahuila, and Durango. Both deserts are considered to be remarkably biologically diverse, containing a wide variety of flora and fauna that have adapted to the hot and arid conditions (Shaw 1999). The Sonoran and Chihuahuan deserts of the southern Southwest are interspersed with Madrean Sky Islands- isolated mountain ranges surrounded by radically different lowland environments, resulting in a habitat island. These Sky Islands are known for remarkable biodiversity and a wide variety of habitats due to the range of elevations that they encompass (Sky Island Alliance N.D.).

Garden Canyon is located in the Huachuca Mountains, a southwest-northeast trending sky island mountain range that extends from Sonora, Mexico, into Cochise County, Arizona (Figure 2.1). The Huachuca Mountains are approximately 22 miles long and 8 miles wide at their maximum (Shaw 1999:34). Garden Canyons elevation ranges from 4,900 feet above sea level at the broad mouth to almost 7,000 feet above sea level at the southwest end of the canyon (Cook 2000:1). Garden Canyon Village itself sits in a broad basin at the mouth of the canyon at approximately 5,000 feet above sea level (Whittlesey et. Al. 2009:17). This basin is ideal because of it's "accessibility, flat terrain, and proximity to shady stream sides" (Shaw 1999:7). Garden Canyon has the largest watershed on the east face of the Huachuca Mountains with three major tributaries- McClure, Scheelite, and Sawmill Canyons. Its waters drain northeast, following Garden Canyon Creek toward the San Pedro River (Shaw 1999:7). The canyon forms

a natural pass through the Huachuca Mountains, and it is possible that the prehistoric and historic Native Americans of the San Pedro Valley used Garden Canyon to traverse the Huachucas between the San Pedro and Santa Cruz valleys (Altschul et al 1993).

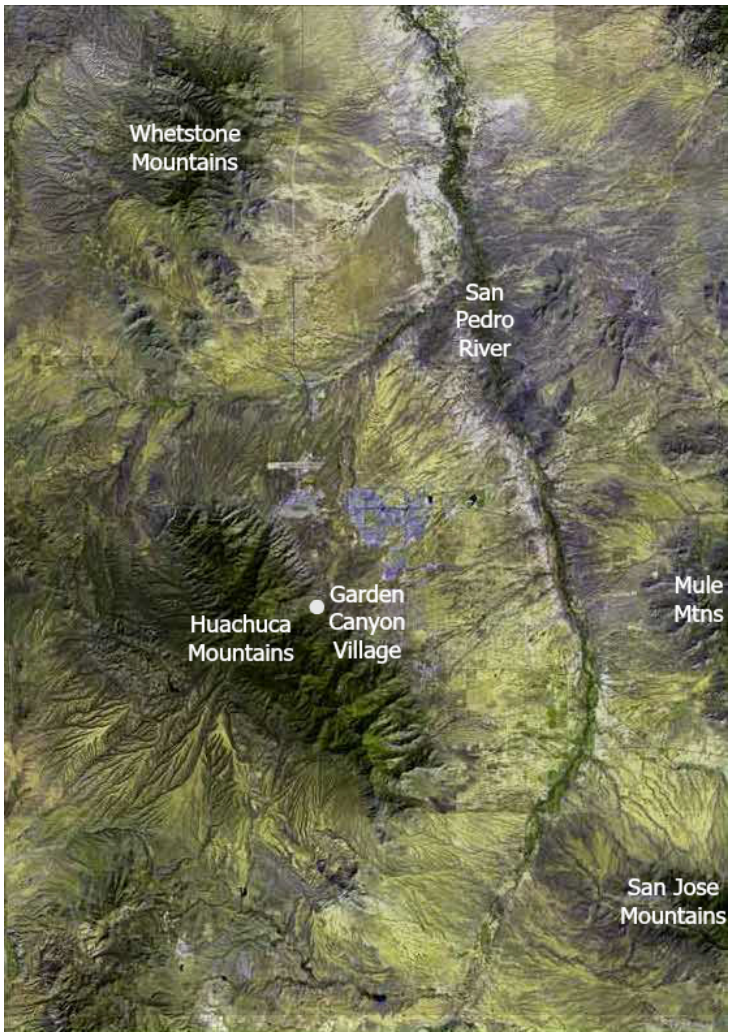

Figure 2.1 Aerial View of the Huachuca Mountains and San Pedro River Valley

Located 12 miles due east of Garden Canyon Village, the San Pedro River is a perennial watercourse that was a well-used travel corridor for prehistoric peoples and continues to be a major migration route for animals (Whittlesey et. al. 2009:15). The San Pedro River flows north from its origin in Sonora, Mexico, and ultimately converges with the Gila River (Shaw 1999:7). Garden Canyon Village and the Huachuca Mountains are located within the Middle San Pedro

River Valley, defined as the 56 miles between the international border and Benson, Arizona (Figure 2.2). The Upper San Pedro is the 31 miles from its headwaters to the international border, and the Lower San Pedro stretches from Benson, Arizona, to its confluence with the Gila River (Whittlesey et al 2009:15). The San Pedro valley forms a boundary between the Chihuahuan Desert vegetation to the east and an upper Sonoran Desert Grassland to the west (Altschul and Jones 1990:7).

Figure 2.2 The Lower, Middle, and Upper San Pedro River Valley

In addition to the San Pedro River, Garden Canyon Village's location provided access to several other important water sources. Fort Huachuca has 4.5 miles of perennial streams and 39 documented springs (Figure 2.3). The Babocomari River follows the northern boundary of the Fort, and numerous creeks and washes dissect the landscape (Whittlesey et. al. 2009:22). Garden Canyon Creek is located immediately adjacent to Garden Canyon Village.

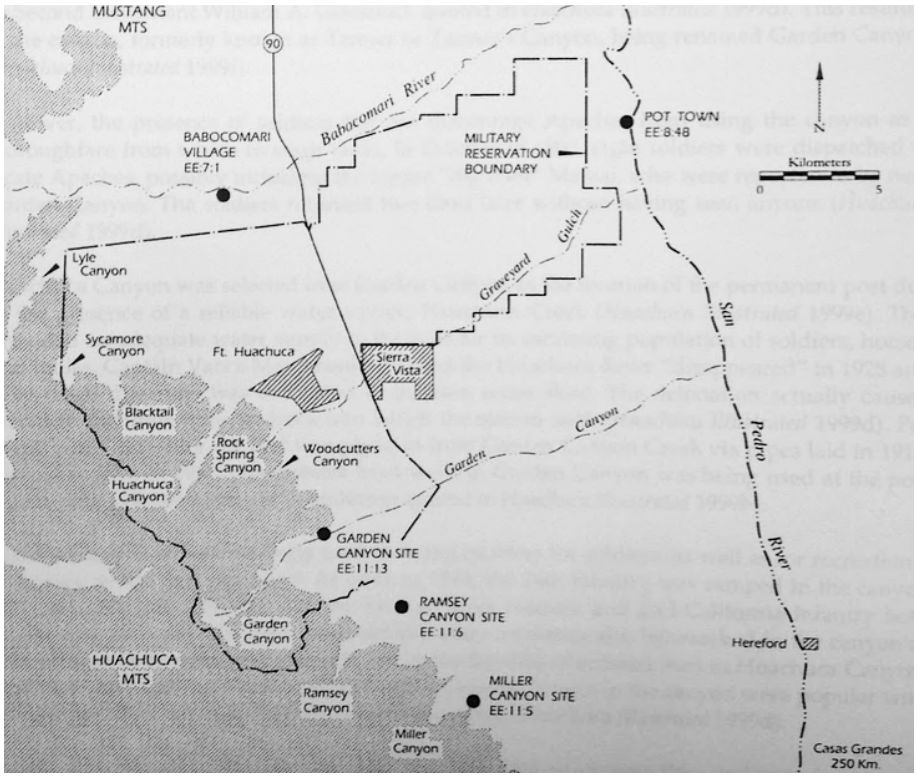

Figure 2.3 Fort Huachuca's boundaries in relation to the Huachuca Mountains and major nearby archaeological sites

Today, Garden Canyon Creek and the majority of the Fort's washes and creeks are ephemeral, primarily running after heavy monsoon rains. However, historical documents indicate that, in the past, the creeks ran year round and supported riparian vegetation. Father Eusebio Francisco Kino described a wet region during his visit to a Sobaipuri village near modern day Fort Huachuca (Whittlesey et. al. 2009: 23). Similarly, Camp Wallen, a 19th century predecessor to Fort Huachuca, was abandoned when its location by the Babocomari River led to a mosquito problem and subsequent outbreaks of malaria. Additionally, the area around the San Pedro river was historically known to be swampy and wet until an earthquake in 1877 shifted the flow of the river primarily underground, transforming the San Pedro River into a shallow, narrow channel (Young 1972). Faunal analysis further paints a picture of a prehistoric riparian habitat at Garden Canyon Village: the faunal assemblage included species such as beaver, fish, frogs, ducks, and water snakes, suggesting a moist marshland habitat (Whittlesey et al 2009b:42).

Rainfall is biseasonal and occurs from December to February and during the July to September monsoon season. May and June are generally dry with a high occurrence of wildfires and increased stress for plants and animals (Shaw 1999:30). Average annual rainfall at Garden Canyon Village is approximately 15 inches (Whittlesey et. al. 2009:17). The annual variance is high, ranging from less than 10 inches to upwards of 22 inches. However, the Huachuca Mountains, "because of their height and location relative to movement of storms, receive more rainfall than most ranges in Southeastern Arizona" (Shaw 1999:46). Altschul and Jones (1990) compare the Huachuca Mountains to an oasis, as they are wetter and cooler than the surrounding river valleys. As a sky island, Garden Canyon's high elevation leads to a wide temperature range. Between May and September, daytime temperatures occasionally exceed 100 F, but generally range from the high 80s to low 90s. Below freezing temperatures occur during the winter and the peaks of the Huachuca Mountains often receive snow, but the climate is generally temperate year round. On average, Fort Huachuca's frost-free season is 232 days (Shaw 1999:30).

Like many southwestern sky islands, the Huachuca Mountains are home to diverse plant and animal life. A 1995 ecological survey recorded 993 plant species (Shaw 1999:56). Fort Huachuca is also home to 80 mammal, 71 reptile, and 364 known bird species (Shaw 1999:78). Wildlife in Garden Canyon includes both mule and white-tailed deer, javelina, coati, mountain lion, black bear, wild turkey, quail, and a variety of small birds, mammals, and reptiles. Prior to European intervention in the Huachuca Mountains, grizzly bear, Mexican wolf, beaver, black-tailed prairie dog, Aplomado falcon, thick-billed parrot, and native fish were present (Shaw 1999:13). Today, there are no bison, but faunal remains identified as possible bison or cow were documented at both Garden Canyon Village and Babocomari Village, a small Classic Period (A.D. 1200 – A.D. 1450) village located near Garden Canyon Village and excavated by Charles

Di Peso in the 1950s. (Whittlesey et. al. 2009: 27).

Garden Canyon is dominated by ponderosa pine, one-seed juniper, alligator juniper, Douglas fir, and oak, with density increasing higher in the canyon (Cook 2000:1). Near the canyon's broad, open mouth trees are sporadic and tall native grasses define the landscape. Prehistorically- before the introduction of domestic livestock and overgrazing transformed the landscape- much of the region consisted of tall grasslands (Bock and Bock 2000). Due to the presence of Fort Huachuca since its establishment in 1877, many federal lands- including those near Garden Canyon Village- have been protected from grazing and have maintained their natural grassland state. Due to its wide elevation range, Garden Canyon includes semi-desert grasslands, oak and juniper woodlands, and pine and fir forests (Shaw 1999:11). Prehistoric peoples had access to numerous biotic zones as they moved up and down in elevation on the mountainous sky island and into the surrounding desert "sea."

With its considerable watershed, arable land, abundant water, and access to resources from a variety of ecosystems, Garden Canyon was and continues to be ideal for human occupation. It is no coincidence that the area drew ancient peoples from A.D. 1 through A.D. 1450, and was subsequently selected by the U.S. Army as a favorable place to establish a military reservation and, later, the city of Sierra Vista. This advantageous setting meant "a great deal of interaction, population movement, and exchange. The result was a mosaic of peoples that defy pigeonholing into archaeological constructs" (Whittlesey et. al. 2009a:15).

Sources of Lithic Raw Material

This section will provide a geologic context for the lithic analysis in Chapter 5. Garden Canyon and the Huachuca mountains include a variety of lithic raw material, including varieties

that would have been exploited by prehistoric peoples. Lithic material is important to consider, as its quality and availability directly influenced prehistoric manufacturing activities. While local raw material may constrain or enable certain activities, desirable nonlocal raw material can be brought in via trade or expeditions to the source. Thus, the variety of lithic material present at a site can provide insights both into the exploitation of the environment immediately around the site, as well as into long distance trade relationships that prehistoric people may have engaged in.

On the eastern side of the Huachucas, where Garden Canyon Village is located, the mountains are transected by a fault that separates Precambrian granite from Phanerozoic sedimentary deposits (Figure 2.4). (Huckleberry 1996). This granite dike makes up the mouth of the canyon, where it has eroded away to form granitic hills. Further up the canyon, limestones, quartzites, and loose conglomerates are common (Shaw 1999). The western face of the Huachuca Mountains is made up of Cretaceous shale, limestone, and sandstone (Whittlesey et al 2009a). Basalt and other volcanic materials such as rhyolite can also be found.

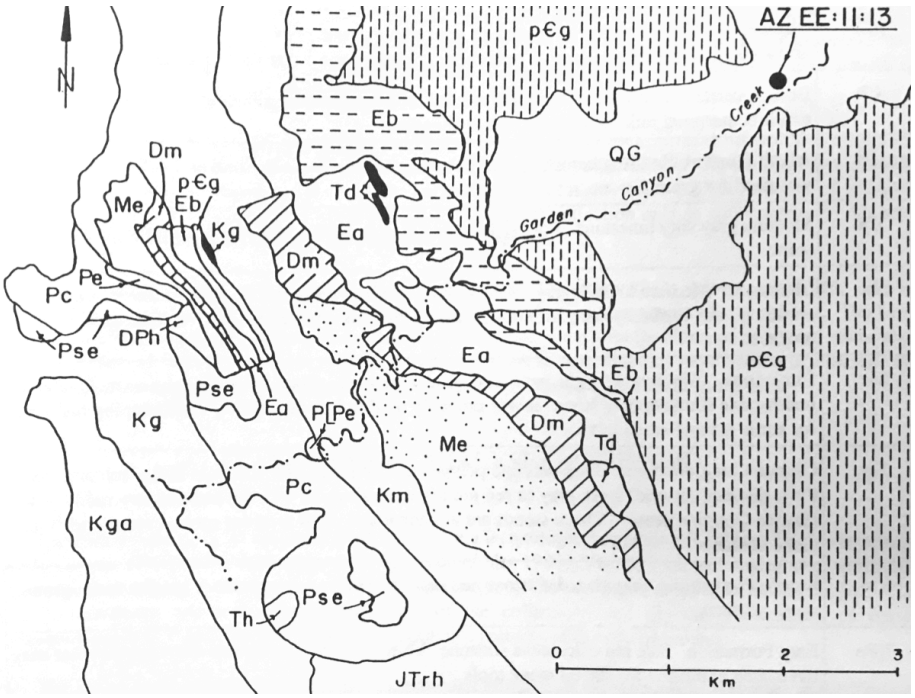

Figure 2.4. Lithic raw materials in the Garden Canyon Village area.
See Table 2.1 for map code.

In the immediate vicinity of Garden Canyon Village, SWCA Environmental Consultants identified 16 principal materials, several of which would have been useful prehistorically (Table 2.1). Notably, small pebbles and nodules of chert can be found in the Earp Formation. However, this chert is of highly variable quality for flaking (Shelley and Altschul 1996:67). Additionally, the nodules are typically small in size, limiting their utility to the production of small tools. Notably, higher quality chert is also available in the nearby Whetstone mountains 30 km to the north and the San Jose mountains 35 km to the southeast (Shelley and Altschul 1996:92). It is possible that these sources were also exploited, but, unfortunately, chert sourcing techniques are still largely unreliable, and chert in southeastern Arizona is not easily visually distinguished by source.

Table 2.1 Lithic raw materials in the vicinity of Garden Canyon Village (Whittlesey et al 2009a:19)

Map Code†	Name	Color	Grain Size	Suitability for Tools	Comments
pCg	Precambrian granite	yellowish to pinkish gray	coarse	good	Includes thin basalt dikes, some fine-grained alaskite
Cb	Bolsa quartzite	yellowish (resistant) to reddish brown (weathering)	–	marginal	siliceous sandstone
Td	Alkali diorite	red to greenish black	–	used	diorite present in dikes and sills
Ca	Silty limestone	medium to dark gray	–	undesirable	
Dm	Limestone	medium to dark gray	–	undesirable; possibly used	
Me	Limestone	medium to light gray	–	undesirable; possibly used	contains crinoids
Kg	Glance conglomerate (four varieties)	gray to red	–	good	conglomerate pebbles and boulders within Canelo Hills volcanic rock
Km	Morita formation	grayish red	–	occasionally used	siltstone and mudstone
P[Pe	Earp formation	pale red	–	possibly used	calcareous siltstone
Pse	Dolomite		–	not used	
Jh	Huachuca quartz monzonite	milky	medium	rarely used	quartz crystals present
Kga	Andesitic lava	grayish red to grayish purple	–	not used	

As summarized above, the lithic raw material available locally could fulfill most of the needs of prehistoric peoples- there were granites and quartzites that could be utilized for ground

stone as well as cherts suitable for chipped stone tools. All of these materials could be gathered immediately in the vicinity of Garden Canyon. Shelley and Altschul have hypothesized that residents of Garden Canyon Village exploited nearby rivers and drainages such as Garden Canyon Creek for raw material (1996:79). These drainages are generally filled with cobbles of all sizes that could have been easily collected and utilized. However, there are also bedrock outcrops that may have been utilized for raw material procurement. The Precambrian granite dike that forms the mouth of Garden Canyon includes numerous outcrops that may have been exploited. Additionally, there is a quartz quarry located near the site. On the northwest side of Garden Canyon one of the low foothills has several thick veins of quartz that are eroding out onto the surface. Quartz cobbles are extremely numerous and would have been a convenient source of material (Figure 2.5, Figure 2.6)

Figure 2.5 Quartz shatter

Figure 2.6 Quartz vein and shatter

Locally available raw materials are important to understanding the lithic assemblage at Garden Canyon Village, but materials that are not locally available can be equally informative. While the local availability of raw materials is generally good, several prehistorically valuable materials are conspicuously absent in the area. The Huachuca Mountains and surrounding areas lack vesicular basalt, obsidian and turquoise. While basalt is present in small quantities, it is generally not vesicular, limiting its use for ground stone. Additionally, the closest obsidian

source is 145 km away in the Animas Mountains. Obsidian is an ideal material for manufacturing chipped stone tools and, while chert was locally available, obsidian was still likely preferred. Turquoise- a desirable material for ornaments- is also not available in the Huachuca Mountains. The closest known source is Bisbee, located 40 km to the east, but it is unknown whether this source was exploited prehistorically. A major component of this thesis is sourcing turquoise and obsidian artifacts from Garden Canyon Village in order to determine their origins. The methodology used for this sourcing, the results, and their implications will be expanded on in Chapters 4, 5, and 6.

The Prehistory of the Southern Southwest and the Middle San Pedro River Valley

This thesis focuses on the region now divided by an international boundary between the United States and Mexico. In describing archaeological cultures, archaeologists have been unduly influenced by this boundary, which, of course, did not exist prehistorically. I will use established cultural divisions, while recognizing the modern political borders have colored these divisions. Traditionally, the southern part of the U.S. southwest has been divided into two primary culture areas: Hohokam and Mogollon (Figure 2.7). South of the border, the Trincheras, Rio Sonora and Casas Grandes (Paquimé) cultures have also been defined. While often ignored by Southwestern archaeologists, these northern Mexican archaeological cultures should be considered the southern half of the Southwest culture area (Pailes and Whitecotton 1995). Much of the southern Southwest was also affected by the Salado horizon, which has been variably described as a Puebloan migration, a product of Mesoamerican influence, a local development, or a religious cult (Clark 2001). The residents of Garden Canyon Village negotiated their daily lives within this multicultural context.

Figure 2.7. Garden Canyon Village in relation to the archaeological cultures of the southwest. Map courtesy of Desert Archaeology, Inc., edited by A. Schneider.

In this section, I will first discuss the prehistory of the middle San Pedro River Valley, focusing on Garden Canyon Village. Then, I will discuss regional developments in the Hohokam, Casas Grandes, Mogollon, Rio Sonora, and Trincheras culture areas in order to situate Garden Canyon Village within the context of the broader Southwest. While southeastern Arizona certainly deserves a revised and updated phase sequence of its own, I will follow Whittlesey et al (2009a, 2009b) in referring to the major phases of Garden Canyon Village as Early, Middle, and Late Formative (Figure 2.8). The "Formative" is an extremely broad construct, spanning hundreds of years and encompassing numerous developments such as ceramic container technology, agricultural dependence, and increased sedentism (Willey and Phillips 1958). However, the term is useful for remaining consistent with prior work at Garden Canyon Village and avoiding the baggage that might come with imposing the sequences of neighboring regions on the Middle San Pedro.

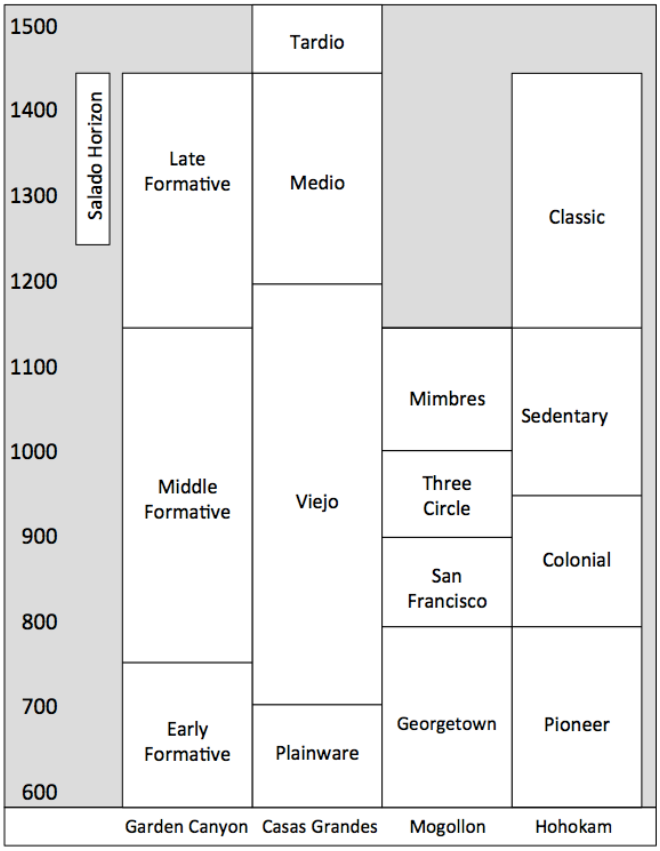

Figure 2.8 Chronological phases of the major southern Southwest culture areas. Adapted from Whittlesey et al 2009a, Whalen and Minnis 2001.

In the Early Formative Period (A.D. 1 – A.D. 750), large villages developed in the mountain foothills and along rivers. More formalized architecture emerged, including a variety of pit house styles (Cook 2000:5). Reliance on crops such as maize, beans, squash, and agave increased, leading to growing populations and more permanent settlements. Regional trade in shell, turquoise, obsidian, and other materials flourished (Cook 2000:5). In southeastern Arizona, Early Formative occupations were characterized by plainware and redware pottery, expedient flaked stone technology, and pit house architecture. Painted pottery emerged toward the end of the Early Formative period, circa A.D. 650 (Whittlesey et al 2009a). It is believed that early phases of occupation at Garden Canyon Village were underway during this period, but much research remains to be done on the oldest portions of the site. It appears that the earliest

archaeologically visible occupation of the site was contemporary with the late Pioneer period of the Hohokam sequence and the Early Pit House period of the Mogollon sequence. Shelley and Altschul hypothesize that, during these early years, Garden Canyon was the site of a seasonal fall/winter basecamp, or even a year round village (1996:148). The site seems to have been occupied on a continuous or nearly continuous basis over the subsequent periods, culminating in a large late Formative period occupation.

During the Middle Formative Period (A.D. 750 – A.D. 1150) in southeastern Arizona, major regional developments were underway. Permanently occupied sites, a variety of agricultural techniques, and distinctive pottery styles emerged (Cook 2000:5). At this time, southeastern Arizona "began to exhibit its complicated and confusing character" (Whittlesey and Heckman 2000:8). The portions of Garden Canyon Village that this thesis focuses on- the E75 and E100 complexes- were occupied during this period.

The same portions of Garden Canyon Village continued to be occupied into the Late Formative Period (A.D. 1150- A.D. 1450). Large settlements and regional trade are major traits of this period (Cook 2000:6). Garden Canyon Village was not isolated during this period; at least six other Late Formative Period sites are known in the middle San Pedro, including the Ramsey and Miller sites located at neighboring canyon mouths in the Huachucas (Shelley and Altschul 1996:150). Babocomari pottery- which is used throughout southeastern Arizona and appears in large quantities at the Garden Canyon Village site- also emerged during the Late Formative (Cook 2000:6). During this period of time, the San Pedro River Valley was home to numerous sites and peoples, and the population likely reached its peak (Figure 2.9). By A.D. 1450, the prehistoric period ended and, like much of the surrounding southwest, Garden Canyon Village was abandoned under circumstances that are still unclear (Whittlesey et. al. 2009b:190).

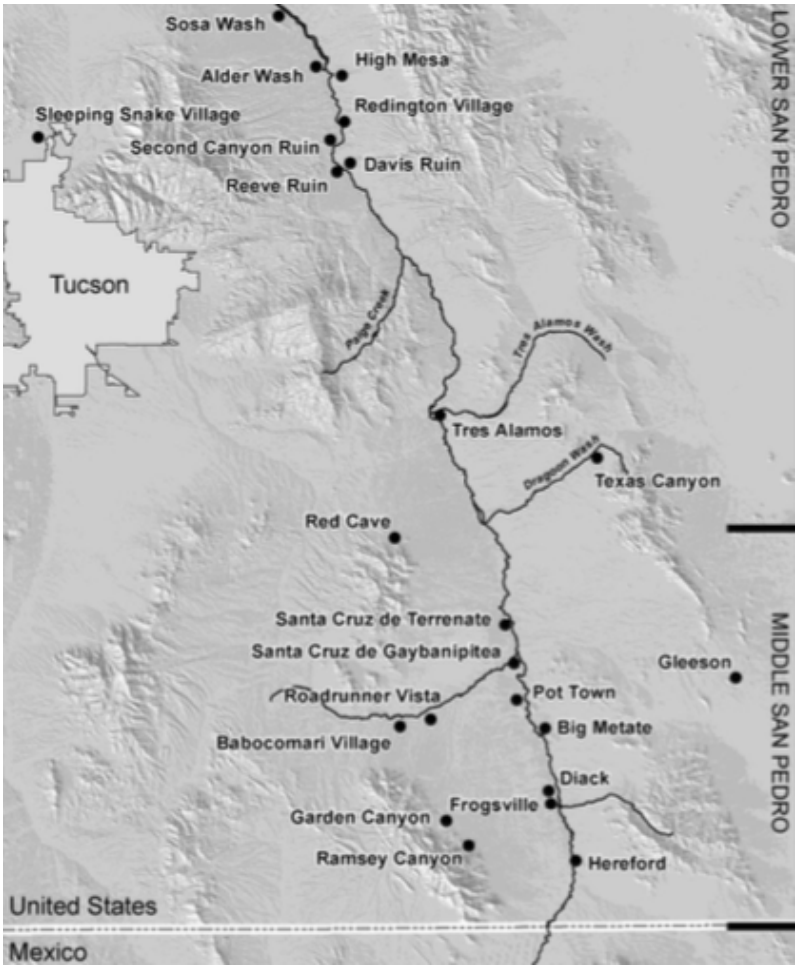

Figure 2.9 A sampling of Late Formative archaeological sites in the Middle and Lower San Pedro River Valley. From Whittlesey et al 2009a.

While our knowledge of Garden Canyon Village is limited, it can be better understood by placing it in the context of regional developments. During the Early Formative period, when Garden Canyon Village was first occupied, the first stirrings of the Hohokam culture were underway in the Salt and Gila river valleys to the north. During the Pioneer period (A.D. 300-A.D. 800), the Hohokam area was characterized by small, dispersed agricultural villages supported by canals. Distinctive Hohokam ceramic styles were developing, and serving vessels were decorated with red painted designs. Other Pioneer period Hohokam material culture included ceramic figurines, stone bowls and palettes, and items made of shell from the Pacific Ocean and Gulf of California (Fish and Fish 2007).

During this period, it is likely that the Mogollon were closely associated with the Hohokam. The early Mogollon were characterized by pit house villages and a brownware ceramic tradition (Shafer 2003). The Mogollon area is usually divided into several regional/cultural variations and, around A.D. 600, the Mimbres branch developed out of the Mogollon culture (Shafer 2003). South of the border in Sonora, Richard Pailes and others (Amsden 1928) have described the Rio Sonora Culture, which has been given an initial date of A.D. 700. It is possible that this early phase of the Rio Sonora represents an intrusion of new people who expanded westward into Sonora (Braniff 1995:225). The Trincheras culture also emerged during this period, with a possible initial date of A.D. 200 for characteristic purple-on-brown Trincheras ceramics (McGuire and Villalpando 1993). It has been hypothesized that the development of the Trincheras culture was related to the shell trade (Braniff 1990:178).

During the Middle Formative Period, many of the cultures surrounding Garden Canyon Village fluoresced. During the Colonial Period (A.D. 800- A.D. 950) the Hohokam experienced significant population growth. Hohokam styles and traits expanded out of the Salt and Gila river valleys; whether this spread was the result of population movement, emulation, or colonization is not entirely clear. It is during this period that the Hohokam cultural complex defined by red on buff ceramics, stone palettes, glycymeris shell bracelets, and unique architectural forms such as ball courts and platform mounds emerged (Lekson 2009). Canal systems were elaborated and trade networks expanded. During the Sedentary period (A.D. 950 – A.D. 1150), platform mounds played an increasing role in the Hohokam architectural repertoire. To the east, Mogollon pit house villages were eventually replaced by masonry pueblos similar to those of the Ancestral Puebloans. The Mogollon were impacted by the Chacoan florescence to the north, and it appears that their allegiances shifted north during this period. The Classic Mimbres period reached its

apogee between A.D. 1050 and A.D. 1110 (Shafer 2003). During this period, the Mimbres were distinguished by surface pueblos and black-on-white painted ceramics (Anyon and LeBlanc 1984). The Mogollon-Mimbres sequence ended around A.D. 1150, and there appears to have been an occupational hiatus in the southern portion of the Mogollon cultural area (Anyon and LeBlanc 1984:23).

To the southwest, the Rio Sonora and Trincheras cultures continued to develop. A unique ceramic complex emerged among the Trincheras culture (Johnson 1963). Trincheras purple-on-red ceramics appeared early in this period, circa AD 800 (Braniff 1978:76). Additionally, they began to construct terraced hillside sites- called *cerros de trincheras*- in the Altar, Magdalena, and Concepción Valleys of Sonora (McGuire and Villalpando 2015). Some have interpreted these sites as fortifications related to warfare, while others have argued that they were ritual spaces (McGuire and Villalpando 2015:431). In his early analysis of La Playa site, Johnson observed close connections between the Trincheras and the Hohokam (1963:174). Indeed, the terraced hillsides for which the Trincheras culture is named can be observed as far north as the Tucson Basin and the Gila River (Johnson 1963). Interactions between Papaguerian Hohokam and Trincheras people also appear to have included war and hostilities (McGuire and Villalpando 2015). The Trincheras were both temporally and spatially close to the Rio Sonora Culture, but the two appear to have been separated by a frontier at the San Miguel River; however, both areas were penetrated by Casas Grandes ceramic wares (Braniff 1978, Pailes 1976). The Middle phase of the Rio Sonora culture began around A.D. 1000 with the appearance of houses-in-pits, textured red-on-brown pottery, and habitations located on bajadas overlooking floodplains (Pailes 1984:312). It appears that, beginning around A.D. 1000, the Rio Sonora had a close relationship with the Chihuahuan cultural province, explained by Pailes as migration of

Chihuahuan peoples into the Rio Sonora valley (1984:320).

In Chihuahua, the Middle Formative period coincides with the Viejo period (A.D. 700 – A.D. 1200). The Viejo period was originally characterized by Di Peso as a time of pit houses transitioning to above ground room blocks (Di Peso et al 1974). The population of the region was believed to have been small, distributed in scattered settlements. However, much about the Viejo period is still debated. Whalen and Minnis disagree with Di Peso, arguing that Viejo period northwestern Chihuahua may have been highly populated due to its favorable environment (Whalen and Minnis 2001:43). Ultimately, the Viejo period remains poorly understood, and much work remains to be done.

The Late Formative was a time of change in the southern Southwest. The Hohokam Classic Period (A.D. 1150- A.D. 1450) was characterized by significant cultural shifts. Populations retracted back into the Salt and Gila River valleys, and ceramic styles, burial methods, and architecture changed. Hohokam ball courts, which had once been the focus of ceremonial and integrative functions, were replaced by platform mounds. These platform mounds have been interpreted by many as a sign of increased social stratification- while events in ball courts would have been highly visible, raised mounds may have signified exclusion from elite activities taking place on top (Peterson et al 1997). Meanwhile, the southern Southwest was affected by the emergence of the Casas Grandes and Salado phenomena (Figure 2.10). Between A.D. 1200 and A.D. 1450, the Casas Grandes phenomenon exploded out of Paquimé and exerted influence over northern Chihuahua, western Texas, southern New Mexico, and northeastern Sonora. Paquimé, a large settlement of more than 2,000 rooms located in northern Chihuahua, was the center of the Casas Grandes phenomenon and engaged in specialized production and consumption of items such as macaws, shell ornaments, copper, and ceramics (VanPool et. al. 2006:235).

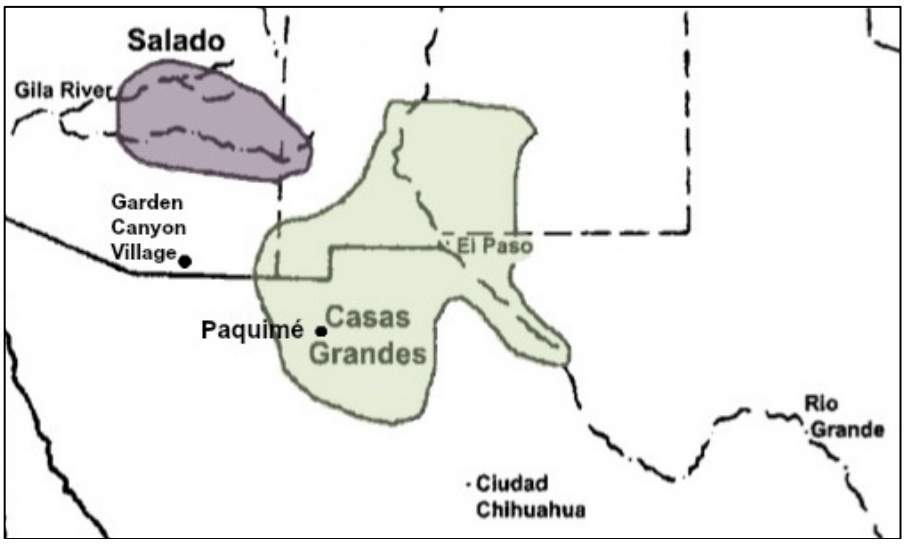

Figure 2.10 Garden Canyon Village in relation to the Salado heartland and the Casas Grandes region. Map from VanPool et al 2006, edited by A. Schneider.

The Casas Grandes phenomenon was characterized by distinctive polychrome pottery and architectural features including ball courts, butterfly-shaped rooms, raised hearths, and effigy mounds (VanPool et. al. 2006:235). The extent of Paquimé's political and economic influence has been hotly debated (VanPool et. al. 2006: 235). Wilcox has argued that Paquimé was the center of a local system that extended 100 km from the site. Sites up to 300 km from Paquimé were more loosely incorporated, as evidenced by the presence of Chihuahuan ceramics. Due to craft specialization, Paquimé may have had trade relationships with other groups beyond this 300 km zone; Wilcox estimates that the total hierarchical series of zones may have exceeded a radius of 500 km (1991:149). Additionally, there is evidence of a migration from northwest Chihuahua into northeast Sonora between A.D. 1300 and A.D. 1500, so the influence of Casas Grandes may have included the spread of people as well as ideas (Douglas and Quijada 2005:275). In contrast, others have argued that Paquimé's power did not extend outside of a very small sphere of direct control. The exact nature of this fluorescence remains unclear- during the course of the decades-long debate, many have attributed Paquimé's rise to Mesoamerican connections (Di Peso et al

1974, Kelley 1993, Whitecotten and Pailes 1986, and others), while others have argued that it was a local development (Whalen and Minnis 2001).

During this same period, the Salado phenomenon was spreading in central and southern Arizona. There are several known Salado sites in the San Pedro River Valley, including Reeve Ruin, the Ringo Site, and the Kuykendall Site (Altschul and Jones 1990:12). Between AD 1250 and AD 1425, Salado was characterized by distinctive polychrome pottery, compound architecture, and specialized ground stone and ceramic items (VanPool et. al. 2006:235). However, the true nature of the Salado horizon is still debated, and it has been alternatively interpreted as a Puebloan migration, a product of Mesoamerican influence, a local development, or a religious cult that spread throughout the Southwest (Clark 2001)

The Rio Sonora culture reached their late phase sometime around A.D. 1150 or 1200, and it is characterized by rectangular surface structures and the import of Chihuahuan polychromes (Pailes 1984:313). In addition to the significant shift from pit houses to surface structures with rock foundations, public architecture, including ballcourts and platform features, was introduced. After A.D. 1200, a settlement hierarchy emerged with small hamlets and local centers. Large sites with multistoried adobe structures and ballcourts were at the center of this emergent system (Phillips 1989) During this same period, the upper Rio Sonora Valley underwent a population increase at a greater rate than what would be expected for a subsistence agricultural society (Pailes 1984:319). Trade goods also increased during this period, and included Casas Grandes and southern Arizona ceramics, marine shell ornaments, and copper tinklers, likely from west Mexico (Phillips 1989:389). After AD 1300, Trincheras pottery was no longer distributed and the area appears to have only received foreign pottery from Arizona and Chihuahua as the area was, presumably, drawn into the Casas Grandes sphere of influence. (Braniff 1978:76). While

much remains to be learned about the Trincheras and Rio Sonora cultures, they none the less had a notable presence in Northern Sonora during the Late Formative period (Figure 2.11)

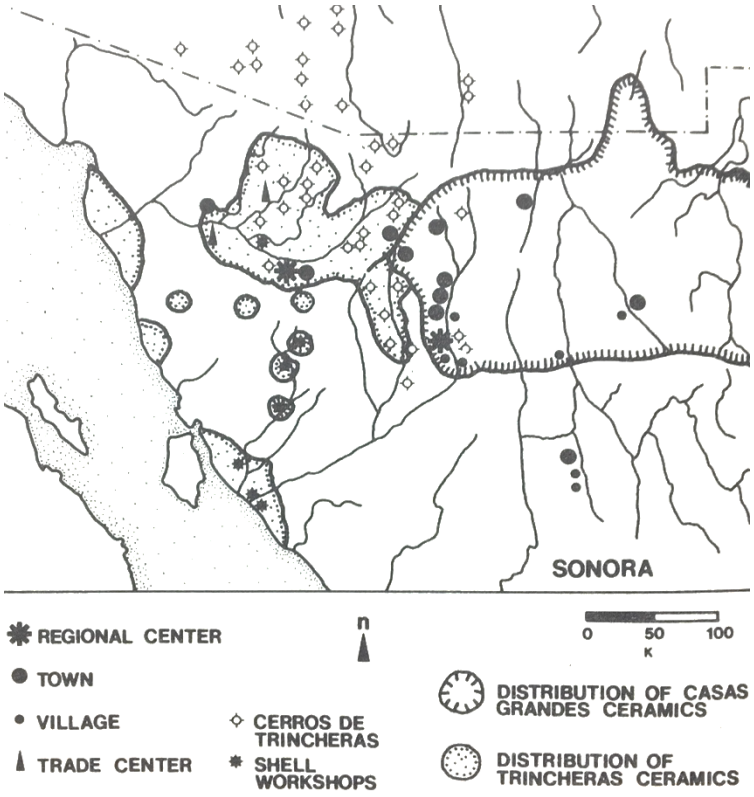

Figure 2.11 Archaeological sites in northern Sonoran dating to the 14th through 16th centuries. From Braniff 1990.

A History of Research at Garden Canyon Village

The Garden Canyon Village site was initially recorded in 1951 by Charles DiPeso during a regional reconnaissance for his Babocomari Village project. Di Peso noted Babocomari Polychrome, Gila Polychrome, and Tanque Verde red-on-brown ceramics at the site (1951:11). The site was designated as AZ EE:11:1 (ASM) and named the Tanner Canyon site (Cook 2000:7). In 1954, the site was re-recorded by archaeology students under the supervision of Emil Haury and Edward Danson, and the site was renumbered AZ EE:11:13 (ASM) and renamed the Garden Canyon Village site (Cook 2000:7).

Between 1964 and 1965, Jon Nathan Young, a graduate student at the University of

Arizona, excavated part of the site under the instruction of Emil Haury and with the assistance of personnel assigned by the army (Cook 2005:1; Figure 2.12, Figure 2.13). As reported by SWCA Environmental Consultants, "Mr. Young's excavations were meticulous, and the artifacts were carefully processed and stored at the Fort Huachuca Museum" (Whittlesey et. al. 2009:1). The Young excavation resulted in a short report (Young 1972).

Figure 2.12 Emil Haury (left) and Jon Nathan Young (right) confer during the 1964 Garden Canyon Village excavations. Photo courtesy of the Fort Huachuca Museum.

Figure 2.13 Jon Nathan Young (left) and Charles Di Peso (right) during the 1964 Garden Canyon Village excavations. Photo courtesy of the Fort Huachuca Museum.

Unfortunately, the location of many of the artifacts collected during the 1964 excavation is currently unknown. Following the excavation, the artifacts, including the cremations and inhumations, were stored on Fort Huachuca. Reports conflict as to whether the collections were stored in the archaeology laboratory, post museum, or both (Whittlesey et al 2009:1, Cook 2000:7). During a period when there was no Post Archaeologist or Cultural Resource Manager on Fort Huachuca, the material from the 1964 excavations was moved, discarded, or otherwise lost (Cook 2000:7). Several regional archaeological institutions, including the Arizona State

Museum (ASM), the Department of Anthropology at the University of Arizona, the Amerind Foundation, and Cochise Community College, have been contacted, and none have Garden Canyon collections within their facilities (Cook 2000:7-8).

Investigations at the Garden Canyon site stalled in the years after the Young excavation, and most archaeological activities at Fort Huachuca were compliance driven. In the 1970s, the army constructed a paved road through Garden Canyon, which resulted in direct ground disturbance at the site as well as the diversion of water into parts of the site (Cook 2000:7). Garden Canyon Village was added to the National Register of Historic Places in 1975 (Cook 2000:7). In the following years, the site was impacted both by sheet wash from Garden Canyon Road as well as erosion and deposition from an intermittent seasonal drainage that ran from the northwest corner of the site through its center. In 1992, the United States Department of Agriculture Soil Conservation Service was contracted by Fort Huachuca to provide a plan to mitigate these effects. Structures were built to slow erosion on the site but erosion continued and several archaeological features at the site were exposed and partially destroyed (Shelley 1995:1). Subsequently, Statistical Research, Inc. (SRI) was contracted to assess the damage and prepare a stabilization plan. SRI confirmed that archaeological features had been impacted by the erosion, and that stabilization was urgently needed before damage was caused. The actions taken included the installation of several culverts under Garden Canyon Road, placing boulders to slow water flow, and the installation of rip-rap in several washes (Shelley 1995:26).

Between 1991 and 1992, Post Archaeologist Marie Cottrell began excavations at Garden Canyon Village to mitigate impacts from trenching for installation of a fiber optic cable through the site (Whittlesey et. al. 2009:1). Her units were primarily located in midden deposits, although one unit included part of a Classic period adobe room overlying a pre-Classic pit house (Cook

2005:1). No records for Cottrell's excavations exist (Whittlesey et. al. 2009:1). While the cultural affiliation of Garden Canyon Village discussed in depth in Chapter 6, it should be noted here that Cottrell and others commonly used Hohokam phase names for the Garden Canyon Village site. This tendency reveals an underlying assumption of several of the early excavators of Garden Canyon Village: that the site was Hohokam.

In 1993, an analysis was completed of two rock shelters with rock art in upper Garden Canyon, three miles north of Garden Canyon Village. While a definitive connection between Garden Canyon Village and the artists who utilized these rock shelters has not been proven, the rock art can still provide additional insight into the prehistoric peoples who spent time in Garden Canyon. SRI both recorded the rock art and performed test excavations at the associated rock shelters: the Garden Canyon site, which will be referred to the Garden Canyon Pictograph site for clarity, and the Rappell Cliffs site (Altschul et al 1993). The rock shelters each contain abundant white, black, red, and polychrome pictographs on the roof and walls of the shelter. It is apparent that the rock art at each shelter is an accumulation of different elements done by different sets of artists at different times (Altschul et al 1993:1-21). Proto-historic Apache components, as well as possible Mogollon or Hohokam inspired elements were recorded. Excavations revealed hearths, sherds, flaked stone artifacts, ground stone artifacts, and faunal remains. The ceramic assemblage primarily included Babocomari polychrome. Also present were non-micaceous red-on-brown ceramics with designs similar to those seen during the Hohokam Sedentary period, red wares generally similar to Rincon Red from the Tucson Basin, and red ware sherds similar to those from the San Simon series of Mogollon ceramics. SRI concluded that the cultural deposits resulted from short term utilization of the shelters during the 12th or 13th centuries- they may have been temporary camps established during hunting or

gathering expeditions into Garden Canyon (Altschul et al 1993:2-99).

The same year, SRI was contracted by Fort Huachuca to catalog and analyze the collections held by the post (Shelley and Altschul 1996). These collections included a portion of the 1964 collections excavated by Young, as well as the entirety of the 1991-1992 collections excavated by Post Archaeologist Marie Cottrell. SRI's efforts resulted in a volume summarizing chipped stone, ground stone, shell, ceramics, and faunal remains. However, their analyses were hampered by a lack of information on the excavated contexts and artifact proveniences. They found that very little of the 1964 material had survived, and that the majority of the artifacts from the 1991-1992 excavations were from midden deposits. From the assemblage, Shelley and Altschul concluded that Babocomari sherds dominated the ceramics, and that Garden Canyon Villagers were agriculturalists who also heavily hunted cottontail rabbits (1996).

Additional excavations supervised by Marie Cottrell and her successor John Murray were undertaken between 1994 and 1999. These excavations were done in collaboration with a field school run by the Arizona Archaeological Society (AAS) and by Cochise Community College (Cook 2005:3). No reports have been prepared on these excavations and documentation is minimal. AAS volunteers prepared unit level report forms for each level and wrote daily field journals- however, there are no feature forms and only a few photographs were taken. While the AAS volunteers and students were enthusiastic and willing to learn, they lacked proper supervision and the excavations did not meet professional standards (Whittlesey et. al. 2009:3). The AAS excavations ended in 1999 when human remains were encountered and Native American groups consulted by Fort Huachuca objected to the excavations (Whittlesey et. al. 2009:3). Volunteers continued to process artifacts from the site, but their efforts did not result in a full analysis of the collections or a report.

In 1999, Desert Archaeology, Inc. (DAI), was contracted to perform a ground penetrating radar (GPR) survey and attempt to relocate the missing collections from the 1964 excavations (Cook 2000). Oral histories and secondhand reports suggested that the collections may have been reburied, and a meadow in upper Garden Canyon was identified as a possible location (Cook 2000:1). The GPR survey revealed several anomalies, and the report concluded that the results suggested buried deposits whose exact nature could not be ascertained without ground truthing via excavation (Cook 2001:16). Excavation never took place. In 2000, the US Army Criminal Investigation Division opened an investigation into the missing collections. Unfortunately, they were unable to determine how the artifacts disappeared or where they are located (Whittlesey et. al. 2000:1)

In 2003, DAI was contracted to analyze artifacts from the Garden Canyon site that had been curated at the Bowers Museum in Santa Ana California and the Fort Huachuca Museum. The collection included 14 ceramic vessels, 10 of which were from the 1964 Young excavations and had been on display at the Fort Huachuca Museum. The remaining 4 came from the Bowers Museum; their provenience as well as how they came to be at the Bowers Museum is unknown. The assemblage of vessels included Dragoon red-on-brown vessels, a "shoe pot," and an elongated vessel (Cook 2003a:13)

In 2004, all artifacts and forms from the Garden Canyon site were submitted to the Arizona State Museum (ASM), Fort Huachuca's repository, for curation (Cook 2005:3). That same year, ASM completed an initial inventory of the assemblage from the 1994 − 1999 excavations. While individual artifacts were not counted, the collection included 2,227 bags of ceramics, 1,682 bags of flaked stone, 1,190 bags of ground stone, 1,268 bags of faunal bone, 479 bags of shell, 557 bags of soil samples, 277 bags of mineral samples, 44 bags of metal, 34 bags

of glass, 8 bags of other historic-period artifacts, and 15 miscellaneous bags (Cook 2005:5).

In 2005, the Center for Desert Archaeology undertook a report (Cook 2005) to examine the excavation records for the Garden Canyon site and propose an approach to summarize the excavations completed to date. The report recommended a comprehensive remapping of the site, additional petrographic study, and analysis of existing collections (Cook 2005:6).

In 2009, Fort Huachuca contracted with SWCA Environmental Consultants through the prime contractor, Engineering and Environmental Consultants, in order to take steps to rectify the unfortunate history of archaeological work at Garden Canyon Village (Whittlesey et. al. 2009:xv). SWCA was charged with preparing a description of Garden Canyon Village that incorporated all previous excavations, analyzing a sample of artifacts from the site, and preparing a report synthesizing their work (Whittlesey et. al. 2009:1). In their review of previous excavations, they concluded that these past efforts were not "guided by a research design, excavation and recording techniques were not of a professional quality, collections were not analyzed, inadequate curation resulted in the loss of many collections, and no reports were prepared" (Whittlesey et. al. 2009a:1).

The two volume SWCA report provided the most complete body of work summarizing Garden Canyon Village to date, and they completed the challenging task of creating an overall map, compiling information about excavated features, and placing what they had learned in the regional context of northern Mexico and southern Arizona. This task was no small feat due to the lack of professional documentation and absence of photographs. However, due to a contracting dispute, their final report did not include an analysis of ground stone or chipped stone, and was thus considered incomplete by Fort Huachuca's Cultural Resource Manager (Martyn Tagg, Personal Communication 2015).

As of this report, the Garden Canyon Collections are curated at the Arizona State Museum and no additional excavations have taken place. The current condition of the Garden Canyon Village site remains much the same. It is still subject to impacts from both military and recreational activity as well as from Garden Canyon Road; however, site protection measures have been implemented. Additional survey in Garden Canyon has suggested that the area may have been more densely settled than previously thought (Schneider 2014). Additionally, the site boundary was updated and refined during the summer of 2015 (report forthcoming).

Site Description and Synthesis of Previous Work

This section provides a description of the Garden Canyon Village site, as well as a synthesis of what is known about the site from previous excavations. Special attention will be paid to the E75 and E100 complexes, as they are the focus of this thesis. Garden Canyon Village is located where Garden Canyon opens into a flat alluvial area at approximately 5,000 feet altitude (Whittlesey et. al. 2000:3). Garden Canyon Creek is located south of the village and a seasonal drainage runs through the site from its northwest corner to the center, flooding the site during heavy rainfall.

Throughout the history of excavations at Garden Canyon Village, there have been 3 major excavation areas, dividing the site into 3 loci. Young's early excavations represent the first, unnamed locus. Young excavated 4 pit houses, 1 house-in-pit, and 2 adobe surface structures with wing walls that created a courtyard (Figure 2.14; Cook 2000:7). Young noted that both types of sub-surface structure were rectangular with 3 rows of interior roof support posts, plaster walls, east facing doorways, and hearths located just inside the doorway. He also excavated a large outdoor cooking pit and a "small, shallow, circular structure which is very similar to what

DiPeso found at nearby Babocomari Village, and referred to variously as ‘round houses’ and ‘women’s houses’” (1972:10).

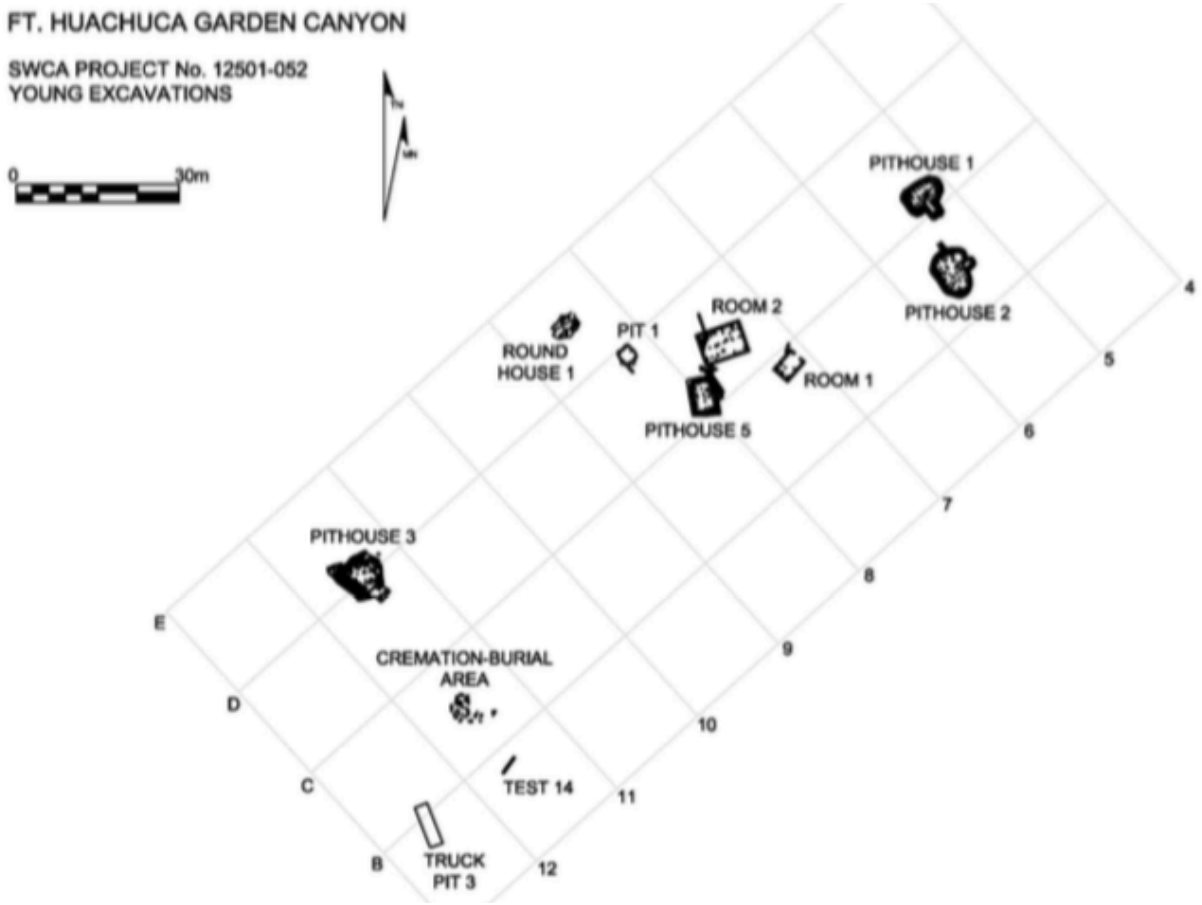

Figure 2.14 A site map from Young’s original excavations, showing the portion of the site documented by Young.

Young speculated that the overall layout of the portion of the site he excavated may have been a circular compound surrounding a central plaza area with a perimeter wall enclosing the plaza. He noted the similarity of the site to Babocomari Village, a nearby site excavated by Charles DiPeso in 1951 (Cook 2003a:11). Di Peso described Babocomari Village as a small hamlet of about 40 people that was likely occupied between A.D. 1200 and A.D. 1450. In addition to architecture, Babocomari Village shared many other similarities to Garden Canyon Village, including a prevalence of Babocomari style ceramics. Since Babocomari Village was much more completely excavated than Garden Canyon Village, we can look to its site plan for an

estimation of what Garden Canyon Village may have looked like (Figure 2.15). Additionally, in Young's field journal, he recounts an occasion in which he observed the site from a helicopter. While taking aerial photographs, he noted a "large depression west of the disturbed room" that looked "very much like a Snaketown ball court from the air" (Whittlesey et. al. 2009a:54).

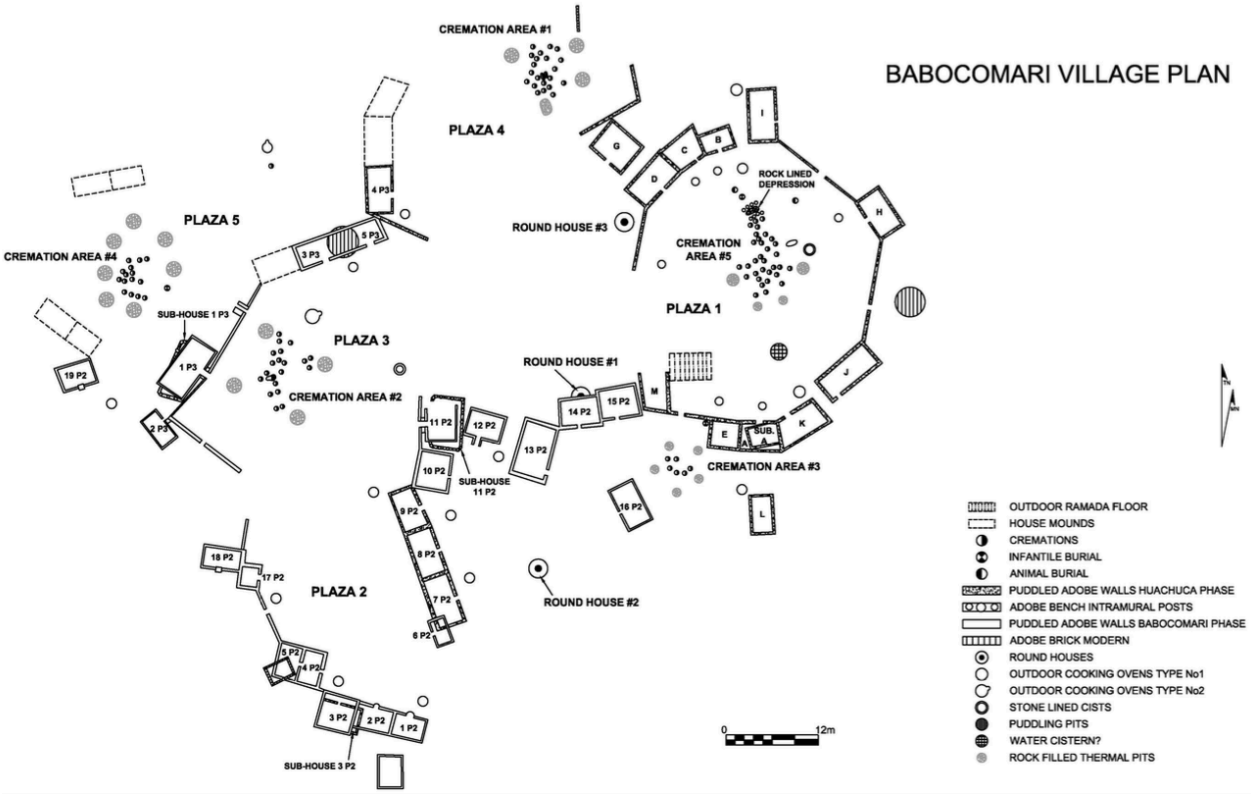

Figure 2.15 Babocomari Village plan (From Di Peso 1951)

Young's excavations revealed a large number of ceramic, lithic, and shell artifacts, as well as approximately 50 cremations, 10 inhumations, and 3 canine inhumations (Cook 2000:1). Burial-Cremation Area 1, which is set away from the residential portions of the site, includes 5 inhumations and numerous cremations, while 4 human inhumations and 3 canine inhumations were recorded in the "floor or near-floor fill of the houses-in-pits" (Young 1972:15). In his 1972 report, Young describes 50 cremations, all of which appeared to be secondary burials. The majority were put in ceramic vessels and buried, but several were buried without a container

(Young 1972:13). Many of the cremation burials included fragments of shell jewelry that appear to have been burned in the crematory fire (Cook 2003a:34). The condition of the inhumations was poor, but some grave goods were noted. Numerous burials were accompanied by a ceramic offering, and one individual had a shell bracelet around the left wrist (Young 1972:15).

In the ceramic assemblage, Young observed Babocomari polychrome, Salado Gila polychrome, Sonoran Trincheras purple-on-red, Chihuahuan polychrome, and Hohokam style Tanque Verde, Rincon, and Rillito varieties (1972:15). Young's excavations also revealed shell artifacts including bracelets, awls, and needles (Young 1972:19). Additionally, two carved shell pendants were located at Garden Canyon Village. One is an incomplete representation of a bird that Cook compares to similar artifacts from Mimbres sites in New Mexico (Cook 2003a:35, Shafer 2003). The other is a carved piece of shell that depicts a quadruped figure. Young interpreted this figurine as a possible "effort to portray a buffalo" (1972:19).

Locus A is the large area that includes the Main Complex, the E75 Complex, and the E100 Complex (Figure 2.16). Locus A was excavated by Cottrell, Murray, and the AAS volunteers in the 1990's. These excavation areas were in close proximity to Young's original excavations. The E75 and E100 complexes are associated with the best documentation and are also the focus of this thesis. Therefore, they will be discussed in detail here. The Main Complex excavations resulted in conflicting maps and confusing feature descriptions, but the complex likely consists of three aboveground adobe-walled rooms, a pit structure, numerous postholes, wall segments, and hearths, and other possible, but not confirmed, rooms and features. Unfortunately, relatively little research has been done on the Main Complex, and much of its assemblage remains unanalyzed.

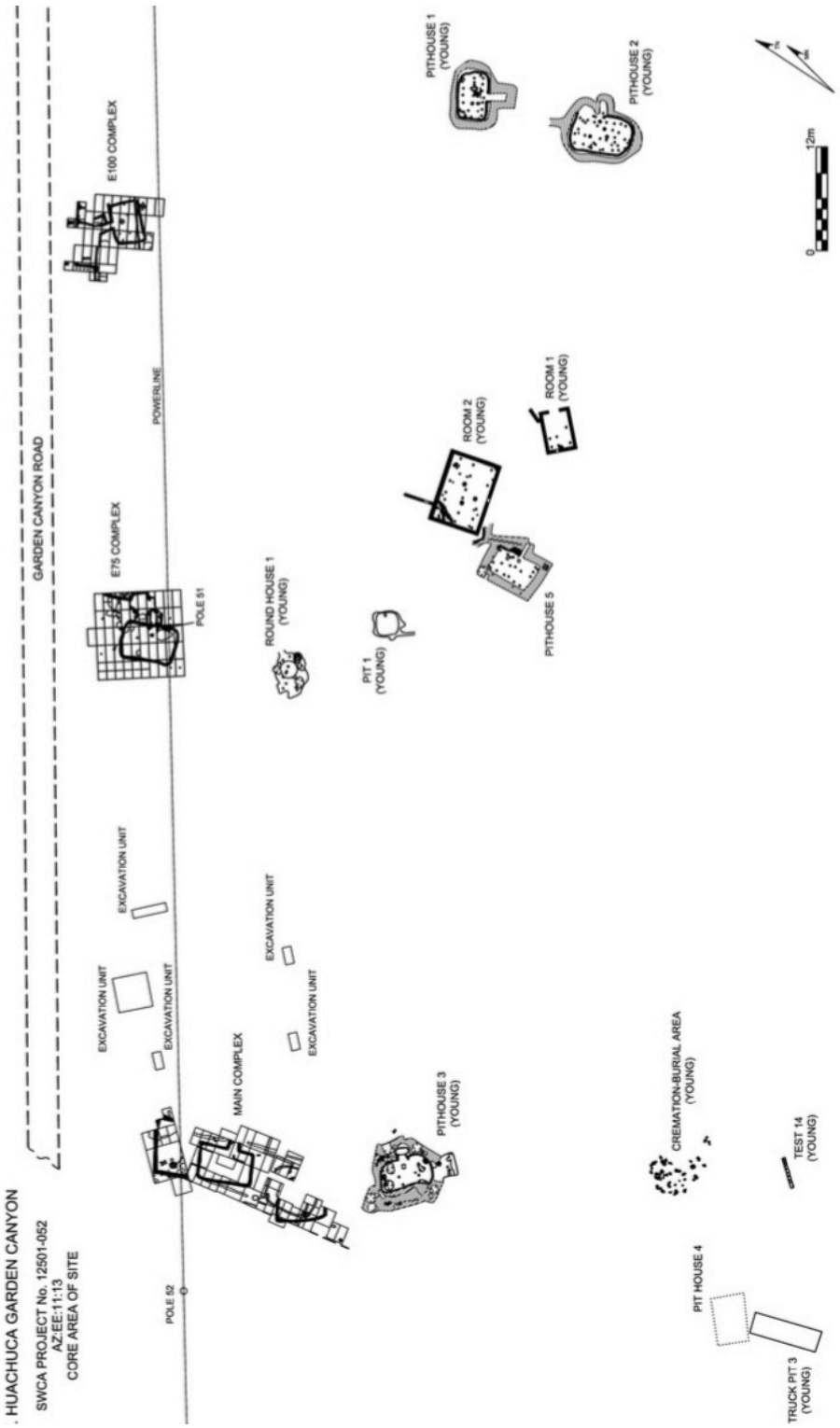

Figure 2.16 Young's excavation areas and Locus A, with excavation grids. The portions of the site that were part of Young's unnamed locus are signified by "(Young)". Locus B is located further south along Garden Canyon Road. Image courtesy of SWCA (Whittlesey 2009a)

The E75 complex includes two structures, designated as House 1 and House 2, and an assortment of wall segments, postholes, hearths, and a refuse deposit (Table 2.2, Figure 2.17). House 1 was completely excavated, while House 2 was only partially excavated. The E75 complex was intensively used through time, resulting in complicated stratigraphy. Eleven features are located outside the boundaries of House 1 and House 2, and may predate the structures. Traces of at least three early structures were identified- a hearth and ash pit complex (F16 and F17), a possible pit structure (F14 and F20), and a complex of early walls (F21; Whittlesey et al 2009a:257). Several of the recorded features may have also been constructed after the abandonment of Houses 1 and 2, including five rock concentrations in the fill of House 1 (F3, F6, F7, F10, F11) and one in the fill of House 2 (F5). Two hearths (F18 and F4) also appear to postdate construction of the houses. The most probable date of the last occupation of House 1 is A.D. 1325, so it is apparent that activity continued in the area into the fourteenth century (Whittlesey et al 2009a:258).

Table 2.2 Features in the E75 Complex (From Whittlesey et al 2009a)

Feature No.	Feature Type
F1	Adobe-walled structure (House 1)
F2	Partial adobe-walled structure (House 2)
F3	Rock concentration
F4	Hearth
F5-7	Rock concentration
F8	Refuse deposit
F9-13	Rock concentration
F14	Activity surface
F15	Rock alignment
F16	Ash pit
F17-18	Hearth
F19	Possible wall segment
F20	Hearth
F21	Complex of early walls
F22	Posthole

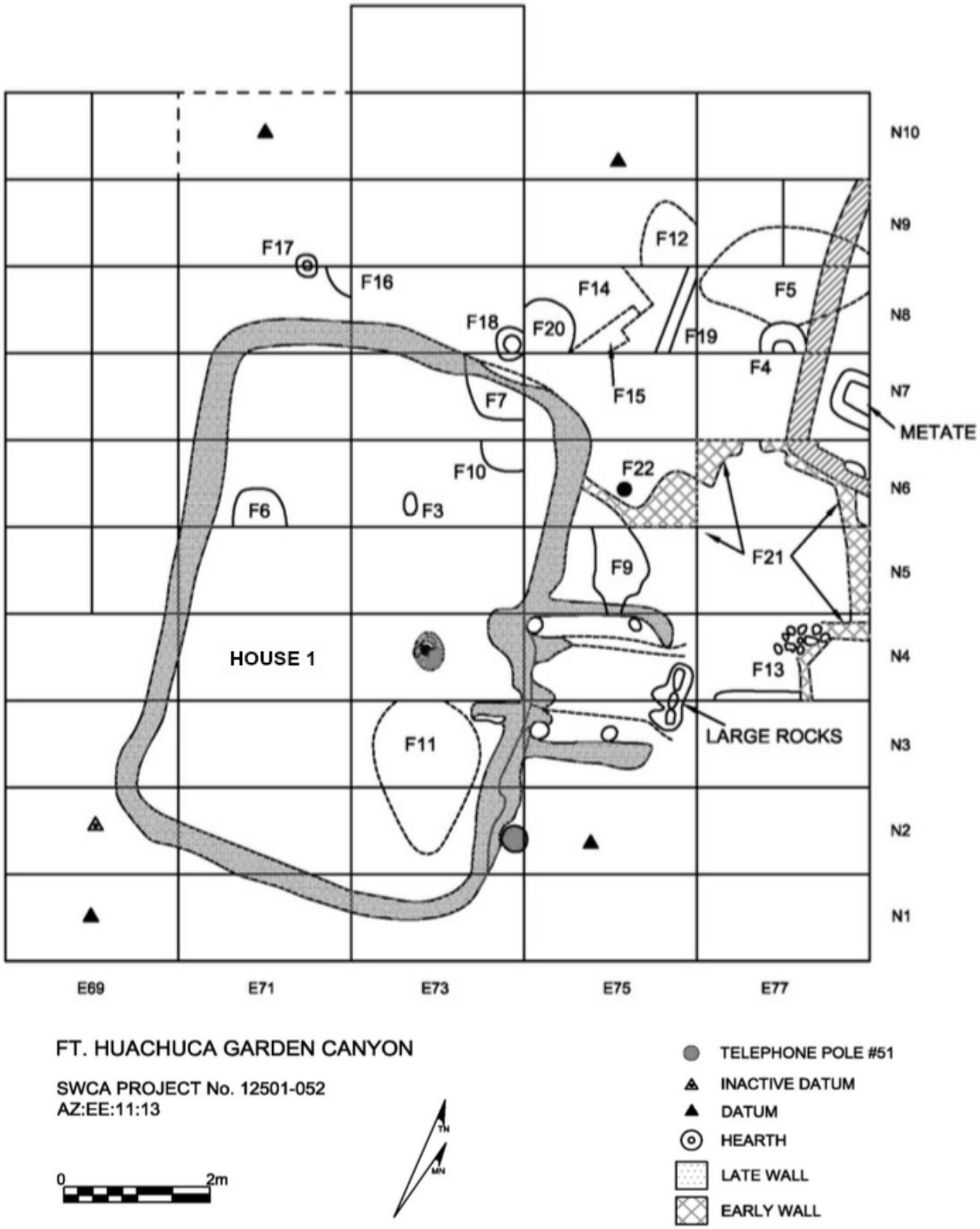

Figure 2.17 Map of the E75 Complex, Courtesy of SWCA.

Archaeomagnetic dates suggest that House 1 was originally built during the transition between the Middle Formative and Late Formative Periods, and subsequently remodeled twice during the Late Formative (Whittlesey et al 2009a:268). House 1 was constructed of puddled adobe with stone and post reinforcements. The Interior dimensions of House 1 were 5.5 m north-south and 3.5 m east-west. On the east side of the building, a square entryway provided access. The floor was plastered and included a basin shaped hearth. Interior features include post holes, an ash pit, and a depression. It appears that the structure burned at the end of its occupation (Whittlesey et al 2009a:261). Unfortunately, some features such as rock concentrations were described but not plotted on any maps (Whittlesey et al 2009a:263). Additionally, due to the limited excavation documentation, it is also unclear whether House 1 was a pit structure or surface room. SWCA estimates from the available documentation that the original ground surface may have been 15-35 cm above the structure floor. The structure had two central roof-support posts and several rows of smaller posts. The floor was plastered and included a plastered, basin shaped hearth aligned with the entryway.

The original excavators indicated a de facto refuse assemblage on the floor, including fifteen ceramic vessels, eleven of which were Babocomari Polychrome, Bichrome, or Plainware. Unfortunately, there is no specific provenience for these vessels, and the vessels appear to have been found in several different levels, further confusing the actual location of the floor (Whittlesey et al 2009a:266). During the course of this thesis, several ground and chipped stone artifacts that may have been part of this floor assemblage were identified within my sample. Due to inconsistencies in the hand-written labels created by the original excavators, there are uncertainties about the accuracy of this lithic floor assemblage. Additionally, it is not clear why these artifacts were designated as part of the floor assemblage, or how that floor was defined.

However, the possible floor artifacts are described in Table 2.3 below. Notably, a number of these artifacts are heat affected or heat cracked, an observation consistent with SWCA's argument that House 1 may have been ritually burned at the end of its uselife (Whittlesey et al 2009a:268). Additionally, the floor assemblage implies a possible concentration of beads and bead making tools in House 1- a possibility that will be further discussed in Chapter 5. While beads and drills in the fill imply that House 1 was used for disposal, the presence of beads and bead making tools on the floor might suggest an actual workshop. Ultimately, SWCA interpreted House 1 as a habitation structure with ceramic vessels used for cooking, serving, and possibly storage.

Table 2.3 Possible lithic floor assemblage for House 1 in the E75 complex.

Field Unit	Location Description	Artifacts
N7/E73	North end of House 1	¾ groove diorite axe, unburned
N7/E73	North end of House 1	Lapstone, heat cracked
N7/E73	North end of House 1	Fragmentary metate, heat cracked
N7/E73	North end of House 1	Drill
N7/E73	North end of House 1	Chert biface
N6/E73	North end of House 1	Tabular tool
N3/E71	South end of House 1	Mano, heat cracked
N2/E71	South end of House 1	Two beads
N4/E71	West side of House 1	Palette fragment, heat affected
N4/E71	West side of House 1	Drill
N4/E71	West side of House 1	Multitool
N5/E71	West side of House 1	Shaft straightener
N5/E71	West side of House 1	2 handstones, heat affected
N4/E73	East side of House 1, near hearth	Bead
N4/E73	East side of House 1, near hearth	Two handed trough mano

Significantly less is known about House 2, as it was only partially excavated. The excavated portion includes the southwest corner of what appears to be an aboveground, adobe-walled structure (Whittlesey et al 2009a:268). The walls were made of adobe reinforced with stones and two postholes were identified (Whittlesey et al 2009a:269). No floor or floor features

were identified, but the original excavation notes indicate a possible floor assemblage that included a Babocomari plainware jar. The sample analyzed in this thesis did not contain any ground or chipped stone artifacts associated with the possible floor assemblage. SWCA hypothesized that House 2 and House 1 were likely inhabited at different times, but the documentation from the original excavation does not make it possible to identify which structure predates the other.

The E100 complex is located 40-50 m northeast of the E75 complex. The complex includes a possible courtyard with at least two aboveground, adobe-walled rooms (Table 2.4; Figure 2.18). Additionally, one walled, possibly intramural, space, three wall segments, one activity surface, two rock features, a midden or roasting pit, and a refuse deposit were identified. Like the E75 complex, this area appears to have been occupied extensively over time and, as a result, has complicated stratigraphy. There is evidence of reuse and remodeling suggesting more than one occupation episode (Whittlesey et al 2009a:282). While no archaeomagnetic samples appear to have been taken, SWCA estimates that the portion of the site was occupied during the Late Formative.

Table 2.4 Features in the E100 Complex (From Whittlesey et al 2009a)

Feature No.	Feature Type
F1	Probable courtyard
F2	Aboveground, adobe-walled room (Room 1)
F3	Partial aboveground, adobe-walled room (Room 2)
F4	Wall segment and possible intramural space
F5	Midden/Roasting pit
F6	Stone Feature
F7	Rock Pile
F8	Refuse Deposit
F9	Modern disturbance (Fiber optic cable trench)
F10	Wall segments
F11	Possible wall segment
F12	Possible activity surface

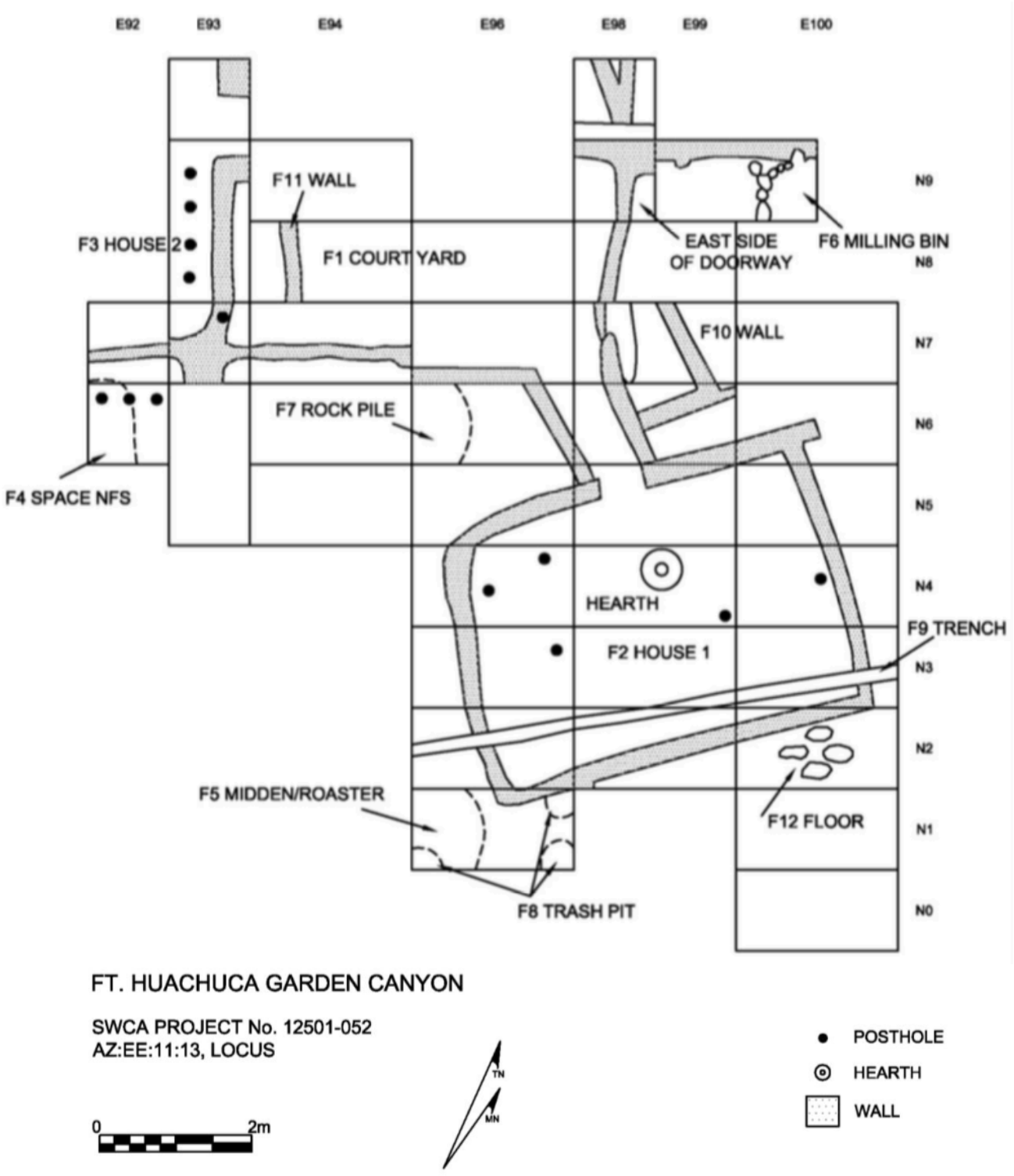

Figure 2.18 Map of the E100 Complex, Courtesy of SWCA.

The possible courtyard measured about 4 by 4 m and was bounded by adobe walls to the east, south, and west. House 1 opened into the southeast corner of the courtyard. House 1 measured 4.6 m north-south by 2.7 m east-west. The structure was constructed from puddled adobe and contained a central hearth, 5 postholes, and charcoal stains. Like House 1 in the E75 complex, it appears to have been burned at some point during or after its occupation (Whittlesey et al 2009a:283). A possible floor was identified and it included a hearth, several sandstone slabs, and two charcoal deposits. However, the limited information available indicates that the volunteers did not find any de facto refuse on the floor (Whittlesey et al 2009a:284). Additional ground and chipped stone artifacts identified within the sample analyzed for this thesis and possibly associated with the floor assemblage are described in Table 2.5 below. However, due to inconsistencies in the hand-written labels created by the original excavators, there are uncertainties about the accuracy of this lithic floor assemblage. Additionally, there is no explanation of why these artifacts were designated as part of the floor assemblage, or how that floor was defined. Furthermore, several of the artifacts identified by the original excavators as coming from the floor were found within the fiber optic cable trench. The disturbed nature of this context makes any association between an artifact and the floor questionable. SWCA concluded that the room evidently served a habitation function, but little else could be said (Whittlesey et al 2009a:285). House 2 was likely an aboveground room constructed from adobe. It was only partially excavated, and no floor or floor features were recorded.

Table 2.5. Possible lithic floor assemblage for House 1 in the E100 complex.

Field Unit	Location Description	Artifacts
N2/E98	Cable Trench	3 beads
N2/E97	Cable Trench	4 cores
N2/E97	Cable Trench	Edge modified flake
N2/E97	Cable Trench	Hammerstone
N4/E100	East side of House 1	1 bead
N4/E100	East side of House 1	1 core

Locus B includes the erosion control features constructed in 1992 (Whittlesey et. al. 2009a:9). During SRIs assessment of the erosion issues, they observed two pit structures and three roasting pits that had been exposed by erosion (Whittlesey et al 2009a:70). Additionally, the gabion had been placed in an area believed to be outside the site, but it was actually within the site and more archaeological features were uncovered, and damaged, during its construction. Based on the pit structures and lack of painted pottery, Locus B is believed to be an Early Formative component, but no chronometric dates were recovered (Whittlesey et al 2009b: 201).

Notably, when Danson and Haury recorded the site in 1954, they documented several features that are either obscured or no longer intact today. These features included five compounds described as similar to rectangular Salado compounds and four rows of rooms west of the compounds. Ten years later, when Young excavated at Garden Canyon Village, he noted what he believed was a ball court and a plaza in aerial photos of the site (Figure 2.19). During SWCAs 2008 visit, no ball courts or plazas were observed, and they were unable to identify the feature that Young believed to be a ball court in the aerial imagery. However, a rubble area was noted in the vicinity of the rooms observed by Danson and Haury (Whittlesey et. al. 2009:4)

Fig. 2.19 An aerial view of the 1964 Garden Canyon Village Excavation. Photo courtesy of the Fort Huachuca Museum.

The estimated size of Garden Canyon Village has varied considerably in the decades since it was first recorded. During Danson and Haury's work in 1954, it was estimated to be 400 by 400 m. Young later refined the estimate to 530 m east-west by 100 m north-south, but he did not map the entire site area. In winter 1999 − 2001, Cook expanded the Garden Canyon Village boundary to encompass 1,400 m east-west by 700 m north-south (Whittlesey et. al. 2009:4-9). Recent surveys of Garden Canyon have suggested that the site may be significantly larger than previously believed (Schneider 2014).

Military disturbance is extensive both at Garden Canyon Village and throughout lower Garden Canyon. Numerous roads, firebreaks, and utility lines- including above ground power lines and buried cables- cross the low basin of the canyon. The paved Garden Canyon Road and an accompanying utility pole line parallel the site on its north side. Several of the utility poles were installed directly within the ruins, including a power pole that intersects a wall of House 1 in the E75 complex. During the Young excavations of 1964, a WWII airstrip paralleled the site on its south site (Whittlesey et. al. 2009:4). There is extensive evidence of military activity scattered across Garden Canyon, including barbed wire, communications wire, cartridges of varying ages, land navigation trails, and construction debris. Garden Canyon is often the site of heavy vehicular and pedestrian traffic due to both recreational activities and military exercises. Military maneuver areas Site Uniform and Site Papa, as well as the lower Garden Canyon Picnic area are all located within the vicinity of Garden Canyon Village. Many people use Garden Canyon recreationally, and there have been issues with looting and other disturbances at archaeological sites in the area. Site protection measures have included the placement of boulders along the road to prevent off-roading, erosion mitigation, and monitoring of the site (Figure 2.20, Figure 2.21).

Figure 2.20 The location of the E100 Complex as it appears today. Facing south from Garden Canyon Road.

Figure 2.21 The location of the E75 Complex as it appears today. The telephone pole pictured was installed through the eastern wall of House 1. Facing southwest from Garden Canyon Road.

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Cumulatively, the past 50 years of work at Garden Canyon Village have made several things clear. With its long occupation history and ideal environmental setting, Garden Canyon Village can be considered to be a persistent place on the landscape (Schlanger 1992). The residents of Garden Canyon Village were maize agriculturalists, and flotation and pollen analyses also suggest that they grew cotton (Whittlesey et al2009b). They likely practiced mixed

subsistence and supplemented cultivated plant foods with wild plants and hunting. Faunal analysis has shown that cottontail rabbit and, to a lesser degree, artiodactyl, were important parts of the prehistoric diet (Whittlesey et al 2009b:41).

A wide variety of material goods were present at Garden Canyon Village. The ceramic assemblage in particular illustrates the diversity of the artifact assemblage. In their analysis, SWCA described 10,151 sherds, summarized in Table 2.6. The assemblage included styles from the Phoenix and Tucson Basins, the Salado horizon, the Mogollon Highlands, the Santa Cruz River valley, and northern Sonora. However, SWCA concluded that Garden Canyon Village residents also made a great deal of their own pottery, and may have been an important production center for Babocomari style ceramics (Cook 2005:2).

Table 2.6 Summary of SWCAs ceramic analysis, adapted from Whittlesey et. al. 2009b

Ware/Type	Quantity	Ware/Type	Quantity
Plain- Unclassified	5,742	San Simon Tradition (Painted)	184
Plain- Babocomari	1,586	Trincheras (Painted)	15
Plain- Gila	7	Tucson Basin Tradition (Painted)	7
Corrugated and Textured	154	Santa Cruz Polychrome (Painted)	12
Mogollon Brown Ware	12	Hohokam Buff (Painted)	31
Red- Dragoon	10	Roosevelt Red (Painted)	84
Red- San Francisco	61	Tucson Polychrome (Painted)	5
Red- Unclassified	110	Tularosa Black on White (Painted)	2
Ind. Plain or Red	69	Ind. Painted	336
Babocomari Tradition (Painted)	1,332	Ind. Plain or Painted Babocomari	170
Dragoon Tradition (Painted)	222		
Total	10, 151		

Notes: Ind. = indeterminate

Two general architectural types were found at Garden Canyon: partially subterranean pit structures- including both true pit houses and houses-in-pits- and aboveground puddled adobe rooms (Whittlesey et al 2009a:209). At Locus A and Young's excavation areas, both styles of structure tend to be sub-rectangular with rounded corners. Covered entryways that were flat or slightly ramped were placed on the long axis in alignment with hearths. It appears that the

Middle Formative period at Garden Canyon followed a pattern of groups of two to three pit houses with an open, central courtyard space. In the Late Formative, aboveground rooms became the primary architectural type, and SWCA believes that Garden Canyon Village had a circular compound enclosure pattern, similar to nearby Babocomari Village (Whittlesey et al 2009a:307). They believe that the wing walls and extramural wall segments with rooms attached are evidence of compound enclosures; however, the limited excavation restricts what can be said.

The inhumations and cremations excavated by Young also reveal something about mortuary practices at Garden Canyon Village. It appears that cremation took place in a discrete area away from the cemetery and the cremains were then buried in a cemetery located some distance away from residential dwellings. The inhumations were disturbed, and less can be said about them. However, it appears that cremation was the predominant mortuary procedure for adults while subadults and infants were more frequently inhumed. SWCA concluded that "Garden Canyon Village represents patterns that were widespread in southern Arizona, in southeastern Arizona/southwestern New Mexico, and perhaps in northern Chihuahua during the Middle Formative and Late Formative periods" (Whittlesey et al 2009a:320).

Previous research has also established some basic information about chipped and ground stone from Garden Canyon Village- a body of information that I will attempt to build on here. The original stone assemblage excavated by Young included "200 whole and fragmentary manos and handstones, more than 50 whole and fragmentary trough or slab metates, 19 pestles, 114 hammerstones, as well as numerous shaft straighteners, axes, knives, anviles (sic), lids, projectile points, beads, pendants, etc." (Young 1972:17). However, Young primarily focused on exotic stone artifacts, and subsequent analyses such as Cook's (2003) only analyzed very small quantities of chipped and ground stone. Perhaps the most complete lithic analysis to date was

completed by Shelley and Altschul (1996). In their report, they found that the assemblage showed a strong preference for local material. Additionally, they conclude that the Garden Canyon site exhibits a simple flake-core technology typical of sedentary agriculturalists, and that the ground stone assemblage indicates that maize grinding was a principal activity supplemented with wild plants (Shelley and Altschul 1996:98). They also recorded a relatively small number of nonlocal materials or styles, and concluded that evidence for interregional interaction is minimal (1996:96). However, their analysis was limited to material from the 1964 and 1991-1992 excavations, which primarily represented test units that had been excavated to mitigate installation of fiber optic cables, revealing midden deposits. The analysis presented in this thesis will build on their analysis by examining material from the 1994-1999 excavations at Garden Canyon Village, which represent much more thorough excavations of actual structures and living areas.

This chapter has summarized Garden Canyon Village's environmental and cultural surroundings as well as previous work done at the site. Additionally, I have provided a site description and attempted to synthesize the numerous previous works into a summary of what we know about Garden Canyon Village. While previous work has contributed a great deal to knowledge about this important site, much remains to be done. Large portions of the collection remain unanalyzed, and, while diverse influences have been acknowledged, little is known about how Garden Canyon Village interacted with surrounding cultures. In order to better address the question of Garden Canyon Village's position in the larger southwest, the next chapter will discuss frontier theory and its application to this particular case.

Chapter 3

Frontier Theory

In this chapter, I will explore the intellectual genealogy of frontier and boundary theory and apply these concepts to Garden Canyon Village. Due to its location at a cultural crossroads, the material culture of Garden Canyon Village presents a case study of how the archaeological record is interpreted in a region that functioned as a geographic and social frontier. Flanked by the Hohokam, Mogollon, Trincheras, Rio Sonora, and Casas Grandes culture areas, Garden Canyon Village existed in a geographically and culturally intermediate space. The literature on frontiers and boundaries has the potential to provide new models and ways of understanding sites like Garden Canyon Village. First, I will provide an overview of frontier theory, its history, and its major concepts. Then, I will discuss the relevance of frontier theory at Garden Canyon Village and how it can help interpret Garden Canyon Village's place in the land between.

Frontier Theory: An Intellectual Genealogy

The first rumblings of frontiers as a dedicated field of study came with Frederick Jackson Turner's essay "The Significance of the Frontier in American History," published in 1893 (Naum 2010). In this essay, Turner explores how the frontier shaped American history, treating it as a primary influence on American culture. Turner's frontier was an empty zone separating metropolitan culture and wilderness- the "meeting point between savagery and civilization" (Turner 1893:200). Turner believed that the frontier was a space to be "captured, colonized, and domesticated" (Naum 2010:102). However, this transformative effect was a mutual one, as it also acted upon its explorers, transforming Europeans into Americans:

> "The frontier is the line of most rapid and effective Americanization…Little by little (the colonist) transforms the wilderness, but the outcome is not the old Europe…At first, the frontier was the Atlantic coast. It was the frontier of Europe in a very real sense. Moving westward, the frontier became more and more American" (Turner 1893:201).

While Turner's thesis was criticized in the coming years, his view of the frontier is intimately linked to American ideas about colonial expansion and westward movement that colored much of frontier theory through the 20th century.

Through the mid 20th century many historians followed Turner's approach in their interpretations of U.S. history. Some scholars applied Turner's ideas to the colonial history of European expansion, while others set out to conduct systematic comparisons of frontiers in various regions around the world (Rodseth and Parker 2005:5). By the 1950's and 1960's there was mounting skepticism about Turner's frontier thesis. The definition of frontier was expanded to include borderlands- in-between spaces between two or more culturally different units. Either side of the frontier is occupied by a different group or nation that interacts with one another along that frontier. Finally, almost 100 years after Turner, it was acknowledged that the American frontier was not being pushed outwards into wilderness, but instead against lands inhabited by Native Americans. Around the same time, European scholars took up the study of frontiers, which, due to their own historical particulars, were understood as imperial boundaries (Rodseth and Parker 2005:6). Increasingly, frontier studies were extended into the distant past. Scholars began to focus on topics like Hadrian's Wall, Roman frontiers, and other archaeological and historical cases (Rodseth and Parker 2005:6).

A 1969 volume resulting from a Scandinavian symposium represented a major step forward in mid century frontier theory (Barth 1969). In the introduction to this volume, Fredrik

Barth assumes that discrete groups of people correspond to each culture, but argues that we need to understand the nature of boundaries between groups. He makes two major observations about boundaries: first, they tend to persist despite a flow of people across them and, second, stable and important social relations are maintained across such boundaries. This volume presents several important definitions. The authors define an ethnic group as a population which 1) is biologically self perpetuating, 2) shares fundamental cultural values, 3) makes up a field of communication and interaction, and 4) has a membership which identifies itself, and is identified by others, as constituting a category distinguishable from other categories (Barth 1969:10-11). Barth asserts that ethnic boundaries often define the group more so than the cultural markers included within that boundary. Additionally, people strategically manipulate these boundaries, changing their ethnic affiliation and moving back and forth across boundaries when it is advantageous to do so. While this publication was early and preliminary, and focused more on ethnic groups from a sociocultural perspective, Barth's recognition of the potential importance of the boundaries between ethnic groups was significant.

In the 1970s, the concept of the frontier continued to be developed. During this period, frontier theory was heavily influenced by Wallerstein's world systems model (1974), which assumes the existence of a dominant core and subordinate periphery. Wallerstein's model was designed for the modern world, and he did not intend it to be used by archaeologists, but it has still influenced numerous schools of thought on interregional interaction (Stein 2002). In a series of publications dubbed *Comparative Frontier Studies: An Interdisciplinary Newsletter*, the frontier was presented as part of a system with a dominant core and a dependent periphery. Decision making, as well as the flow of people and goods, is focused around the core. The periphery is predicted to move through a series of stages that culminate with full integration into

the core (Norton 1977, Osborne and Rogerson 1978). Later that same decade, Ken Lewis offered a major contribution to frontier theory with his dissertation, which adapted models of frontier society and restated them to be relevant and useful in archaeology (1975). While Lewis remained focused on frontiers as a colonial phenomenon and, primarily tailored his model to historical archaeology, and leaned heavily on the outdated "culture core" idea, his translation of frontier theory to archaeologically identifiable traits was a major step forward because it provided testable traits of what a frontier site might look like in the archaeological record. However, his dissertation may have been destined for obscurity, had Pailes not later adapted it for use in the Rio Sonora Valley of Northern Mexico (1984). Pailes restated Lewis's criteria for a frontier society as follows:

1. "The settlement pattern, rather than evolving as a nested hierarchy, with first, second, third, and fourth order sites, should have a truncated central place pattern. In other ways, there should be one or two very large sites…and a large number of small sites. Few or no intermediate size sites should be found.
2. The frontier town should be the locale for specialized activities, both secular and religious. Such activities reflect its role as a center providing services for the outlying settlements and as a link between the frontier and the home country.
3. In general, the culture of the frontier should appear as an impoverished, or simpler, version of the mother culture. In effect, luxuries and elaboration drop out on the frontier, existing only as occasional imports.
4. External relations with the mother culture should predominate, indeed almost to the exclusion of all other external relations.

5. There should be an entrepot, a large town on the edge of the country of origin, which serves as a link between the frontier town and the core.
6. There should be evidence of a separate, presumably indigenous culture in the frontier area" (Pailes 1984:321-322).

In the 1980s, interest in the topic of frontiers and boundaries began to accelerate. However, frontier theory maintained its colonial, "top down" character that privileges developments in the core. DeAtley and Findlow's 1984 volume, *Exploring the Limits: Frontiers and Boundaries in Prehistory* continues in Lewis' footsteps by discussing the importance of boundary studies in archaeology. In their introduction, DeAtley and Findlow note that boundaries are not static phenomena, but are part of the processes defining and integrating cultural units. By virtue of defining cultural units, we are also creating boundaries, and those boundaries must be explored. In the same volume, DeAtley observes that archaeologists typically focus on boundaries as a way to identify distinct ethnic or social groups, or to define the limits of particular economic or political systems. As such, the boundaries themselves and the means of characterizing them tend to be of secondary importance (DeAtley 1984:5). DeAtley goes on to offer a definition of what constitutes a frontier:

> "…it is an area that in some respect is marginal. It is usually a fringe or an outer boundary, but it also may be non-contiguous with the central area. It is exploited by a core group through colonies established there, and the purpose of the exploitation varies. It may provide a growth area for an expanding population; it may be created as a buffer zone between two groups vying for territory and power; or it may be a source of labor, staples, status goods, or technological resources. It is also accepted that a frontier population represents a unique type of transitional social group which becomes integrated

into the core group organization through the exploitation of the area" (1984:5)

What is notable about DeAtley's definition is the emphasis on colonial models of core and periphery, which is consistent with the frontier scholarship of the 1970's (Norton 1977, Osborne and Rogerson 1978). However, she also presents several critiques of this old model of frontiers. DeAtley notes that frontiers are not as uniform as the model presumes, and that the colonial motivations of the core shape the periphery in extremely variable ways.

In the same volume, Lerner (1984) offers a methodological approach for defining prehistoric frontiers. She notes the lack of a concrete, consistent definition of the term frontier, and the absence of explicit models that can help archaeologists identify frontiers in the archaeological record. Her definition of frontier is as follows:

> "A frontier is an undeveloped or unoccupied area that undergoes colonization by a population from an adjacent or distant territory. The frontier is viewed as a dynamic demographic, social and economic phenomenon in which change is constant" (Lerner 1984: 67).

Again, her definition emphasizes colonial models and rather denies the agency, or even existence, of people who live along a frontier. She argues that frontiers are characterized by demographic changes that can be summarized as follows: 1) there is an initial settlement with low, but gradually increasing, population density, 2) the initial settlements are dispersed, but grow increasingly nucleated, and 3) settlement is initially characterized by instability and movement, but with time the settlements become more established and permanent" (Lerner 1984:68). Note that her discussion is focused entirely on outsiders relocating to a frontier area, with no acknowledgement of populations that may already exist in that space. This concept of

the empty frontier receiving colonial peoples from the populated core characterizes frontier theory of the 1970s and 1980s.

In more recent years, understandings of frontiers and boundaries have expanded considerably. As Rodseth and Parker describe, "the frontier is being extricated from the Turnerian tradition" (2005:3). In the 1970's and 1980's, frontiers were traditionally understood through colonialist models that treat frontiers as passive recipients of core innovations, rely on macro scales of analysis, and expect sharp frontier boundaries that are clearly visible in material culture (Lightfoot and Martinez 1995:471). These colonial models underestimate the creativity and agency of frontier populations and do not account for the complex and reciprocal relationships that may occur in frontier zones. In the 1990's and 2000's, these colonial models have been rejected. Lightfoot and Martinez assert that frontiers should instead be conceptualized as "socially charged places where innovative cultural constructs are created and transformed" (1995:472). Frontiers are not simply the "outer boundaries of relatively homogenous colonial populations"…but instead "zones of cross cutting social networks" (Lightfoot and Martinez 1995:474). Archaeologists have recognized that material culture generated along cultural frontiers can play an active role in people's identification, and often functions as symbols for group membership and participation (Lightfoot and Martinez 1995:485). Frontiers do not just function to restrict interactions and constrain relationships; rather, they can become interaction zones where encounters between diverse peoples are facilitated (Lightfoot and Martinez 1995:474). By broadening our perceptions of the frontier beyond colonial constructs, Lightfoot and Martinez argue, we can better study the creation, transformation, and syncretization of new cultural constructs in frontier regions (1995:474).

Stein echoed Lightfoot and Martinez's calls for a new approach to interregional interaction in his 1998 Archaeology Division Distinguished Lecture at the American Anthropological Association Annual Meeting (2002). Stein argued that unidirectional, Eurocentric frameworks were outdated, and called for a new set of methods for understanding interregional interaction. Perhaps because it is so visible in the archaeological record, Stein believes that archaeologists have privileged external dynamics of change, downplaying or ignoring local developments. Additionally, these dynamics of change were primarily seen as unidirectional, with a one-way flow of ideas and influence from the core to its less developed periphery. In his new set of methods, Stein emphasizes the importance of agency, practice, and social identity. He argues that "human agency is as important as macroscale political economy in the organization of interregional interaction networks" (2002:907). Recognizing human agency means that foreign material culture objects and styles are not necessarily direct indicators of acculturation or foreign control. Instead:

> "individuals, households, and larger-scale groups are quite selective in what they choose to borrow from another group. Even when one society appropriates the material culture of another through trade or emulation, the borrowers transform the meanings or ideological content of these items into local cultural schemes. The process of emulation in no way implies economic or political control. Although foreign knowledge, goods, and styles may bring prestige to those who borrow them, this prestige will be defined in terms of the borrowers own cultural system" (Stein 2002:907).

Stein's perspective is important because he reverses the traditional view of the periphery passively accepting styles and ideas from the dominant core. Instead, frontier areas may have been active agents, picking and choosing which elements to incorporate from the cultures around

them, all while maintaining their own local traditions. Furthermore, there may have been a bidirectional movement of material culture and ideas (Stein 2002:908).

In the 2000's, frontier theory became increasingly interdisciplinary and underwent a comparative turn. Many authors directly positioned their works in opposition to the Turnerian understanding of the frontier, and also expressed dissatisfaction with the use of world-system perspectives. Traditionally, the world-system perspective emphasized core-periphery relationships, but the newest wave of frontier scholarship rejected this dichotomy.

In 2006, Bradley Parker proposed a framework to allow for cross-disciplinary, supra-regional comparison of frontier dynamics. He argues compellingly for a cross disciplinary approach, noting that although "the study of frontiers is unique in its cross-disciplinary and multiregional appeal, few researchers have explicitly addressed this issue by proposing models that can be applied across spatial, temporal, and disciplinary divides" (2006:78). Parker also argues for simplified terminology. He proposes that, at the most simple level, boundaries are divides that indicate limits of various kinds. Borders are typically tangible lines between separate political or administrative entities and are, importantly, the opposite of frontiers. Parker uses Thompson and Lamar's (1981) definition of frontiers as dynamic, fluid zones of interpenetration between two previously distinct peoples (2006:79). Significantly, frontiers are composed of various types of boundaries. This concept is foundational to his model, called the "continuum of boundary dynamics," which is meant to help characterize the wide variety of boundary situations. He argues that interactions occurring in frontiers are influenced by five types of boundaries- geographic, political, demographic, cultural, and economic- that contribute to the continuum of boundary dynamics in which frontier boundaries range from hard and static to soft and fluid (2006:92; Figure 2.1). This model allows researchers to characterize the full variation

of boundaries. For example, a particular boundary might be geographically and politically restrictive but economically porous (Parker 2006:81).

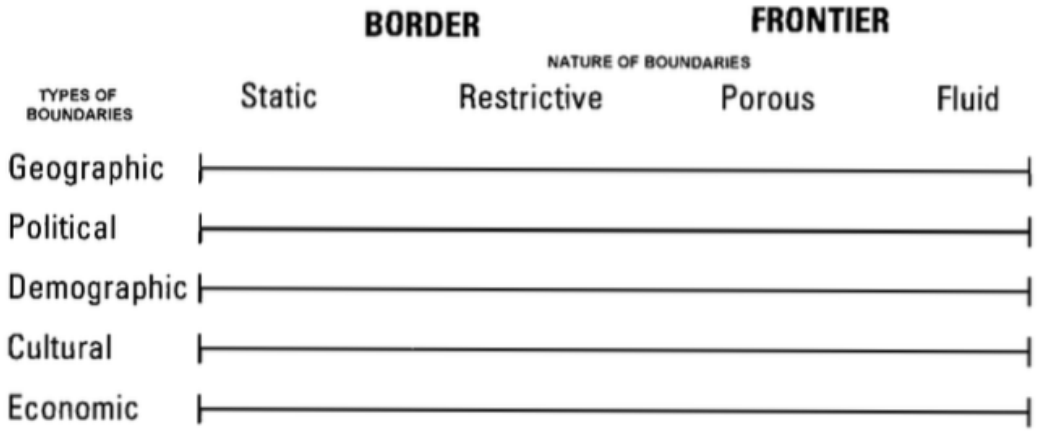

Figure 3.1 Parker's Continuum of Boundary Dynamics (Parker 2006)

Also in the 2000s, more scholars began to integrate postcolonial theory into their understandings of frontiers. Magdalena Naum draws from Homi Bhabha- a major figure in postcolonial studies- in her discussion of frontiers, which employs Bhabhas concept of a "third space" – a "space of hybridity, a realm of inventions and conventions, initiated and maintained by day-to-day situations and encounters…a place of constant dialogue and remaking" (2010:106). Bhabha defines this "third space" as "a space of translation and construction of a political object that is new, neither one nor the other" (Naum 2010:106). She argues that these concepts of third spaces, in-betweenness, and hybridity are useful for addressing cultural and social processes in borderlands, regardless of whether these borderlands were shaped by colonial empires (Naum 2010). She characterizes frontiers as "fragmented landscapes, distinguished by fluidity in social and cultural sphere and by the multiple loyalties and identities of their inhabitants" (2010:102). According to Naum, postcolonial theories "offer…a conceptual toolbox to nuance the cultural processes and their backgrounds and to describe diversity and shiftiness of inter-human and human-object interactions in the borderland" (Naum 2010:106). Whether or not

the frontier in question resulted from colonial expansion, postcolonial theory is a valuable tool for examining hybridity, inbetweenness, and ambiguity.

Frontier and Boundary Theory at Garden Canyon Village

Garden Canyon Village is an excellent site for the application and development of frontier theory. However, the site also presents several theoretical challenges. First, the limits of material culture and archaeological data must be acknowledged. Much of frontier theory has been used and developed along modern nation-state borders, along historical frontiers, or in regions with ethnohistorical and documentary evidence. As such, it is often difficult to apply this theory to prehistoric contexts. Second, due to the characteristics of modern nation-state borders, frontier theory typically deals with contact and negotiation between two different groups- the core and periphery, the colonizer and the colonized, and so on. However, Garden Canyon Village is located on the boundary of as many as five different prehistoric groups- a degree of interaction and contact that perhaps frontier theory is not designed to deal with. Third, archaeological frontiers have dramatically greater time depth than most historic and modern case studies in frontier theory. Frontier theory was not developed to examine boundaries over the course of hundreds or thousands of years. Fourth, frontier theory often assumes a shared national or ethnic identity. However, in many small-scale societies, kinship was paramount in structuring social groups and negotiating group membership. Frontiers and boundaries based on kinship rather than nationality or ethnicity are by nature less visible and less clearly differentiated. Finally, and perhaps most significantly, frontier theory typically presumes the presence of a cultural core. Even if a cultural core did exist prehistorically, in might not necessarily be easily recognizable archaeologically.

Clearly, there is a need for frontier theory is compatible with the archaeological record and does not attempt to impose models formed by our modern, Western experience onto the past. I believe that Garden Canyon Village is fertile ground for developing frontier theory, and that frontier theory can also contribute to a greater understanding of Garden Canyon Village. Beyond simply inferring cultural affiliation from material culture, frontier theory allows us to ask about the precise nature of interaction. Does the artifact assemblage reflect the surrounding cultures, hybrid traditions, local traditions, or some combination of the above? Is local innovation visible in the archaeological record, or was Garden Canyon Village marginal to the surrounding cultures? In Chapter 6, some of these questions will be addressed in light of the material culture of Garden Canyon Village. Specifically, I will attempt to reformulate Lewis' (1975) criteria for a frontier settlement based on the analyses of Garden Canyon Village presented in Chapters 5 and 6.

In this thesis, I will also approach Garden Canyon Village from the theoretical position that it is an important site in its own right, and should be understood on its own terms. As Vanderpot and Altschul described, archaeologists traditionally have viewed southeastern Arizona "as a hinterland, an area on the fringe of major prehistoric developments in the so-called heartlands" (2007:65). As I will show in my analysis below, Garden Canyon Village was not merely a peripheral site, but instead- in the spirit of Naum (2010) and Bhabha- a third space marked by hybridity. Garden Canyon Village was populated by creative agents who adopted ideas from the world around them while also developing their own local traditions. In the "land between" of the Middle San Pedro Valley, Garden Canyon Village was a space of innovation, interaction, and negotiation. I will return to this idea in Chapter 6 and explore how frontier theory can help us understand Garden Canyon Village.

CHAPTER 4

Research Methods

Before describing my research methods, it is important to clarify exactly what is, and is not, possible with this sample. The E75 and E100 complexes- the focus of this thesis- were excavated primarily by volunteers who were enthusiastic and willing, but unfortunately lacked sufficient supervision. Therefore, the documentation of these excavations is lacking. No feature forms were used, a list of feature numbers was not kept, and no photographs were taken. Additionally, no maps were made of the structures and, in the rare cases where a floor was identified, the locations of the floor artifacts were not documented. An attempt at retroactive mapping was made after the excavations were terminated, but at that point the excavation units had been left open for years without being backfilled, leading to slumping and erosion. Individual artifacts were not assigned field numbers and, in most cases, the most specific provenience that can be identified is unit, and sometimes level. During SWCA's attempt at reconciling the excavation records, they assigned feature numbers and created updated maps as best they could based on the available information (Whittlesey 2009a and 2009b). Due to these unfortunate issues, this thesis will approach the spatial distribution of artifacts at a very general, unit-by-unit level. I am hesitant to make assessments of floor versus fill, and will therefore offer a variety of interpretations based on the possibilities.

From the artifacts recovered from Garden Canyon Village, I selected a sample from the E75 and E100 complexes, both excavated by Cottrell, Murray, and the AAS volunteers in the 1990's. SWCA completed extensive analysis of ceramics, shell, and other artifact categories from these units, which will provide additional context for the results of my analysis. With the

addition of ground and chipped stone analysis, a relatively complete picture of the material culture of the E75 and E100 complexes is possible. Within each complex, a systematic random sample of every third excavation unit was selected. In general, the majority of the excavation units were 1 m by 2 m, with occasional 1 m by 1 m units. This approach incorporated units from all portions of each complex, while also keeping the sample manageable. This resulted in 11 units from the E75 complex (out of 51 units) and 13 units from the E100 complex (out of 37 units). An additional non-random group of seven units were included in the analysis due to the presence of architectural features of interest or unique artifacts. Additionally, four units representing a variety of contexts were selected for debitage analysis. This smaller subsample was chosen in order to keep the quantity of debitage manageable given the scope of the project. The assemblage from each unit was analyzed in its entirety. However, the representativeness of that assemblage may vary depending on the collection procedures of the original excavators- for example, they may have been preferentially collecting the most interesting and complete artifacts. Finally, certain unusual artifact types- such as obsidian- were selectively analyzed from other units not otherwise included in the sample.

Since this portion of the Garden Canyon Village collection is previously unanalyzed, a very basic, but important, goal of the analysis was simply to determine what sorts of artifact types were present. Additional analyses were designed to gain insight into the manufacture, function, and origins of these artifact types. The goals of the analysis were to address two main questions. First, what can the lithic assemblage tell us about activities that took place at Garden Canyon Village? Second, can the assemblage provide insights into interregional interaction and Garden Canyon Village's place in the greater Southwest? The types and function of artifacts present is important for identifying activities that took place at Garden Canyon Village.

Additionally, the origins of these artifacts is important for understanding the kind and degree of interregional interaction that Garden Canyon Village may have engaged in.

As this thesis progressed, it became apparent that some of the attributes described in this chapter were more relevant to my research questions than others. For example, in my debitage analysis, I recorded amount of cortex. However, it quickly became apparent that the majority of the material was local, and, as such, degree of cortex was not a particularly informative attribute. Additionally, strategic versus expedient design, the number of ground stone use surfaces, and degree of use proved to be only minimally useful in my current analysis, given its scope and goals. As a result, not all of the attributes described here are incorporated into my analysis and interpretation in Chapter 5. However, the data collected for these attributes is available to other researchers, and can hopefully be used to answer other research questions in the future.

Chipped Stone

The chipped stone analysis included an overall assessment of the variety of objects in the assemblage and interpretation of the activities that these artifacts may represent. For a complete description of all attributes used, refer to the chipped stone attribute sheet in Appendix A. For tools, each artifact was assigned a type based on the definitions provided by Crabtree (1982). Each tool was scored as whole, measurable, incomplete, or fragmentary in order to understand the condition of the collection and the limits on which interpretations and analyses are possible. Cortex and retouch were documented in order to gain insight into the manufacturing process, which is related to the intensity of reduction activities at Garden Canyon Village. Special attention was paid to raw material, as non-local material is suggestive of trade. The raw material was recorded based on groups defined by Shelley and Altschul (Table 4.1; 1996). This grouping

was originally developed and utilized during their assessment of a different portion of the Garden Canyon Village lithic collection. I chose to use it in my own analysis for two reasons: first, it helped to simplify the complex geology of southeastern Arizona and, second, it ensured that the data collected during the present project was easily comparable to previous research done at Garden Canyon Village.

Table 4.1 Raw material groups at Garden Canyon Village (Shelley and Altschul 1996)

Material Group	Description
Group 1	Fine grained, dense sedimentary rocks; includes materials such as argillite, siltstone, shale, and mudstone
Group 2	Sandstone and some limestone
Group 3	Canelo Hills volcanics; includes rhyolite, basalt, and granite
Group 4	Quartzites and orthoquartzites
Group 5	Obsidian; not available locally
Group 6	Cherts and chalcedonies
Group 7	Quartz and quartz crystals
Group 8	Anomalies, including unusual and unidentified material types; whenever possible, the anomalous raw material will be identified

For tools, measurements of length, width, and thickness were taken using digital calipers to the nearest hundredth of a millimeter. Artifacts were weighed to the nearest 5 grams using a digital scale. These measurements were taken to characterize size and capture variation in each artifact type. Size can also shed light on the kinds of activities an artifact was used for. For example, extremely large versus extremely small mortars might be used to grind different types of material. Alternatively, drills with small tips might be used to perforate different materials than drills with large tips. Due to inadequate curation, observations of use-wear and fracture were noted in the comments with reservations. Many of the artifacts were stored intermingled in plastic bags, and likely experienced damage that may be misinterpreted as use-wear.

Additional data were recorded based on artifact type. For cores, the number of flake scars, number of platforms, and directionality of reduction were recorded in the notes section in

order to gauge intensity of reduction. A core was categorized as "exhausted" if it had reached a high enough degree of reduction that it was unlikely to produce any more usable flakes. For drills, the shape of each drill-tip was categorized as blunt, midrange, or sharp based on measurements (See attribute sheet, Appendix A). Again, the nature of a drill-tip has important implications for what activities it may have been used for. Additionally, drills were identified as expedient or strategic. Bifaces, edge modified flakes, and debitage were categorized according to size using a chart of concentric squares of increasing diameter in order to get an idea of size variation within the assemblage. Debitage from four different units that represented a variety of contexts was analyzed, focusing on raw material, cortex, and size. These traits were chosen in order to compare the debitage raw materials to those represented in the tool assemblage and determine the degree of reduction that took place, which can inform on manufacturing activities.

For projectile points, length, width, and thickness were measured. For points, length was defined as the maximum distance from the proximal end to the distal end. Similarly, width was measured as the maximum distance between the margins of the point. Thickness was defined as the maximum distance between the dorsal and ventral faces of the point. Additionally, blade shape, base shape, and notch location were recorded using the same attributes as Shelley and Altschul (1996; See attribute sheet, Appendix A). While Shelley and Altschul's categories are somewhat non-standard, I chose to use them in order to maintain consistency with existing data from the Garden Canyon Village collection and facilitate comparison. When possible, projectile points were compared to existing typologies and analyses done for the southern Southwest (Kelly 1978, Tagg 1994, Justice 2002, Schafer 2003, Whalen and Minnis 2009, and others). Special attention was paid to style as a possible indicator of regional affiliations.

In addition to the attributes laid out above, detailed notes were made for any aspect of an

artifact not captured by the attributes described here. For example, additional measurements were taken when necessary, and any notable characteristics were described. Together, these attributes were designed to establish basic information about a previously unanalyzed collection, with special attention to types of artifacts, the activites they represent, and evidence of interregional interaction.

Ground Stone

Ground stone analysis included an overall assessment of the variety of objects in the assemblage and interpretation of the activities that these artifacts may represent. For a complete description of all attributes used, refer to the ground stone attribute sheet in Appendix B. Ground stone artifacts were analyzed using the methods and attributes laid out by Adams (1996, 2002). Her definitions and interpretations will be heavily utilized throughout the ground stone analysis. Each artifact was first classified according to the types defined by Adams (2002). In order to gain insight into the variety of subsistence activities, manos were - whenever possible- recorded as trough, flat, or basin manos, and metates were described as basin, flat/concave, or trough. These different mano and metate types involve different manufacturing processes, and can also tell us about tool design, the type of grinding stroke used, and grinding intensity (Adams 2002). The condition of each artifact was documented in order to capture the degree of use of individual artifacts and overall artifact types, shedding light on the intensity of particular activities at Garden Canyon Village. Condition was also important to clarify constraints on the analyses and interpretations that were possible.

Additionally, any evidence of burning was noted in order to identify possible secondary uses of stone artifacts in thermal features. Texture and color were documented to assist with

material type identification, and the material type as well as whether or not it can be procured locally was recorded. Again, material types were categorized according to the raw material groups identified by Shelley and Altschul (1996; See pg. 69 above). Special attention was paid to non-local materials, as they suggest interaction with other areas via trade or direct procurement.

When possible, the design of the artifact was classified as strategic, expedient, or indeterminant in order to determine the amount of time and effort typically invested in tool manufacture for different types of tools. The number of ground surfaces were recorded as single, multiple adjacent, multiple opposite, or other. Additionally, the overall degree of use of each utilized surface was categorized as light, moderate, or heavy (Adams 1996). These last two attributes indicate how intensive production and manufacturing activities at Garden Canyon Village may have been. These three attributes were only minimally utilized in my analysis in Chapter 5, and potential remains for further exploration of these aspects of the ground stone assemblage.

Maximum overall length, width, and thickness, as well as the dimensions of use surfaces, were measured with digital calipers to the nearest hundredth of a millimeter. Each artifact was weighed to the nearest 5 grams using a digital scale. These measurements were taken to characterize the size and variation of each artifact type. Additional notes were made for any aspects of an artifact not captured by the attribute table. For example, wear patterns observed on artifacts such as pestles were described, and the diameter of mortar cupules was recorded. As with chipped stone, these attributes were designed to establish basic information about a previously unanalyzed collection, with special attention to types of artifacts, the activities they represent, and evidence of interregional interaction.

Geologic Sourcing

Additional analyses were performed to determine the geologic source of non-local turquoise and obsidian. By comparing the sources that Garden Canyon Villagers exploited or had access to with other known trade networks operating in the prehistoric Southwest, inferences can be made about the connections that Garden Canyon Village had to areas outside the San Pedro Valley. As can be seen in Figure 4.1, Garden Canyon Village was well situated to play an active role in exchange networks between the Southwest and Mexico.

Figure 4.1 Southwestern trade networks at A.D. 1100 (from Doyel 1991)

A sample of turquoise and obsidian artifacts was submitted for analysis to investigate 1) which geologic sources of obsidian and turquoise are represented at Garden Canyon Village and 2) the associated implications regarding regional patterns of interaction and exchange. Turquoise and obsidian samples were selected on the basis of several considerations. First, a variety of

proveniences were selected for. However, any artifacts from mortuary or otherwise sensitive contexts were excluded from the sample at the request of the Arizona State Museum, where these collections are curated. Second, the samples were chosen from the units with the best documentation. Finally, samples were selected to ensure that their size and condition was sufficient for sampling. Unfortunately, as it exists today, the Garden Canyon Village artifact inventory only includes extremely basic information on what each box of excavated material contains, and does not detail material or artifact type. As a result, the total quantity of turquoise and obsidian artifacts from Garden Canyon Village is unknown, and it is not clear how large a proportion was analyzed here.

Twenty-seven obsidian artifacts were analyzed by Dr. M. Steven Shackley. The sample included fourteen projectile points, seven pieces of debitage, two edge modified flakes, one blade, one biface, and two unidentified artifacts. The analysis was performed using a ThermoScientific *Quant'X* energy dispersive x-ray fluorescence spectrometer at the Geoarchaeological XRF Laboratory in Albuquerque, New Mexico. By identifying the constituent elements of obsidian, it is possible to connect archaeological obsidian to its geologic source. Trace element intensities were reported for fifteen different elements. Trace element intensities were converted to concentration estimates, which were then compared to known standards for geologic obsidian (Shackley 2015).

Seven turquoise artifacts were analyzed by Dr. Alyson Thibodeau at the Department of Geosciences at the University of Arizona. The sample included five tesserae, one bead, and one pendant. Research conducted in the Department of Geosciences and the School of Anthropology at the University of Arizona has led to the development of a geochemical framework that uses lead and strontium isotope measurements to determine turquoise provenance. While this

technique is still relatively new, researchers have so far examined over 137 turquoise samples from 19 turquoise sources across the North American Southwest and Mexico. The combined strontium and lead measurements have been shown to discriminate between turquoise sources, demonstrating that the isotopic signatures of turquoise deposits vary geographically according to regional differences in the geologic settings of turquoise formation (Thibodeau et al 2015, 2012).

Samples were first subjected to scanning electron microscopy with energy-dispersive x-ray spectrometry (SEM-EDXs) in order to ensure that the samples were turquoise, and not other, similar-looking blue-green minerals. Next, lead and strontium isotope analysis was performed to identify the geologic provenance of the turquoise samples. To prepare samples for analysis, turquoise fragments were abraded with a silicon-carbide sandpaper (to remove any surficial contaminants), cleaned in an ultrasonic bath of dilute, ultra pure acetic acid, and rinsed in ultra pure water (Millipore, 18.2 MΩ). After drying, samples were powdered using a cleaned aluminia mortar and pestle and accurately weighed. The samples were then dissolved using twice-distilled hydrochloric acid (HCl). Lead and strontium were then separated from the sample using Sr-Spec resin. Lead isotopes were measured by multi-collector inductively coupled plasma mass spectrometry and strontium isotopes were measured by thermal ionization mass spectrometry (TIMS). Due to the destructive nature of the sampling, a small reference fragment was preserved in the event that additional chemical analysis should need to be performed. Additionally, each object was thoroughly documented and photographed before sampling.

This chapter has laid out the analytical procedures used in this thesis. While there are some limitations due to the original excavation procedures, this methodology is designed to maximize the amount of information that can be collected from this assemblage. In the next chapter, I use these methods to analyze chipped and ground stone from Garden Canyon Village.

CHAPTER 5

Data Analysis and Discussion

In the course of this thesis, 3,475 artifacts were analyzed. While this is a fraction of the Garden Canyon lithic collection, which includes 1,682 bags of chipped stone and 1,190 bags of ground stone, it can begin to inform on lithic procurement, interregional interaction, and the various activities that took place at Garden Canyon Village (Cook 2000:5). In the following chapter, I will provide an overview of chipped stone material usage, and explore activities at Garden Canyon Village through an analysis of debitage, manufacturing tools including hammerstones and multitools, informal tools, and formal tools. Similarly, the ground stone analysis is aimed at identifying activities that took place at Garden Canyon Village. By organizing the ground stone assemblage into groups laid out by Adams (2002) and defined by specific functions- such as pulverizing or polishing- I will explore the activities represented by this group of artifacts. Additionally, special attention will be paid to both non-local materials and non-local styles that will help me address my research question regarding interregional interaction and Garden Canyon Village's connections to the broader Southwest.

Chipped Stone

The chipped stone assemblage consisted of 439 tools and 2,337 pieces of debitage, for a total of 2,776 chipped stone artifacts (Table 5.1). For the purposes of this discussion, the chipped stone assemblage will be divided into four groups: debitage and cores, manufacturing tools (including hammerstones and multitools), informal tools, and formal tools. Overall, the raw materials represented across these four groups are primarily local, and obsidian is the only non-

local chipped stone material (Table 5.1). Cherts and chalcedonies are the preferred material for formal tools, while volcanics, cherts and fine grained sedimentary types make up the majority of the informal tools. This suggests a strong preference for chert and chalcedony in the manufacture of formal tools. With few exceptions, the material types represented in the tool assemblage correspond to the material types observed in the debitage and core assemblage. This implies that tool manufacture largely took place in the immediate vicinity, as the tool assemblage appears to match the debitage that was produced as manufacturing waste. However, there is a discrepency between the high proportion of chert in the formal and informal tool assemblages, and the relatively low proportion of chert in the debitage and core assemblage. This may suggest that some chert tools were not manufactured on-site.

Table 5.1 Chipped stone assemblage and raw material types

Material Type	Artifact Type									
	Debitage & Cores		Manufacturing		Informal Tools		Formal Tools		Unidentified	
	#	%	#	%	#	%	#	%	#	%
Sedimentary	294	12%	5	4%	36	32%	5	6%	-	
Sandstone	11	<1%	1	1%	1	1%	-		-	
Volcanics	1,037	42%	42	37%	29	26%	2	2%	2	50%
Quartzites	622	25%	31	27%	-		2	2%	-	
Obsidian	6	<1%	-		3	3%	13	16%	1	25%
Cherts	404	16%	-		40	35%	43	52%	1	25%
Quartzes	81	3%	34	30%	4	4%	15	18%	-	
Anomalies	8	<1%	-		-		3	4%	-	
Total	2,463	100%	113	100%	113	100%	83	100%	4	100%

Debitage and Cores

Together, debitage and cores represent lithic reduction activities at Garden Canyon Village. These artifact categories can provide information on lithic material procurement as well as reduction technology and intensity. The sample included 2,337 pieces of debitage and 126 cores.

Only a basic analysis of debitage was completed. Due to the time constraints of my

thesis, as well as the fact that this portion of the collection is previously unanalyzed, I felt that I could gain a greater amount of information more efficiently by focusing on tools rather than debitage. Altogether, 2,337 pieces of debitage were analyzed, noting raw material, cortex, and size. These traits were chosen in order to compare the debitage raw materials to those represented in the assemblage of tools and determine the degree of reduction that was typical of chipped stone manufacturing at Garden Canyon Village. Of this sample, 2,331 pieces of debitage came from the units emphasized in my analysis. An additional six pieces of obsidian debitage that had been recovered from units not selected for this analysis were included in my sample due to the significance of this non-local material. With the exception of the obsidian debitage, the entire debitage assemblage was produced from materials available locally in the Huachuca Mountains, including large quantities of volcanics and quartzites.

Figure 5.2 shows the raw material distribution in the debitage assemblage. Locally available materials make up the vast majority of the sample. Therefore, while I also recorded cortex amount in my analysis, I determined that this variable was not particularly useful, as it is apparent that the residents of Garden Canyon Village were, for the most part, not utilizing a significant quantity of nonlocal materials. Volcanics, quartzites, and cherts make up the bulk of the debitage sample. Quartz, sandstone, and limestone appear in very small quantities, which is likely a function of their poor knapping properties. Fine-grained sedimentary stone also appears in relatively small amounts, which may be because locally available varieties are often of marginal quality for flaking. Notably, this distribution mirrors that identified by Shelley and Altschul in their 1996 analysis of a different portion of the Garden Canyon Village lithic collection. In their analysis of 4,526 pieces of debitage, they also found that volcanics, quartzites, and cherts made up bulk of the debitage sample (Shelley and Altschul 1996:76). However, our

proportions differ slightly, as illustrated by the inclusion of Shelley and Altschul's data in Table 5.2 below. In their sample, volcanics made up a larger proportion, while in my sample there was a greater quantity of fine grained sedimentary stone, cherts and chalcedonies, and quartzites. These differences may be due to sampling error; however, the fact that these three material types cumulatively make up 85% or more of both samples makes it clear that they were the preferred local materials. Obsidian represents less than 1% of the debitage, but 16% of the formal tools. This relatively small quantity of obsidian debitage has interesting implications for the formal obsidian tools in the collection. They may have been transported to Garden Canyon Village in their finished or nearly finished form, rather than manufactured on-site.

Table 5.2. Debitage and core assemblage and raw material types

Material Type	Artifact Type					
	Debitage		Shelley & Altschul 1996 Debitage		Cores	
	#	%	#	%	#	%
Sedimentary	234	10%	22	<1%	60	48%
Sandstone	9	<1%	17	<1%	2	2%
Volcanics	993	42%	3,413	75%	44	35%
Quartzites	612	26%	260	6%	10	8%
Obsidian	6	<1%	1	<1%	-	
Cherts	397	17%	635	14%	7	6%
Quartzes	79	3%	156	3%	2	2%
Anomalies	7	<1%	22	<1%	1	1%
Total	2,337	100%	4,526	100%	126	100%

I also examined debitage size in order to assess which activities or manufacture stages the debitage might represent. Small flakes often represent tool manufacture, while larger ones may have been utilized as expedient tools. Although I did not record debitage types (for example, flakes versus shatter), I feel that size may provide a useful measure of activities. In general, the greatest proportion of debitage tends to cluster between size class 3 and 6 (Table 5.3). Extremely small or extremely large pieces are unusual. The lack of very small debitage may result in part

from screening or collection procedures during the original excavation, but it also might reflect a lack of on-site tool manufacture and, instead, the production of flakes for expedient tools. Notably, the distribution of debitage size does not appear to vary significantly based on material type (Table 5.4). Even when broken down by material type, the majority of each raw material group still ranges between size class 3 and 6. However, notably, volcanics and quartzites do tend to have larger debitage that other material types. These materials may have been used to make large, expedient flakes that were used as tools. Reduction of these materials may have been aimed not at producing tools, but at producing useful flakes. Additionally, cherts and chalcedonies are more tightly concentrated around size class 3. Similarly, the small quantity of obsidian debitage is concentrated around size class 2. Obsidian, cherts, and chalcedonies are the preferred material for smaller, more formal tools so the presence of smaller debitage makes sense since a greater degree of reduction is involved in the manufacturing process.

Table 5.3 Debitage size class distribution

Size Class	% of Debitage
1-2 (0 to < 1 cm)	10%
3-4 (1 cm to < 2 cm)	53%
5-6 (2 cm to < 3 cm)	25%
7-8 (3 cm to < 4 cm)	8%
9-10 (4 cm to < 5 cm)	3%
11+ (5 cm and larger)	1%

Table 5.4. Debitage size class distribution and material type

Size Class	Material Type															
	Sedimentary		Sandstone		Volcanics		Quartzites		Obsidian		Cherts		Quartzes		Anomalies	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
1-2	17	7%	3	33%	54	5%	47	8%	4	66%	93	23%	12	15%	-	
3-4	116	50%	-		489	49%	348	57%	2	33%	247	62%	49	62%	1	14%
5-6	66	28%	5	56%	292	29%	155	25%	-		53	13%	11	14%	2	29%
7-8	31	13%	1	11%	109	11%	38	6%	-		3	<1%	6	8%	2	29%
9-10	4	17%	-		35	4%	16	3%	-		1	<1%	1	1%	1	14%
11+	-		-		14	1.4%	8	1%	-		-		-		1	14%
Total	234	100%	9	100%	993	100%	612	100%	6	100%	397	100%	79	100%	7	100%

One hundred and twenty six cores were present in the sample. On average, the cores weighed 97 grams, ranging from very small five gram cores to large 890 gram ones (Table 5.5). This range of sizes likely corresponds to different stages in the reduction process. Flake scars show that the majority had multiple platforms and were multidirectionally reduced. At least 15 of the cores were exhausted and, on average, each core had 12 flake removals, with a standard deviation of 4. Given that only 15% of the cores were visibly exhausted, it appears that material sources were readily available and opportunistically utilized.

Table 5.5 Core dimensions, based on measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	1.8 cm	9.0 cm	5.1 cm	1.5 cm
Width	1.4 cm	7.9 cm	4.1 cm	1.2 cm
Thickness	1.1 cm	6.2 cm	3.1 cm	1.1 cm
Weight	5 g	890 g	97 g	111 g

The majority (52%) of the cores had no remaining cortex (Table 5.6). The percentage of cores retaining cortex generally falls off with increasing distance from the raw material source. This assemblage with cores in which half are cortical and half are noncortical could suggest that both Garden Canyon Creek, located immediately adjacent to the village site, as well as other, farther away, stream beds throughout the Huachuca Mountains and San Pedro River Valley may have been sources for raw materials. Alternatively, the noncortical cores may represent cores derived from bedrock which naturally has less cortex than cobbles. Of those that did retain cortex, many exhibited cortex that was rounded and smoothed, a pattern consistent with previous observations of river polished cores in other portions of the collection. This supports the hypothesis that the residents of Garden Canyon Village exploited nearby rivers and drainages such as Garden Canyon Creek for raw material (Shelley and Altschul 1996:79).

Table 5.6 Remaining cortex in core assemblage

Remaining Cortex	Proportion of Cores
0% Cortical	66 (52%)
1-25% Cortical	47 (37%)
> 25% Cortical	13 (10%)
Total	126 (100%)

Notably, the proportions of material types represented in the sample of cores differs from the proportions of material type represented in the debitage assemblage. Most significantly, 48% of the cores were fine-grained sedimentary, while only 10% of the debitage was fine grained sedimentary. This may be due to sampling error, as the cores come from twenty-nine different units while debitage was only sampled from four units. Alternatively, it may signify off-site reduction. Also significant is the absence of any obsidian cores, despite the presence of obsidian formal tools as well as several pieces of obsidian debitage; again, the lack of obsidian cores and relative infrequency of obsidian debitage may suggest that manufacture of obsidian tools did not take place at the site.

This analysis of debitage and cores reveals several important things about reduction activities at Garden Canyon Village. This sample emphasizes the importance of local materials in reduction activities at Garden Canyon Village (Table 5.2). Overall, less than one percent of the debitage and cores were determined to be nonlocal. Furthermore, it is clear that these local materials were widely and easily available- only a small proportion of the cores were identified as exhausted, suggesting that raw material was available whenever needed. Additionally, while the raw materials observed in the core, debitage, and tool assemblages are largely consistent with one another, there are also several important discrepencies. While obsidian is an important material for formal tools at Garden Canyon Village, very little obsidian is present in the core and debitage assemblage. Similarly, chert makes up a large proportion of the tool assemblage but

only a small proportion of the debitage. It is possible that some lithic reduction activities may have taken place off-site, accounting for this pattern. Alternatively, goods such as obsidian projectile points may have been brought to the site from elsewhere, possibly as trade goods. Altogether, the debitage and cores discussed here comprise over 70% of my entire sample. It is clear that lithic reduction was a major activity at Garden Canyon Village.

Manufacturing Tools

The assemblage of manufacturing tools includes hammerstones and multitools. Hammerstones are percussion tools often used in chipped stone reduction, and multitools refer to stones with a combination of battering, flaking, and/or evidence of grinding, suggesting that they were used for several simultaneous or sequential functions. Together, these two tool groups were likely used for manufacturing activities, and are possibly closely related to the previous artifact category- cores and debitage. Hammerstones and multitools would have both been ideal tools for removing flakes from cores. These manufacturing tools can shed light on lithic material procurement as well as manufacturing activities at Garden Canyon Village.

Both artifact types were largely expedient and not subject to large amounts of modification or reduction. Volcanics and quartzites were the preferred materials for these artifact types (Table 5.7). However, quartz also represents a relatively large proportion of the hammerstones. These local materials were all easily available, and likely chosen for their durability due to the nature of percussion tasks.

Table 5.7, Manufacturing tool assemblage and raw material types

Material Type	Artifact Type			
	Hammerstones		Multitools	
	#	%	#	%
Sedimentary	3	3%	2	1%
Sandstone	1	1%	-	

Volcanics	26	29%	16	73%
Quartzites	27	30%	4	18%
Obsidian	-		-	
Cherts	-		-	
Quartzes	34	37%	-	
Anomalies	-		-	
Total	91	100%	22	9%

Ninety-one hammerstones were recorded. Each hammerstone has evidence of battering, suggesting that these artifacts were used for chipped stone flaking, refreshing ground stone, shaping structural stones for construction, or other tasks involving percussion. The hammerstones range in size from small, 95 gram hammerstones to hammerstones in excess of 1000 grams (Table 5.8). This broad range of sizes may correspond to different activity types. For example, a smaller, lighter hammerstone might be preferred for knapping a delicate chert core, while a larger, heavier hammerstone would be a better choice for shaping a large metate. Ninety-one percent of the hammerstones were more than 25% cortical, suggesting that the majority were procured from nearby. The most common hammerstone material is quartz, which is likely related to the proximity of quartz veins and cobbles in Garden Canyon. While the local quartz is often brittle and prone to unpredictable fracturing, it is also abundant and located close by. Its less-ideal characteristics were likely outweighed by the convenience of being able to gather quartz cobbles from the quartz bedrock located immediately across the canyon from the Garden Canyon Village site.

Table 5.8. Hammerstone dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	3.7 cm	11.4 cm	8.0 cm	1.4 cm
Width	4.0 cm	10.5 cm	6.8 cm	1.2 cm
Thickness	3.8 cm	8.6 cm	5.5 cm	1.1 cm
Weight	95 g	1145 g	459 g	210 g

Twenty-two multi-tools were recorded, weighing an average of 435 grams and measuring an average of 8 cm long (Table 5.9). Their dimensions are generally extremely similar to those of the hammerstone assemblage, emphasizing that these two artifact categories had similar and often overlapping functions. These multitools exhibit a variety of usewear patterns, including negative flake scars, evidence of grinding, and battering (See Figure 5.1 for an example). They were likely expediently used for simple tasks. Due to the easy availability of raw lithic materials in Garden Canyon, it would have been extremely convenient to select a cobble, use it for the task at hand, and discard it. I believe that these multitools are evidence of that kind of behavior.

Table 5.9. Multitool dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	5.6 cm	10.4 cm	7.9 cm	1.4 cm
Width	4.6 cm	9.4 cm	6.8 cm	1.1 cm
Thickness	3.5 cm	7.0 cm	5.3 cm	0.9 cm
Weight	135 g	1045 g	435 g	225 g

Figure 5.1 Example of a multitool exhibiting both battering and grinding

Together, this group of informal tools were used for manufacturing tasks. While the cores discussed in the previous section provided the raw material for the production of flakes, hammerstones were used for removing these flakes as well as other tasks like refreshing ground stone. Multitools represent some combination of these activities; many of them may have been sequentially or simultaneously used for battering, grinding, and other tasks. This group, like cores and debitage, demonstrates the importance of local materials at Garden Canyon Village. Hammerstones in particular suggest a pattern of raw material procurement based on convenience- quartz, the dominant hammerstone material, was located in abundance immediately across the canyon from Garden Canyon Village. Additionally, the relatively large quantity of manufacturing tools further emphasizes the importance of reduction activities at Garden Canyon Village. In combination with the previous artifact group, cores, debitage, and the hammerstones and multitools used to reduce them make up almost 75% of my entire sample.

Informal Tools

The assemblage of informal tools includes edge modified flakes, scrapers, blades, bifaces, and drills (Table 5.10). Edge modified flakes, bifaces, and blades may have played a role in processing plant or animal materials. Drills likely played a role in perforating beads, hides, basketry, or other materials. Scrapers were likely used for hideworking or woodworking. Together, this group of artifacts can shed light on the kinds of tools that were utilized at Garden Canyon Village, and the activities that these tools may have been associated with. Additionally, this category allows us to compare raw material preferences for informal tools to the raw materials represented in the previously discussed artifact groups.

Table 5.10 Informal tool assemblage and raw material types

Material Type	Artifact Type									
	Edge Mod Flakes		Scrapers		Blades		Bifaces		Drills	
	#	%	#	%	#	%	#	%	#	%
Sedimentary	14	25%	12	50%	2	29%	-		8	50%
Sandstone	-		1	4%	-		-		-	
Volcanics	13	23%	11	46%	1	14%	1	10%	3	19%
Quartzes	-		-		-		-		-	
Obsidian	2	4%	-		-		1	10%	-	
Cherts	25	45%	-		3	43%	8	80%	4	25%
Quartzes	2	4%	-		1	14%	-		1	6%
Anomalies	-		-		-		-		-	
Total	56	100%	24	100%	7	100%	10	5%	16	100%

A total of 113 informal tools were identified within my sample. Chert and chalcedony were the preferred material type for blades, edge modified flakes, and bifaces, which would have been manufactured by pressure flaking and therefore required an easily flakable material that could produce a sharp edge. Fine grained sedimentary stone was the material of choice for scrapers and drills. Scrapers and drills require more durability due to the nature of their use- a characteristic offered by the fine grained sedimentary stone of the area. Again, the majority of the raw materials were available locally; however, there is a small quantity of non-local obsidian. Overall, the assemblage is in relatively good condition, with 85% of the tools categorized as "whole" or "measurable," enhancing the interpretation of this group of artifacts. However, it is possible that the original excavators may have selected for intact tools in their collection process.

Edge modified flakes make up the largest category of informal tools. These tools are flakes that underwent a minimal amount of alteration. They typically retain most of the characteristics of a flake, with the addition of a small amount of intentional shaping in order to produce a useful edge. Fifty-six edge modified flakes were documented; however, this sample was separated from other materials when the collection was curated in 2004, and it is possible that additional edge-

modified flakes remain within the debitage assemblage. A significant proportion of the modified flakes were manufactured from chert (45%). This is likely due to the flaking properties of chert; chert generally responds well to pressure as well as percussion flaking. Of the material types present in the assemblage, chert flakes would likely be ideal for additional modification. Only 14 of the modified flakes had remaining cortex, suggesting that flakes from later stages of the core reduction process were generally preferred for edge modification.

The flakes chosen for edge modification showed more variability in size than the debitage (Table 5.11). However, in general, the edge modified flakes are extremely small, with 62% measuring less than 3 cm across. Their size implies that they were used for tasks that required a small, sharp edge. Furthermore, their small size may be related to the preference for chert and the nature of chert that occurs in the area. The locally available chert generally appears in the form of pebbles and small nodules. Notably, larger, higher quality pieces of chert may have been available in the Whetstone Mountain 30 km to the north and the San Jose Mountains 35 km to the southeast. However, the small size of these chert edge modified flakes and other chert artifacts in the assemblage may suggest that Garden Canyon Village was not taking advantage of these other chert sources. It is unclear how many were utilized and to what degree, as improper storage has led to damage that may be mistaken for use wear.

Table 5.11 Edge modified flake size distribution

Size Class	% of Edge-Modified Flakes	% of Debitage
1-2 (0 to < 1 cm)	6%	10%
3-4 (1 cm to < 2 cm)	36%	53%
5-6 (2 cm to < 3 cm)	20%	25%
7-8 (3 cm to < 4 cm)	17%	8%
9-10 (4 cm to < 5 cm)	17%	3%
11+ (5 cm and larger)	6%	1%

Twenty-four scrapers were identified within the collection. Scrapers are most often associated with woodworking or hideworking activities. On average, the scrapers were 4.8 cm in length and 3.9 cm in width- a relatively small size (Table 5.12). The apparent preference for smaller scrapers has important implications for the kinds of activities these scrapers were used for. Smaller scrapers may have been used to shape small wooden objects. Additionally, scrapers play an important role in hide preparation. Faunal analysis has suggested the cottontail rabbits were the most important animal resource at Garden Canyon Village (Whittlesey et al 2009b:41). Small scrapers may have been the preferred tool for preparing relatively small rabbit hides. Half of the scrapers were made from fine-grained sedimentary stone, and forty-six percent were made from volcanics. These local materials were both easily accessible and durable, a desired trait for tools such as scrapers. Notably, these scrapers are all categorized as expedient, and no strategically manufactured scrapers were included in the sample.

Table 5.12 Scraper dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	2.8 cm	8.3 cm	4.8 cm	1.5 cm
Width	1.8 cm	7.6 cm	3.9 cm	1.3 cm
Thickness	0.4 cm	2.6 cm	1.7 cm	0.6 cm

The sample included seven blades. Blades were identified according to the criteria defined by Crabtree: "specialized flakes with parallel or sub-parallel lateral edges; the length is equal to, or more than, twice the width" (1982:16). Like the edge modified flakes discussed above, these blades were separated from other materials when the collection was curated in 2004, and it is possible that additional blades remain within the debitage assemblage. Unfortunately, the majority of these blades are fragmentary or incomplete, limiting their interpretation. The blades that were measurable were relatively small, averaging 2.6 cm in length (Table 5.13). This small size is likely related to the size of the cores that the blades were removed from, as well as the

knapping limitations of various material types. Materials used for blades include fine-grained sedimentary stone, volcanics, chert and chalcedony. While chert and chalcedony are ideal for blade production, the fine-grained sedimentary and volcanic blades are, in general, much cruder. Again, like edge modified flakes, the small size of these blades implies that they would have been useful for tasks that required a small, sharp edge. These tasks may have included various craft making activities. It is unclear how many of the blades were utilized and to what degree, as improper storage has led to damage that may be mistaken for use wear. All seven were located within House 1 in the E75 complex; again, it is not clear whether they were on the floor or in the fill.

Table 5.13 Blade dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	1.8 cm	3.4 cm	2.6 cm	0.8 cm
Width	0.7 cm	1.3 cm	1.0 cm	0.3 cm
Thickness	0.3 cm	0.8 cm	0.5 cm	0.3 cm

Ten artifacts in the sample were identified as bifaces (Table 5.14). These are flaked on both faces but do not exhibit notches or evidence of hafting; they may be projectile point preforms, points that fractured and lost their hafting element, or tools in their own right. Of the informal tool types, bifaces exhibit the strongest association with a particular material type; 80% of the bifaces are made of chert or chalcedony. Notably, in Shelley and Altschul's biface assemblage, they also observed that chert or chalcedony made up about 80% of the sample. This high frequency of chert is likely connected to the extremely small average size of the bifaces (Table 5.14). As discussed above, the locally available chert generally appears in the form of pebbles and small nodules. The small size of the local chert may have constrained tool manufacture to similarly small dimensions.

Table 5.14 Biface dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	1.2 cm	3.5 cm	2.2 cm	1.0 cm
Width	0.7 cm	1.5 cm	1.0 cm	0.3 cm
Thickness	0.2 cm	0.7 cm	0.4 cm	0.2 cm

Sixteen drills or perforators were observed in the sample (Table 5.15). Half of the drills were made of fine grained sedimentary materials. The remainder of the drill assemblage included volcanics, chert, and quartz. All of these materials would have been relatively durable for drilling activities that required pressure and rotation.

Table 5.15 Drill dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	1.2 cm	5.9 cm	3.0 cm	1.3 cm
Width	0.7 cm	5.0 cm	1.8 cm	1.1 cm
Thickness	0.2 cm	1.7 cm	0.7 cm	0.4 cm

The drill tips range from broader, blunter tips to narrow, sharper tips and the majority exhibited evidence of use wear such as crushing at the tip and smoothing on the sides. The different drill tips likely reflected use with different materials such as skins, leather, wood, shell, bone, and stone. The drill tips observed in the assemblage were sorted into three categories: blunt, midrange, and sharp (see attribute sheet, Appendix A). Blunt tips were generally wide with a thick, dull, rounded end. Tips measuring 3 mm or more across were classified as blunt. Sharp tips have a narrower point that comes to an acute angle. Tips measuring 2 mm or less across were classified as sharp. Midrange tips were those that measured between 2 and 3 mm across. Additionally, each drill was categorized as expedient or strategic. Each of these attributes was then examined in relationship to material type.

The majority of the drills were identified as expedient (Table 5.16). These expedient drills were all flakes with a sharp tip that was then utilized as a drill. It is likely that these flakes were

produced during normal reduction activities and then, due to their sharp point, identified as useful drills and perforators. All material types, with the exception of Group 3 volcanics, followed this dominant pattern of expedient drills. Additionally, the majority of the drill assemblage had sharp tips (Table 5.17). However, blunt and midrange tips were present in equal proportions. It is possible that the frequency of sharp-tipped drills might indicate that activities requiring the creation of smaller holes- such as bead manufacturing- may have been most common. The midrange and blunt tipped drills may have been used to manufacture objects that did not require a small, delicate hole. One possible use for these larger drills is perforating spindle whorls- an artifact category distinguished by a centrally drilled hole that will be discussed at length in the ground stone section.

Table 5.16 Drill manufacture and material type

Manufacture	Sedimentary		Volcanics		Cherts		Quartzes		Total	
	#	%	#	%	#	%	#	%	#	%
Expedient	6	75%	1	33%	4	100%	1	100%	12	75%
Strategic	2	25%	2	66%	-		-		4	25%
Total	8	100%	3	100%	4	100%	1	100%	16	100%

Table 5.17 Drill tip type and material type

Tip Type	Sedimentary		Volcanics		Cherts		Quartzes		Total	
	#	%	#	%	#	%	#	%	#	%
Blunt	2	25%	2	66%	-		-		4	25%
Midrange	2	25%	-		1	25%	1	100%	4	25%
Sharp	4	50%	1	33%	3	75%	-		8	50%
Total	8	100%	3	100%	4	100%	1	100%	16	100%

Several of the finest drills exhibited smoothed areas on the sides of the point, possibly resulting from bead production based on their size and the location of the use wear. One had a "T"-shaped base that may have been used to haft the drill to a shaft. Notably, of the 16 drills in the artifact assemblage, 9 are located in House 1 in the E75 complex where there is also a

concentration of ornaments. While the nature of the collection limits what can be said about this apparent pattern, there are several possible interpretations. If these drills were part of a floor assemblage- which two of them possibly are- they may indicate the presence of a craftspersons workshop. Alternatively, if they were in the fill of House 1, they may represent a location where someone disposed of exhausted tools. When compared to the general drill assemblage, the drills collected from House 1 exhibit several important differences (Table 5.18). It appears that the drill assemblage in House 1 contained less fine grained sedimentary and more chert and chalcedony than the general sample. Additionally, the House 1 drills are, overall, more strategically manufactured and have blunter tips. The higher proportion of blunt-tipped drills in House 1 challenges the possible association between these drills and the large quantity of beads in House 1, as bead manufacture most likely involved sharp-tipped drills. This may indicate that other forms of craft production may have taken place in House 1. While the drill tip analysis presented here is extremely preliminary, there is great potential for a future study elaborating on the question of drill tip and activity type. More detailed measurements and use wear analysis has the potential to identify specific activity types among the assemblage.

Table 5.18 General drill assemblage vs. House 1 drill assemblage

	Material Type				Manufacture		Tip Type		
	Sedi-mentary	Volca-nics	Cherts	Quartzes	Exped-ient	Strategic	Blunt	Midrange	Sharp
All Drills	50%	19%	25%	6%	75%	25%	25%	25%	50%
House 1 Drills	33%	22%	33%	11%	56%	44%	44%	22%	33%

Overall, this assemblage of informal tools reveals several important patterns. These informal tools were likely related to a variety of activities including the processing of plants and animals, hideworking, and woodworking. Drills likely played a role in perforating beads, hides,

basketry, or other materials. They tended to be expedient tools manufactured from flakes that were selected because they had a point that could be utilized as a drill. In general, the majority of the drill-tips were of a sharper variety that was likely ideal for manufacturing beads. However, thicker tips that are likely related to other, yet unknown, uses were also present in the collection. Drills appear to have been concentrated in House 1, and the House 1 drill assemblage contained less fine grained sedimentary and more chert and chalcedony than the general sample. Additionally, the House 1 drills are, overall, more strategically manufactured and have blunter tips than the overall drill assemblage. Once again, local materials were strongly preferred. Notably, the available local materials may have acted as a constraint on some artifact types. As discussed above, bifaces and edge modified flakes were both predominantly chert, and also tended to be very small- this is likely a function of the nature of local chert, which primarily appears as small nodules and pebbles. Similarly, scrapers- commonly associated with hideworking- were also small, which may be related to cotton tail rabbits as the game of choice at Garden Canyon Village.

Formal Tools

The assemblage of formal tools consists entirely of projectile points. Eighty-three projectile points were analyzed with attention to material type, dimensions, and stylistic attributes. These attributes can help identify nonlocal styles or materials that can inform on interregional interaction, as well as help determine the function of these points. As discussed in Chapter 4, I recorded blade shape, base shape, and notch location using the same attributes as Shelley and Altschul (1996; See attribute sheet, Appendix A).

Table 5.19 presents a summary of projectile point attributes measured for this analysis.

While Shelley and Altschul's categories are somewhat non-standard, I chose to use them in order to maintain consistency with existing data from the Garden Canyon Village collection and facilitate comparison. Toward this aim, Shelley and Altschul's results are included in Table 5.19. In general, the Garden Canyon Village projectile point blades commonly had straight edges, and concave bases were the most frequently observed (See attribute Table, appendix A). Stemmed points were generally unusual, as were serrated edges. The assemblage was approximately split between notched and unnotched points; among notched points, side notches were the most common. In general, my results are broadly comparable with Shelley and Altschul's.

Table 5.19 Frequency of projectile point traits

Blade Shape	Straight		Incurvate		Excurvate		Incomplete	
	#	%	#	%	#	%	#	%
Thesis Sample	63	76%	14	17%	4	5%	2	2%
Shelley & Altschul 1996	13	87%	1	6%	1	6%	-	
Base Shape	Concave		Convex		Straight		Stemmed	
	#	%	#	%	#	%	#	%
Thesis Sample	43	52%	5	6%	9	11%	15	28%
Shelley & Altschul 1996	4	27%	3	20%	1	7%	6	40%
Notch Location	Corner		Side		Serrated		Unnotched	
	#	%	#	%	#	%	#	%
Thesis Sample	6	7%	25	30%	8	10%	44	53%
Shelley & Altschul 1996	-		2	13%	4	27%	9	60%

A multivariate analysis (Tables 5.20, 5.21, 5.22) reveals that four main projectile point types emerge from these attributes. For ease of discussion, these point types will be referred to as Type 1 (stemmed), Type 2 (side notched with concave or straight bases), Type 3 (unnotched straight edged blades with concave bases), and Type 4 (unnotched straight edged blades with straight bases). Approximately 67% of the assemblage fell into one of these categories; the remainder were too incomplete to be typed or had different attributes. Examples of these four projectile point types are illustrated in Figure 5.2.

Table 5.20. Multivariate analysis of blade shape versus base shape

		Blade Shape					
		Straight		Incurvate		Excurvate	
		#	%	#	%	#	%
Base Shape	Concave	**37**	**52%**	3	4%	2	3%
	Convex	4	6%	-		1	1%
	Straight	5	7%	3	4%	1	1%
	Stemmed	**8**	**11%**	**7**	**10%**	-	

Table 5.21. Multivariate analysis of notch location versus base shape

		Notch Location							
		Corner		Side		Serrated		Unnotched	
		#	%	#	%	#	%	#	%
Base Shape	Concave	-		**18**	**25%**	4	6%	**21**	**29%**
	Convex	-		2	3%	3	4%	-	
	Straight	-		2	3%	1	1%	6	8%
	Stemmed	6	8%	1	1%	-		8	11%

Table 5.22 Multivariate analysis of blade shape versus notch location

		Notch Location							
		Corner		Side		Serrated		Unnotched	
		#	%	#	%	#	%	#	%
Blade Shape	Straight	4	5%	**22**	**29%**	8	10%	**25**	**32%**
	Incurvate	2	3%	-		1	1%	11	14%
	Excurvate	-		1	1%	-		3	4%

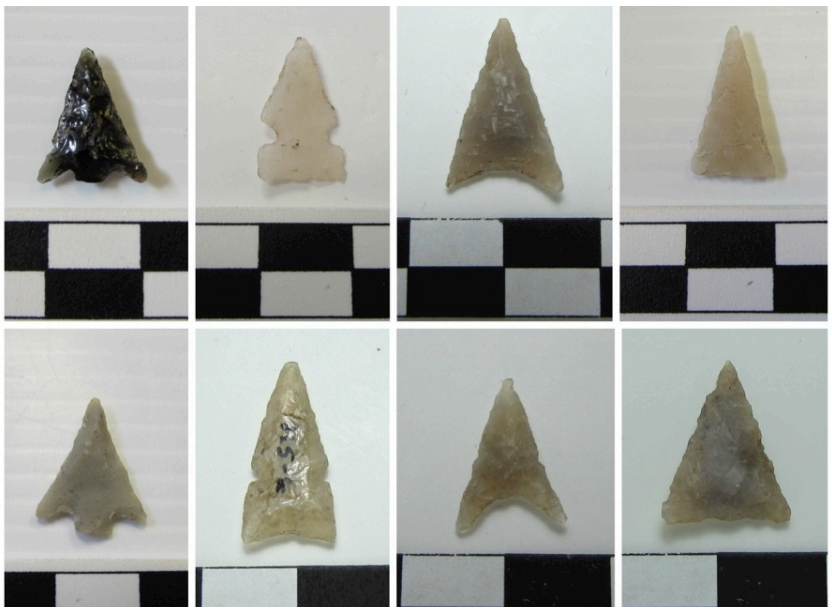

Figure 5.2 A sample of Garden Canyon Village projectile point styles.
From left to right: type 1, type 2, type 3, type 4

The majority of the projectile points were manufactured from chert, chalcedony, or obsidian (Table 5.23). However, a surprising number of points were made from less ideal materials such as quartz or fine grained sedimentary stone. These points were generally poorly made out of easily available materials; they may have been expediently manufactured for tasks that did not require points made from higher quality materials. When analyzed by point type, chert and chalcedony remained the prefered material type for each style. Notably, of the 13 obsidian projectile points, 6 were consistent with the Type 2 stylistic attributes. The entire projectile point assemblage averages 17 mm in length. Type 1 and Type 2 points are, on average, larger than type 3 and type 4 points (Table 5.24).

Table 5.23 Projectile point assemblage and raw material types

Material Type	Projectile Points											
	Type 1		Type 2		Type 3		Type 4		Untyped		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Sedimentary	-		1	5%	1	8%	1	10%	2	7%	5	6%
Sandstone	-		-		-		-		-		-	
Volcanics	1	10%	-		-		-		1	4%	2	2%
Quartzites	-		-		-		-		2	7%	2	2%
Obsidian	2	20%	6	27%	2	15%	-		3	11%	13	16%
Cherts	5	50%	12	55%	8	62%	8	80%	10	36%	43	52%
Quartzes	1	10%	2	9%	2	15%	1	10%	9	32%	15	18%
Anomalies	1	10%	1	5%	-		-		1	4%	3	4%
Total	10	12%	22	27%	13	16%	10	12%	28	34%	83	100%

Table 5.24 Projectile point dimensions by point type, based on complete or measurable specimens

	Type 1	Type 2	Type 3	Type 4
Length	17.5 mm	18.3 mm	14.9 mm	15.8 mm
s.d.	3.1 mm	4.7 mm	2.0 mm	3.4 mm
Width	12.0 mm	10.5 mm	9.8 mm	9.9 mm
s.d.	1.3 mm	1.4 mm	1.6 mm	1.7 mm
Thickness	3.2 mm	2.5 mm	2.7 mm	2.7 mm
s.d.	0.6 mm	0.6 mm	1.2 mm	0.5 mm

Southeastern Arizona has been chronically understudied and, as such, there are not well established projectile point typologies specific to the Middle San Pedro Valley. However, previous analyses of points from other sites in Arizona, New Mexico, and northern Mexico can help interpret these point types and place this projectile point assemblage in its regional context. The four primary types that emerged in this analysis correspond to types from Tagg's projectile point typology for East Central Arizona, which was developed using approximately 900 points recovered on or near the Apache-Sitgreaves National Forest, approximately 300 km north of Garden Canyon Village (1994). Under this typology, the major Garden Canyon Village projectile point styles identified above would be defined as triangular stemmed (Type 1), side-notched straight or concave base (Type 2), triangular concave base (Type 3), and triangular straight base (Type 4). The major traits Tagg identifies for each of those types is outlined in Table 5.25.

Table 5.25 Select point types adapted from Tagg 1994

Type	Example	Time Period	Description	% of Garden Canyon Village Sample
Triangular Stemmed		A.D. 800-900	Small, triangular points with narrow, straight to contracting stems.	12%
Side-Notched Straight or Concave Base		A.D. 900-1300	Small, triangular points with side notches and straight or convex bases; base is usually the widest part of the point and the notches are usually in the lower portion	27%
Triangular Concave Base		A.D. 1300-1450	Small, triangular pressure-flaked points with concave bases	16%

Triangular Straight Base		A.D. 900-1300	Small, triangular pressure-flaked points with straight or slightly convex bases	12%

The four types identified in this multivariate analysis also share similarities with points found to the south. Medio period points from Chihuahua observed by Whalen and Minnis in the area around Casas Grandes share several commonalities with Garden Canyon Village points (Figure 5.3; Whalen and Minnis 2009). Both regions have a variety of styles that include side notched points with concave bases, and small points with incurvate blades and concave bases.

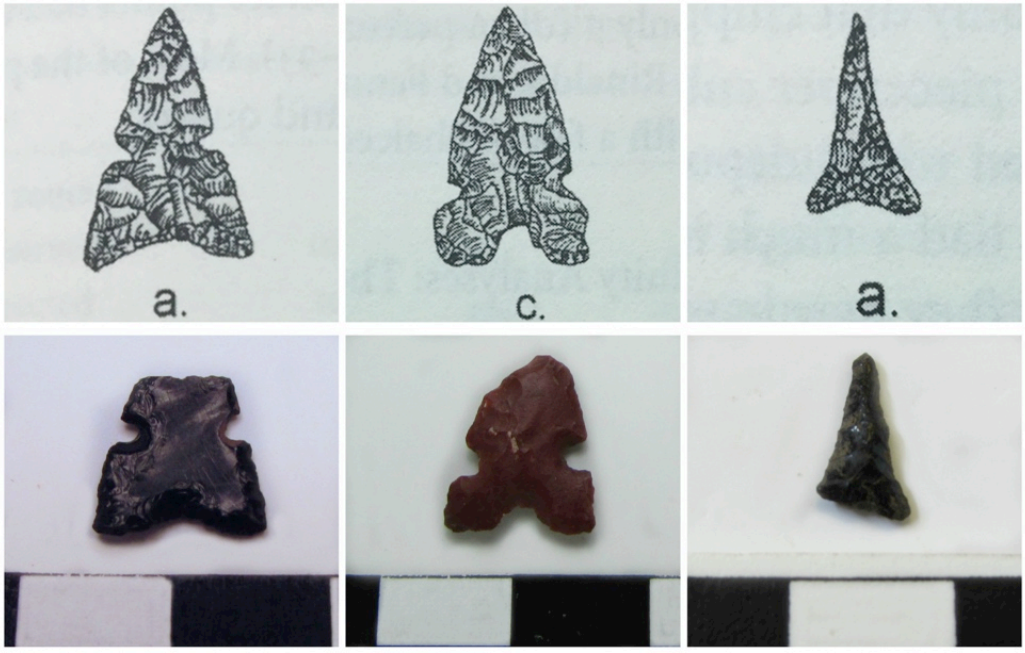

Figure 5.3 Medio Period Chihuahuan points (top row, from Whalen and Minnis 2009) and Garden Canyon Village points (bottom row).

The Garden Canyon Village points not described by Tagg's typology show similarities to points from other surrounding regions. The multivariate analysis revealed a small number of points with incurvate blades. Two of these points were determined to be similar to those found in the Phoenix and Tucson Basins. With slightly convex bases, incurvate blades, and high length to

width ratios, these Garden Canyon Village points are similar to sedentary period Hohokam styles (Figure 5.4; Justice 2002, Kelly 1978).

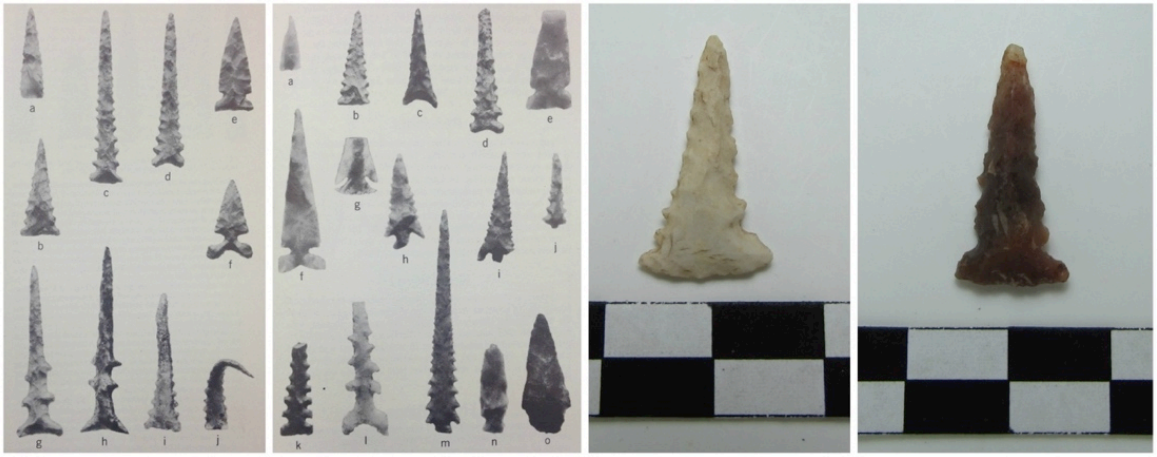

Figure 5.4 Hohokam (Haury 1982) and Garden Canyon Village Projectile Points

The Garden Canyon Village projectile point assemblage also contains several unusual points. Notably, two were observed to have a single serrated edge (Figure 5.5). While points with serrations on both edges are common, particularly in the Hohokam area, this single serrated edge is less frequently documented. Similar points with uneven serrations have been found at Mimbres sites in southwestern New Mexico, including the NAN Ranch site (Shafer 2003:197), the Galaz Ruin site (Anyon and LeBlanc 1984:240-241), the Swarts Ruin, (Cosgrove and Cosgrove 1967) and the Saige-McFarland Site (Lekson 1990:64). Alternatively, these points have been interpreted as reflecting Ancestral Puebloan designs such as those seen at the Dry Prong Site (Jane Sliva, personal communication 2016). The Dry Prong Site, located in east Central Arizona and dating from A.D. 1000 to 1150, included several side notched points with extra serrations on one edge (Olson 1960). There is evidence of a Puebloan migration into the lower San Pedro Valley documented by Di Peso at the Reeve Ruin site, dating after 1250 and located approximately 130 kilometers north of Garden Canyon Village (Di Peso 1958). However, Di Peso reported only leaf-shaped points at the Reeve Ruin site (1958:114).

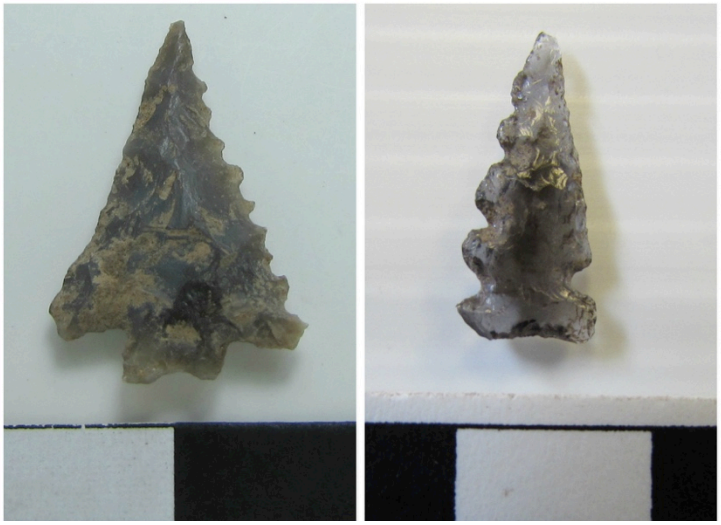

Figure 5.5 Projectile points with a single serrated edge

Other unusual points include one manufactured from transparent quartz crystal (Figure 5.6), and another that appears to be carved rather than chipped through percussion or pressure flaking (Figure 5.7). The notch and serrated edge are each carved into a coarse, tabular piece of stone, simulating the features of a projectile point using a completely different method of manufacture. It may have been a charm, gaming piece, or some other ritual item.

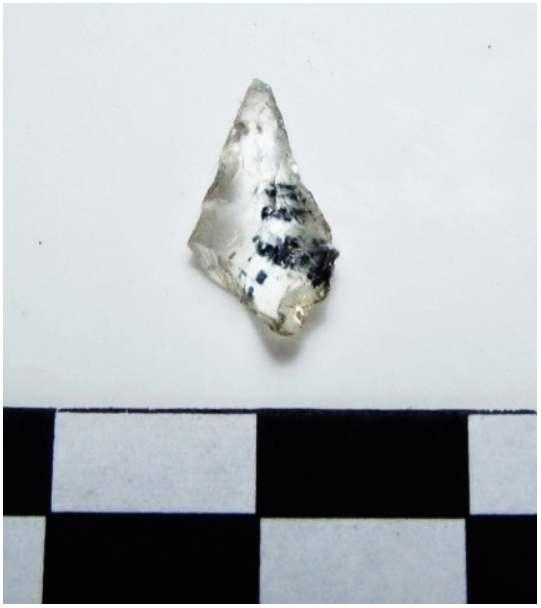

Figure 5.6 Quartz crystal projectile point

Figure 5.7 Carved projectile point

Projectile points are typically assumed to have been used for hunting or warfare. However, it is important to consider that projectile points may have served over purposes- they may have also had ritual significance, functioned as charms, or functioned as hand tools used in cutting and sawing (Lekson 1997, Odell 1988, Waguespack et al 2009, Whittaker 1987, Sedig 2010). It is also important to consider that projectile points were prone to breakage, and some particularly fine points would have been so fragile that they could not have been used effectively. Some such points may have been used for funerary offerings, as observed by Whittaker at Grasshopper Pueblo in east central Arizona (1987). Evidence for use of projectile points in activities other than hunting or war is particularly strong in the Hohokam culture area. Hohokam "flamboyant" points are longer, thinner, and narrower than utilitarian points, often with exaggerated barbs or serrations. Through experimental archaeology, they were determined to be difficult to make and not particularly practical for hunting or war (Crabtree 1973).

The unusual points in the collection- particularly the quartz crystal point and the carved point- may have had ritual uses. Additionally, several extremely small points were observed in the collection. Of the "whole" or "measurable" points in the collection, 19 were less than 15 mm in length. These points may have been too small and delicate for use in hunting or war. Additionally, the proportion of intact points to broken ones raises the question of how many of the points were actually used. The assemblage includes 55 "whole" or "measurable" and 28 "incomplete" or "fragmentary" points. The presence of so many intact points could mean several things. First, it could be a result of collection bias in the original excavation. Second, these points may have been manufactured for hunting or warfare but not yet utilized. Alternatively, it is possible that these points may have been manufactured for other uses, such as those described above. Analysis of projectile point breakage patterns was beyond the scope of this thesis, but an

examination of fracture patterns could shed further light on the nature of this projectile point assemblage. It is possible that the points in this collection include both functional points for hunting or warfare, as well as non-functional points that served ritual or other purposes.

In general, point forms in the southern Southwest and northern Mexico are very widespread, and therefore difficult to assign to specific cultural traditions (Margaret Nelson, personal communication 2015). It appears that the Garden Canyon Village points are largely characteristic of points in the region. Multivariate analysis has revealed that the projectile point assemblage is dominated by four primary types that have similarities to points from both East Central Arizona and northern Chihuahua. Additionally, points consistent with Mimbres and Hohokam styles were also identified. Furthermore, the presence of non-local obsidian projectile points has important implications for interregional interaction that will be explored later in this thesis. While it is difficult to tie the points in this assemblage to specific activities without further analysis, the assemblage appears to include both functional and non-functional points. Functional points were likely used for hunting or warfare, while small, delicate, or otherwise non-functional points may have had ritual purposes. It is clear that projectile points were an important artifact category: of the formal, informal, and manufacturing tools in the chipped stone assemblage, projectile points represent 27% of the artifacts.

Unidentified

Four additional chipped stone artifacts could not be confidently identified. They each appear to be modified on their intact margins, but also exhibit multiple broken edges and are fragmentary enough that form or function could not be determined. Of these artifacts, one is manufactured from obsidian, one from chert, and two from volcanic material.

Ground Stone

The ground stone assemblage consists of 709 artifacts both used for grinding as well as manufactured by grinding. In order to better discuss the variety of objects represented here, I will divide the artifacts into function-based categories originally defined by Adams (2002). First, I will discuss abrading, smoothing, and polishing tools- tools that were largely used in the manufacture of other items. Next, I will discuss grinding and pulverizing tools- an important category that includes manos and metates. Hafted percussion tools and spinning tools are also separated into their own categories, as these each represent very specific activities. Perforating, cutting, and scraping tools are analyzed together. Ornaments include all items of personal adornment- particularly beads- as well as lapstones, which were likely used in the process of manufacturing beads. Finally, the relatively unusual categories of paraphernalia, palettes, and figurines are considered together, as all three of these artifact types may have had ritual significance. In general, I will lean heavily on the interpretations and artifact descriptions provided by Adams (1996, 2002).

The majority of this sample is made up of non-diagnostic fragmentary groundstone (n=402). Overall, the ground stone assemblage is dominated by volcanics, quartiztes, and fine grained sedimentary raw materials (Table 5.26). Across all artifact categories, the raw materials are predominantly local, with the exception of ornaments such as turquoise beads. Additionally, approximately half of the sample was determined to be heat cracked or heat affected. This may have resulted from secondary use in thermal features such as roasting pits or hearths, resulting in fire cracking. Secondary use in thermal features likely accounts for the high proportion of fragmentary groundstone. Additionally, military activities on the site- including tank training and a WWII aircraft runway- may have contributed to the fragmentation seen in this assemblage.

Table 5.26 Ground stone assemblage and raw material types

Material Type	Artifact Type											
	Abrading, Smoothing, Polishing Tools		Grinding & Pulverizing Tools		Hafted Percussion Tools		Spinning Tools		Perforating, Cutting, Scraping Tools		Ornaments		Paraphernalia, Palettes, Figurines	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Sedimentary	14	44%	-		-		7	58%	1	20%	3	2%	11	39%
Sandstone	8	25%	4	4%	-		3	25%	-		3	2%	4	14%
Volcanics	6	19%	48	50%	1	100%	-		-		2	2%	4	14%
Quartzites	2	6%	36	38%	-		1	8%	3	60%	-		-	
Obsidian	-		-		-		-		-		-		-	
Cherts	-		-		-		-		-		-		-	
Quartzes	-		-		-		-		-		-		-	
Anomalies	2	6%	8	8%	-		1	8%	1	20%	125	94%	9	32%
Total	32	100%	96	100%	1	100%	12	100%	5	100%	133	100%	28	100%

Abrading, Smoothing, and Polishing Tools

The assemblage of abrading, smoothing, and polishing tools included polishing stones, abraders, shaft straighteners, and a floor polisher (Table 5.27). These tools play a major role in manufacturing activities, and can tell us about other items that may have been produced at Garden Canyon Village. This portion of the collection is in relatively good condition; 81% of the artifacts were scored as whole or measurable, enhancing the interpretation of this group of artifacts. Locally available fine grained sedimentary materials and sandstone were preferred for this tool category. These preferences were likely closely related to the textural requirements of each tool; fine grained sedimentary materials have a smooth texture ideal for polishing, while sandstone is rougher and ideal for abrading. Overall, 77% of artifacts in this category were classified as moderately used, while 24% were considered lightly used.

Table 5.27 Abrading, smoothing, and polishing tool assemblage and raw material types

Material Type	Artifact Type							
	Polishing Stones		Abraders		Shaft Straighteners		Floor Polishers	
	#	%	#	%	#	%	#	%
Sedimentary	14	66%	-		-		-	

Sandstone	3	14%	4	66%	1	25%	-	
Volcanics	4	19%	1	33%	-		1	100%
Quartzites	-		-		2	50%	-	
Obsidian	-		-		-		-	
Cherts	-		-		-		-	
Quartzes	-		-		-		-	
Anomalies	-		1	33%	1	25%	-	
Total	21	100%	6	100%	4	100%	1	100%

Twenty-one polishing stones were noted and, due to their small size and sheen (Adams 2002), they are likely related to pottery manufacture. Microscopic examination revealed use wear that includes striations, likely resulting from contact with ceramic temper. Each polishing stone had one or more use facets, identifiable by discrete areas with a high gloss. Garden Canyon Village is known for prolific pottery production, and may have been a production center for the Babocomari ceramics unique to the southern Southwest (Cook 2005:2). Polishing stones were generally small, averaging 30.7 grams with an average length of 3.6 cm. The majority were unshaped, water worn pebbles, likely from the river terraces of Garden Canyon Creek or the San Pedro River. These expedient tools could have been easily and conveniently selected from the bountiful river rock within the vicinity of the site.

The collection also includes a single larger polishing stone which can be described as a floor polisher. The floor polisher was located inside House 1 of the E75 complex. While it is not clear whether the artifact was part of a floor assemblage or found within the fill, the artifact is heavily burned. In their analysis of the excavation records, SWCA concluded that House 1 burned near the end of its uselife, possibly as part of a closing ritual (Whittlesey 2009a). The floor polisher was strategically pecked and ground to a disk shape, and had ridges on the sides that may have been finger holds in order to increase comfort while using the tool. Notably, there was also a small pecked depression in the center of the polishing surface, which Adams describes

as characteristic of Hopi polishers that were used to plaster walls and floors, or smooth and finish a plastered wall (Figure 5.8; 1996:33). The floor polisher was made from volcanic stone, and measures 12 cm by 11 cm, and 4 cm thick. The polishing surface appears heavily used.

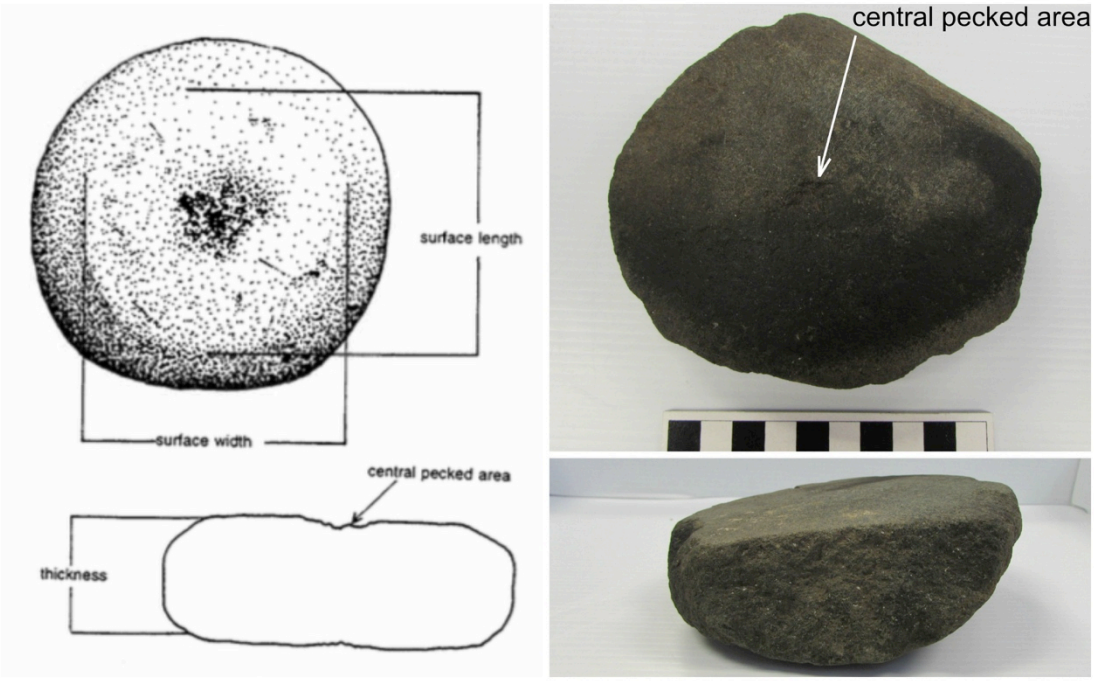

Figure 5.8 Illustration of a floor polisher (Adams 1996) and Garden Canyon Village floor polisher

Six abraders were recorded. According to the criteria described by Adams, all six can be classified as flat abraders- defined by a broad working surface on stone coarse enough to remove material from the contact surface (2002:80). Additionally, Adams and others use a length limit of about 10 cm to distinguish hand-held abraders from other, larger stone tools such as manos (2002:80). Each of the abraders is made from rough sandstone and has a flat surface useful for shaping other items. Ethnographic comparisons suggest that abraders are useful for shaping axes, wooden digging sticks, and other bone, shell, stone, or wood items (Adams 2002:81-82). On average they were relatively small, suggesting that they were used to shape small objects (Table 5.28).

Table 5.28 Abrader dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	2.3 cm	9.2 cm	3.8 cm	3.0 cm
Width	1.6 cm	5.7 cm	2.9 cm	1.7 cm
Thickness	0.9 cm	2.1 cm	1.4 cm	0.5 cm

In addition to the six abraders discussed above, four specialized abraders with U-shaped grooves, commonly referred to as shaft straighteners, were also recorded. These U-shaped grooves were likely utilized for shaping objects such as arrow shafts, strings of beads, or other cylindrical objects (Adams 1996). They functioned to confine cylindrical or shaft-like objects during the manufacturing process (Adams 2002). The possible relationship between shaft straighteners and bead manufacture is significant due to the large quantity of beads in the assemblage, which will be discussed below. The complete shaft straighteners were relatively consistent in size (Table 5.29). Two were made from quartzites, one from sandstone, and the forth from an unidentified material. The material types seem to been have selected for their abrasive properties- all three material types represented are relatively rough and would have assisted with the shaping of whatever object was worked against the grooves.

Table 5.29 Shaft straightener dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	94.0 mm	144.7 mm	114.3 mm	26.8 mm
Width	87.1 mm	101.0 mm	96.2 mm	7.8 mm
Thickness	41.4 mm	61.0 mm	53.2 mm	10.4 mm

Three of the shaft straighteners have a single U-shaped groove. The fourth, manufactured from quartzite, has one U-shaped groove with two adjacent shallow parallel gouges of an unknown function (Figure 5.9). These gouges, with their more “V” than “U”- shaped profiles, may have been used to put points on the end of tools such as awls and needles, or to dull or

abrade other surfaces (Adams 2002:82). V-shaped grooves are worn into the stone by repeatedly working a material against a flat surface to create a point (Adams 2002:84). Alternatively, Adams speculates that incised lines or short V-shaped grooves may be used to dull the bases of projectile points before they are hafted (Adams 2002:87). Therefore, this may have been a multi-purpose arrow producing tool with a U-shaped groove for shaping the shaft and grooves for dulling the bases of projectile points before hafting.

Figure 5.9 Shaft straightener with U-shaped groove and gouges

This group of abrading, smoothing, and polishing tools all represent manufacturing activities at Garden Canyon Village in which these tools were used to alter contact surfaces, whether through abrasion, smoothing, or buffing. Locally available materials were selected for each purpose; river-polished pebbles of fine grained sedimentary material were ideal for polishing due to their smooth texture, while rough sandstone was ideal for abrading. Abraders were coarse and suitable for removing material from the contact surface; they may have been used for shaping wood, manufacturing other stone tools such as axes, or- in the case of grooved abraders- straightening shafts and other cylindrical objects (Adams 2002:81). Polishing stones were used in the manufacture of pottery and wood or bone items. However, based on the use

wear of the polishing stones present in the Garden Canyon Village assemblage, most or all of them appear to have been used for pottery manufacture. This supports previous arguments for a significant pottery manufacturing industry at Garden Canyon Village. Larger polishers, such as the floor polisher discussed above, were likely used for the application of plaster to walls and floors. Both walls and floors appear to have been commonly plastered at Garden Canyon Village (Whittlesey et al 2009a).

Grinding and Pulverizing Tools

The assemblage of grinding and pulverizing tools included manos, metates, handstones, mortars, and pestles. This group of tools can inform on agricultural and food processing activities at Garden Canyon Village. Unfortunately, this portion of the collection is in poor condition, limiting the interpretation of this artifact category. 77% of the artifacts were scored as "fragmentary" or "incomplete." This degree of fragmentation may be due to secondary use in thermal features such as roasting pits or hearths, resulting in fire cracking. However, military use of Garden Canyon has caused also significant ground disturbance and damage. Garden Canyon Village is the site of a World War II aircraft runway, and tank training has been undertaken in and around the canyon. Additionally, the loss of many complete mano and metate specimens from the 1964 excavations has further increased the proportion of fragmentary artifacts within the overall collection.

In general, it appears that volcanics and quartzites were the preferred materials for manos and metates (Table 5.30). These local materials are available in large quantities. Notably, volcanics make up 79% of the metate assemblage- it is possible that volcanic materials were available in larger pieces suitable for metate manufacture. These material types are also common

among the mortars and pestles with the addition of sandstone. However, sandstone is almost completely absent from the mano, metate, and handstone assemblage. It is possible that sandstone was avoided for food processing tools because of risk of mixing grains of sand into the food being ground. Alternatively, if mortars and pestles were being used to mix pigments or medicines, sand wouldn't have been as big a concern.

Table 5.30 Grinding and pulverizing tool assemblage and raw material types

Material Type	Artifact Type									
	Manos		Metates		Handstones		Mortars		Pestles	
	#	%	#	%	#	%	#	%	#	%
Sedimentary	-		-		-		-		-	
Sandstone	1	2%	-		-		2	50%	1	33%
Volcanics	20	43%	19	79%	6	32%	1	25%	2	66%
Quartzites	23	50%	1	4%	11	58%	1	25%	-	
Obsidian	-		-		-		-		-	
Cherts	-		-		-		-		-	
Quartzes	-		-		-		-		-	
Anomalies	2	4%	4	17%	2	11%	-		-	
Total	46	100%	24	100%	19	100%	4	100%	3	100%

Forty-six manos were identified. Of the manos, eight were of the trough variety, four were flat manos, three were basin manos, and the remainder were indeterminate (Table 5.31). Trough manos were distinguished by their rectangular shape and end wear from contact with the walls of trough metates. Basin manos were identified by their circular shape and rotary usewear, and flat manos were identified by their flat use surface with usewear restricted to the grinding surface. Only 11 manos were scored as measurable or complete; the measurements of these manos are presented in Table 5.32. The large range of sizes- ranging from 9.9 cm to 11.5 cm in length- represents the presence of both one- and two-handed manos in the assemblage. Trough manos tend to be shorter than flat manos. As they are used in a trough metate, the wear against the sides causes the mano to grow shorter as the trough grows deeper and narrower (Adams 2002).

Table 5.31 Mano assemblage

Quantity	Type
31	Nondiagnostic mano fragments
8	Trough manos
4	Flat manos
3	Basin manos

Table 5.32 Mano dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	9.9 cm	22.5 cm	17.3 cm	4.3 cm
Width	5.9 cm	11.3 cm	9.3 cm	2.0 cm
Thickness	2.7 cm	6.5 cm	4.2 cm	1.1 cm

Additionally, nineteen handstones were identified. Handstones were defined according to the definition provided by Adams: "handheld tools lacking specific attributes that allow them to be sorted into defined subsets such as manos, abraders, polishing stones, pestles, and so on" (2002:142). The majority were fragmentary, making an assessment of their use difficult. In general, these handstones show almost no evidence of strategic manufacturing and shaping and all of them were categorized as expedient. Some may have been manos, or functioned to do any number of other tasks that required a handheld stone, such as hide processing (Adams 1986), woodworking, processing pigments, or mixing substances on lapstones or netherstones (Adams 2002). Notably, red hematite pigment was observed on one hand stone examined under magnification. Several large pieces of red hematite were recovered from the site, and it is likely that more pigment would have been observed if the artifacts had not been washed by the original excavators (Shelley and Altschul 1996:85). Red hematite was a common pigment in Babocomari Polychrome pottery, which typically consists of black and red designs. Therefore, it is possible that the red hematite pigment was used for pottery production, and stone tools such as the handstones in this sample were used to prepare the pigment and process it into paint. Both manos and handstones were generally moderately used; 85% of the manos and 74% of the handstones

were scored as moderately used.

Twenty-four fragmentary metate pieces were identified; no whole metates were included in the assemblage analyzed. Due to their fragmentary nature, only eight could be more specifically described by type (Table 5.33). Additionally, measurements are not particularly informative due to the condition of the metate fragments. However, the fragments tend to be fairly small to medium, averaging 1,707 grams. Volcanic materials appear to have been preferred for metate manufacture. Metates appear to be one of the more heavily used artifact categories; 54% of the metate fragments were scored as heavily used.

Table 5.33 Metate assemblage

Quantity	Type
16	Nondiagnostic metate fragments
5	Trough metate fragments
2	Flat metate fragments
1	Basin metate fragments

There are likely many more manos and metates represented in the unidentified portion of the sample, but due to the fragmentary nature of the collection it was difficult to confidently identify these artifact types. Flotation and pollen analyses have suggested that the residents of Garden Canyon Village were maize agriculturalists, and these grinding tools were likely an important part of the processing of plant foods (Whittlesey 2009b:23). The proportion of handstones and manos to metate fragments is relatively high, with 65 manos and handstones and 24 metates fragments documented in my sample. Young described a similarly high proportion of handstones and manos to metates and metate fragments in his original excavations: “about 200 whole and fragmentary manos and handstones (and) more than 50 whole and fragmentary trough or slab metates” (1972:17). In Shelley and Altschul’s analyses, they noted 56 manos and handstones and 13 metates (1996). This raises the question of why there were so many more

handstones and manos than metates. Notably, there are numerous grinding slicks in the rocky foothills around Garden Canyon Village, and it is possible that some of the manos may have been used at these locales to process wild foods that were collected in the canyon. Additionally, manos wear out at a faster pace than metates, and typically appear in larger quantities.

Three pestles and four mortars were recorded. In their documentation of a different portion of the collection, Shelley and Altschul note that Garden Canyon Village has a pestle to mortar ratio of 6:1, suggesting that most pestles were used in the bedrock mortars that are common in the foothills of Garden Canyon (1996:90). The pestles exhibit use wear patterns that include impact fractures, chipping, and abrasion and they were likely used with a crushing stroke (Adams 2002). Two of the three pestles are fragmentary; the complete pestle measured 7.6 cm long, 3.4 cm wide, and 4.1 cm thick.

Four mortars were recorded. Two of the mortars averaged 10 cm in length, 8.5 cm in width, and 4 cm thick. They had single cupules for grinding; one measuring 2.5 cm in diameter and the other 3.5 cm in diameter. The other two mortars are unusual in form, and each has multiple cupules (Figures 5.10 and 5.11). While these deviate greatly from typical mortar forms, the original excavators identified them as "paint palette mortars" and, due to presence of apparent usewear from grinding in the cupules, I have chosen to retain the same designation. The first is shaped into a round form measuring 18.2 cm in diameter and 6 cm thick. It has 7 cupules, 2 of which are incipient. The cupules range from 2.5 to 2.7 cm in diameter. The second is fragmentary, but the intact edge indicates that it may have also had a manufactured round shape. It has 9 cupules distributed across both faces of the stone, 3 of which are incipient. The cupules again range from 2.5 to 2.7 cm in diameter. Both are of unknown provenience. The first has been definitively associated with the Garden Canyon Village site, while the second was found in a

closet of the Fort Huachuca Museum during renovation. However, due to its similar form to the other one and the history of the Fort Huachuca Museum as a repository for Garden Canyon Village collections, it is extremely likely that this piece also came from Garden Canyon Village. These artifacts are unusual in both their numerous cupules, and the remarkable consistency of cupule size. They may have had a special purpose such as preparing pigments, medicines, or other goods made in small quantities. No pigment remnants were observed in the cupules, but it appears that both artifacts- like the majority of this collection- were washed thoroughly. Notably, a similar mortar with multiple extremely regular cupules has been reported at Coronado National Memorial at the southern end of the Huachuca Mountains.

5.10 Mortar with multiple cupules

5.11 Mortar with multiple cupules

This group of grinding and pulverizing tools largely represent food processing equipment. While metates and manos were used for grinding with a reciprocal stroke, mortars functioned to confine a substance that is worked with a pestle in a combination of crushing, stirring, or pounding strokes. However, the mortars included in this sample all had relatively small cupules measuring 3.5 cm in diameter and smaller. Therefore, they were most likely used for non-food goods such as pigments, medicines, or other things ground in smaller quantities.

Overall, 78% of grinding and pulverizing tools were classified as moderately used, while 18% were heavily used and 4% were lightly used. The majority of the manos were scored as moderately used, while the majority of metates were scored as heavily used. Unsurprisingly, this indicates that manos were replaced more frequently than metates. Additionally, while the fragmentary nature of this portion of the assemblage limits interpretation, it appears that trough manos and metates may have been the dominant form. Of the diagnostic metate fragments, over 60% were determined to be trough metates. Similarly, of the diagnostic mano fragments, over 50% were identified as trough manos. The prevalence of trough manos supports the idea that this was an era of agricultural intensification at Garden Canyon Village. In experiments done by Adams, she found that the use of two hands on a large mano in a trough metate was far more efficient for grinding corn that other configurations of manos and metates (1993). In an analysis building on Adams' experiments, Diehl observed that changes in the ratio of trough metates to basin metates could be used as an index for increasing dependence on maize (1996). He argued that with increasing maize dependence came increasing efficiency in the processing of such an important staple (Diehl 1996). While there are interpretive issues given the fragmentary nature of the grinding and pulverizing tools, it is possible that these trough manos and metates might indicate increasing maize dependence at Garden Canyon Village.

Hafted Percussion Tools

The only hafted percussion tool in the sample is a single ¾ groove axe manufactured from volcanic diorite. It is notable that this is the only hafted percussion tool in the assemblage; no other hafted percussion tools, such as mauls, picks, or other forms, were noted. However, it is significant that this axe may have been part of the original floor assemblage in House 1 of the

E75 complex. Hafted percussion tools were also absent from the portion of the collection analyzed by Shelley and Altschul in 1996. Axes have been interpreted as tools for both cutting wood as well as working in the soil to grub woody plants and roots out of the ground (Cook 2003). As Garden Canyon has a wide variety of plants- including trees- this relative lack of axes is surprising. It is possible that, prehistorically, the grasslands of lower garden canyon were open enough that tree removal was not a common activity. The axe is whole, and in good condition with only a minor chip on the tip of the blade. It measures approximately 11.5 cm long, 7.9 cm wide, and 3.8 cm thick (Figure 5.12).

Figure 5.12 Axe

It is believed that the ¾ groove axe originated in Mexico and was a common Hohokam and Mogollon design before it was transmitted to the Ancestral Puebloans in the late Pueblo II or early Pueblo III period (Adams 1996:15). However, axes of this type are widespread throughout the southwest, and are not particularly useful for establishing cultural affiliation. During the analysis for the Cook 2003a report, additional analysis of a small sample of ground stone artifacts recovered in Young's 1964 excavation took place. The assemblage included two axes. Both axes were, like this one, ¾ groove axes made from diorite. One axe had use-wear that was identified as resulting from wood chopping and working in the soil, possibly grubbing bushes or

woody plants out the ground (Cook 2003a:28). The second had been resharpened; however, the refreshed edge was unused and its surface highly polished; DAI hypothesized that it may have been subject to a secondary use in ritual activity (Cook 2003a:28).

Spinning Tools

Twelve spindle whorls were analyzed (Table 5.34). All of the spindle whorl fragments were scored as fragmentary or incomplete, limiting their interpretation. Additionally, two possible spindle whorl fragments are included in the "unidentified artifacts" category- however, they are too fragmentary to identify with confidence, and are thus not included here. The majority are manufactured from fine grained sedimentary stone. The whorl fragments were estimated to have ranged from 4.5 cm to 10.5 cm in diameter. All 12 are perforated with a biconically drilled central hole that would have fit over a spindle shaft, which was then twisted in a continuous motion to spin yarn and thread (Adams 1996). These central holes were all 3 mm or greater in diameter, and it is possible that the drill-tips categorized as "blunt" in the informal tools section above may have played a role in manufacturing these spindle whorls.

Table 5.34 Spinning tool assemblage and raw material types

Material Type	Artifact Type	
	Spindle Whorls	
	#	%
Sedimentary	7	58%
Sandstone	3	25%
Volcanics	-	
Quartzites	1	8%
Obsidian	-	
Cherts	-	
Quartzes	-	
Anomalies	1	8%
Total	12	100%

This relatively large quantity of stone spindle whorls appears to be unusual, as reworked sherds are generally the prefered material for whorls. For example, in the 62,588 stone objects recovered by the Joint Casas Grandes Expedition, Di Peso notes only 3 stone spindle whorls (Di Peso et al 1974:139). However, a significant quantity of stone whorls have been noted at sites in the Rio Sonora area (Pailes 1980:36). Di Peso also reported stone spindle whorls at nearby Babocomari Village, where he found 11 incomplete and 19 complete whorls, 32% of which were located in funeral caches (1951). While more analysis is needed, it appears that stone spindle whorls may be somewhat distinctive to northern Sonora and the Middle San Pedro Valley.

Notably, ceramic spindle whorl fragments were observed by SWCA in their analysis of the ceramic assemblage. The E75 complex included 14 modified sherds that SWCA described as spindle whorls, mostly concentrated in House 1 (Whittlesey et al 2009a:146). In the E100 complex, SWCA noted one ceramic spindle whorl fragment. Interestingly, the distribution of stone spindle whorls seems to be opposite that of ceramic spindle whorls: while the majority of the ceramic spindle whorls were located in the E75 complex, over 80% of the stone spindle whorls were located in the E100 complex. This pattern may be due to differences in spinning techniques between the two complexes, the types of materials that were being spun, temporal differences between the E75 and E100 complexes, or perhaps a difference in affiliation of the groups occupying these areas.

Some researchers have suggested that smaller, lighter whorls may have been utilized for cotton, whereas larger whorls may have been used for agave (Parsons 1972). Flotation and pollen analyses suggest that the residents of Garden Canyon Village grew cotton (Whittlesey 2009b), while the presence of tabular tools (discussed below) suggests agave exploitation. The spindle whorls in the sample assemblage were likely an important part of processing both cotton and

agave fibers. However, despite the argument for a relationship between spindle whorl size and function, no obvious pattern emerges in the Garden Canyon Village stone spindle whorls (Figure 5.13). If spindle whorls were manufactured in different sizes to perform different functions, we might to expect to see bimodal clusters of points for smaller cotton whorls and for larger agave whorls. However, save for one outlier, the Garden Canyon Village spindle whorls seem to be grouped together and the distribution does not indicate two different modes of spindle whorl size. Alternatively, weight may be the deciding factor for function, with heavier stone whorls serving a different purpose than lighter sherd whorls. Unfortunately, due to the fragmentary nature of the stone whorls, their weight cannot be estimated. Most of the variation seems to be in terms of the thickness of the spindle whorls; thickness was likely a primary determinant of the weight, and therefore use, of the spindle whorl. Additionally, it is also worth noting that spindle whorls have been associated with other activities, such as jewelry manufacture. The presence of whorls alone is not necessarily proof of fiber production (Adams 2002:183).

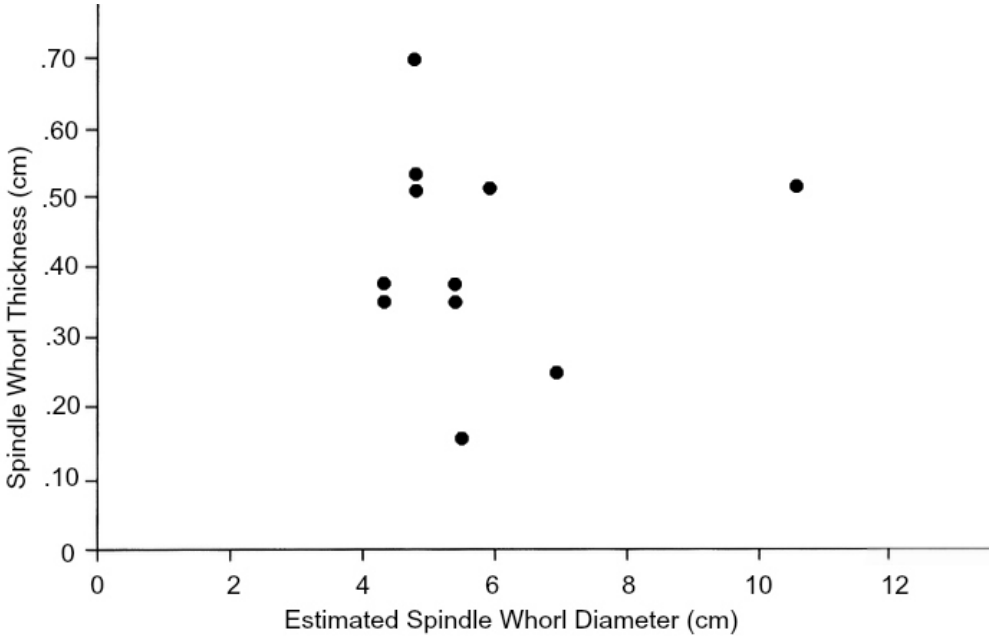

Figure 5.13 Stone spindle whorl size distribution

Perforating, Cutting, and Scraping Tools

Perforating, cutting, and scraping activities are most often associated with chipped stone tools. However, the ground stone assemblage included two tool types manufactured by grinding that also served perforating, cutting, and scraping purposes: tabular tools and awls (Table 5.35). Overall, 40% of this assemblage was whole, and 60% incomplete or fragmentary. Between the fragmentary nature and small size of this portion of the collection, interpretations are limited. However, the presence of tabular tools can still shed light on wild food procurement at Garden Canyon Village. Locally available materials were preferred for this tool category.

Table 5.35 Perforating, cutting, and scraping tool assemblage and raw material types

Material Type	Artifact Type			
	Tabular Tools		Awls	
	#	%	#	%
Sedimentary	1	25%	-	
Sandstone	-		-	
Volcanics	-		-	
Quartzites	3	75%	-	
Obsidian	-		-	
Cherts	-		-	
Quartzes	-		-	
Anomalies	-		1	100%
Total	4	100%	1	100%

Four tabular tools were recorded. Tabular tools are identified by their thin, tabular shape and distinctive usewear; typically, one or more edge has been used in cutting, scraping, slicing, or chopping motions. Of the tabular tools identified here, three were made from quartzite and one was made from a naturally tabular fine grained sedimentary material. The tabular tools range from 1.1 to 1.7 cm thick (Table 5.36). Each one has a single edge that has been ground thin and shows use wear consistent with the cutting and chopping described by Adams. An example is

illustrated in Figure 5.14. Two of the tools were whole, and the other two were incomplete.

Table 5.36 Tabular Tool dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	15.4 cm	17.4 cm	16.4 cm	1.4 cm
Width	10.9 cm	11.6 cm	11.3 cm	0.5 cm
Thickness	1.1 cm	1.7 cm	1.4 cm	0.03 cm

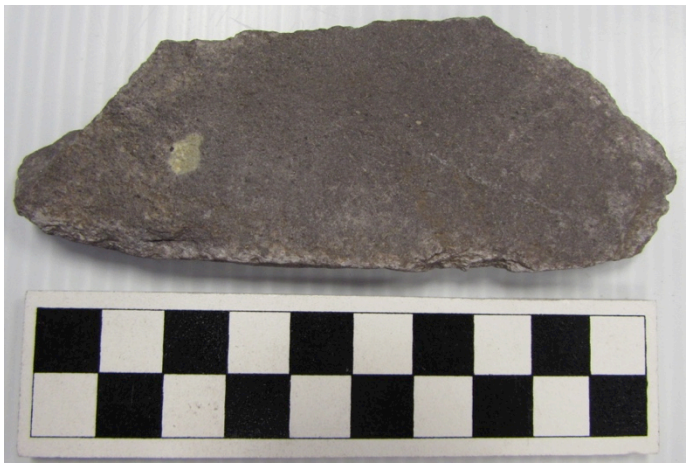

Figure 5.14 Tabular tool

These tools have been associated with the processing of agave and other vegetal materials (Shelley and Altschul 1996:94). The ethnographic record attests to the importance of agave as a gathered resource in the Southwest and to the use of tabular tools for agave processing (Fish et al 1992, Ferg 2003, Parsons and Parsons 1990). Additionally, traces of agave fibers and residues have been found on tabular tools in archaeological contexts (Bernard-Shaw 1990). Tabular tools with a concave working edge were used to remove agave leaves from the core of the plant, which was then roasted and eaten. Tabular tools with a straight or convex working edge were used to scrape away the thick pulp found in agave leaves, leaving behind useful fibers (Parsons and Parsons 1990). In some Hohokam households, archaeologists have found agave toolkits that include tabular tools for removing leaves, tabular tools for scraping away pulp, and implements for processing agave fiber (Fish et al 1992). Agave grew in and around Garden Canyon, and

were likely exploited in prehistoric times.

There was one incomplete steatite awl, measuring 19.4 mm long, 7 mm wide, and 4 mm thick (Figure 5.15). While it is not known whether steatite is available immediately in the area of Garden Canyon Village, it is likely that this common metamorphic rock, ideal for carving, was likely not too difficult to acquire. This awl may have functioned to string corn cobs, poke holes in leather or basketry, or even serve as a hair or clothing pin (Adams 1996). It is flat rather than conical, and sharpened to a point with abrasive scratches on the pointed surface.

Figure 5.15 Steatite awl

Ornaments

This portion of the collection includes a variety of ornaments, as well as a single lapstone, which was included in this category because it was likely part of the ornament manufacturing process (Table 5.37). Overall this portion of the collection is in very good condition- 85% of the ornaments were scored as whole or measurable, likely due to their small size. The ornament assemblage was dominated by materials considered anomalies under Shelley and Altschul's raw material groups. Several of these types are non local, including malachite- which may have been obtained from the Bisbee area 40 km to the east- and turquoise. A large portion of the ornaments were made of steatite; unfortunately, it is unknown whether steatite is available locally.

Table 5.37 Ornament assemblage and raw material types

Material Type	Artifact Type			
	Ornaments		Lapstone	
	#	%	#	%
Sedimentary	2	2%	1	100%
Sandstone	3	2%	-	
Volcanics	2	2%	-	
Quartzites	-		-	
Obsidian	-		-	
Cherts	-		-	
Quartzes	-		-	
Anomalies (Steatite)	54	41%	-	
Anomalies (Unknown)	55	41%	-	
Anomalies (Turquoise)	14	11%	-	
Anomalies (Malachite)	2	2%	-	
Total	132	100%	1	100%

One lapstone fragment was recorded. It was manufactured from a fine grained sedimentary material, and measures 17.3 cm long, 16 cm wide, and 1.8 cm thick. The lapstone is made from a naturally tabular raw material, and appears to have been minimally shaped. The lapstone appears burned, and has cracked into two pieces that can be refit. Notably, it was located within unit N7/E73 of House 1, which is believed to have burned at the end of its occupation. According to the excavation notes, this lapstone is a possible part of the floor assemblage. Lapstones provide a surface upon which artifacts such as ornaments can be modified by another tool (Adams 2002:213). The surface of the lapstone has abrasion and sheen from having artifacts worked against its surface. As described by Adams, lapstones were commonly used in the Tucson basin for activities that required a working surface, such as ornament manufacture (1996:22).

One-hundred and thirty-two ornaments were recorded (Table 5.38). The assemblage included 107 beads manufactured from materials that include steatite and turquoise. Styles varied from disc beads (n=102) to barrel beads (n=5). Additionally, there were two scored beads that appear to have been midway through the manufacturing process. The beads were all shaped by

abrasion, and the majority were biconically drilled to create a suspension hole. All 5 barrel beads were fragmentary or incomplete. The disc beads were generally small, averaging 4 mm in diameter and 1.3 mm thick (Table 5.39). Additionally, they were relatively standardized in size.

Table 5.38 Ornament types

Ornament Type	Quantity
Disc Beads	102
Barrel Beads	5
Scored Beads	2
Bird Pendant	1
Round Pendant	1
Oval Pendant	7
Triangular Pendant	1
Rectangular Pendant	1
Tessera	8
Rings	3
Plug	1
Total	132

Table 5.39 Disc bead dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Diameter	3.0 mm	7.3 mm	4.0 mm	0.9 mm
Thickness	0.5 mm	3.8 mm	1.3 mm	0.7 mm

This category also includes 11 pendants, defined by a suspension hole perforated through one end so that the broad surface is most visible (Adams 2002). One of the pendants was a finely crafted three dimensional bird effigy (Figure 5.16). The pendants varied in shape from rectangular to tear drop shape, and also varied greatly in size (Table 5.40).

Figure 5.16 Bird pendant

Table 5.40 Pendant dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	0.8 cm	5.5 cm	2.3 cm	2.0 cm
Width	0.7 cm	2.8 cm	1.4 cm	0.9 cm
Thickness	0.3 cm	1.1 cm	0.5 cm	0.4 cm

Other ornaments include mosaic tessera (n=8) and rings (n=3). The rings are extremely fragmentary, and were manufactured from unidentified materials. Additionally, a possible ornamental plug that would have been placed through an individual's ear, cheek, nose or lip was identified (Adams 1996:29). The plug was manufactured from an unidentified red-brown stone, and shaped into a 11.2 mm long rectangular piece that tapered toward either end. The tessera were generally small, and six of the eight were made from turquoise (Table 5.41). Tesserae would have been attached to shell, wood, bone or other material using a resin or tar in order to create a decorative pattern (Jernigan 1978).

Table 5.41 Tessera dimensions, based on complete or measurable specimens

	Minimum	Maximum	Average	Standard Deviation
Length	5.0 mm	11.2 mm	7.8 mm	2.7 mm
Width	4.1 mm	6.2 mm	5.1 mm	1.0 mm
Thickness	1.0 mm	3.3 mm	2 mm	0.9 mm

Overall, 32% of the ornament assemblage was located in the E100 complex, while 66% was located in the E75 complex (Figure 5.17). A significant portion of the assemblage is concentrated in the southwest corner of House 1 in the E75 complex. Notably, of the 16 drills in the artifact assemblage, nine are from the same corner of House 1. Additionally, the lapstone is possibly part of the floor assemblage from House 1. Due to the issues with provenience, it is difficult to say whether these artifacts were located in the fill or on the floor, and whether they were all in association. However- as previously mentioned in the discussion of drills, above- it is possible that this pattern could indicate the presence of a workshop, or perhaps a location where a craftspersons refuse was disposed of. With apparent clusters of multiple artifact types including

drills and ornaments, it appears that House 1 is an important place within the Garden Canyon Village site. However, beads have also been known to enter the archaeological record through loss. Morris has argued that many beads were lost and deposited into trash areas via sweeping (1939:141). Similarly, Schiffer commented that "small items are more likely to be lost…loss is usually the process responsible for the deposition of small, still usable items…in activity and refuse areas" (1983:679).

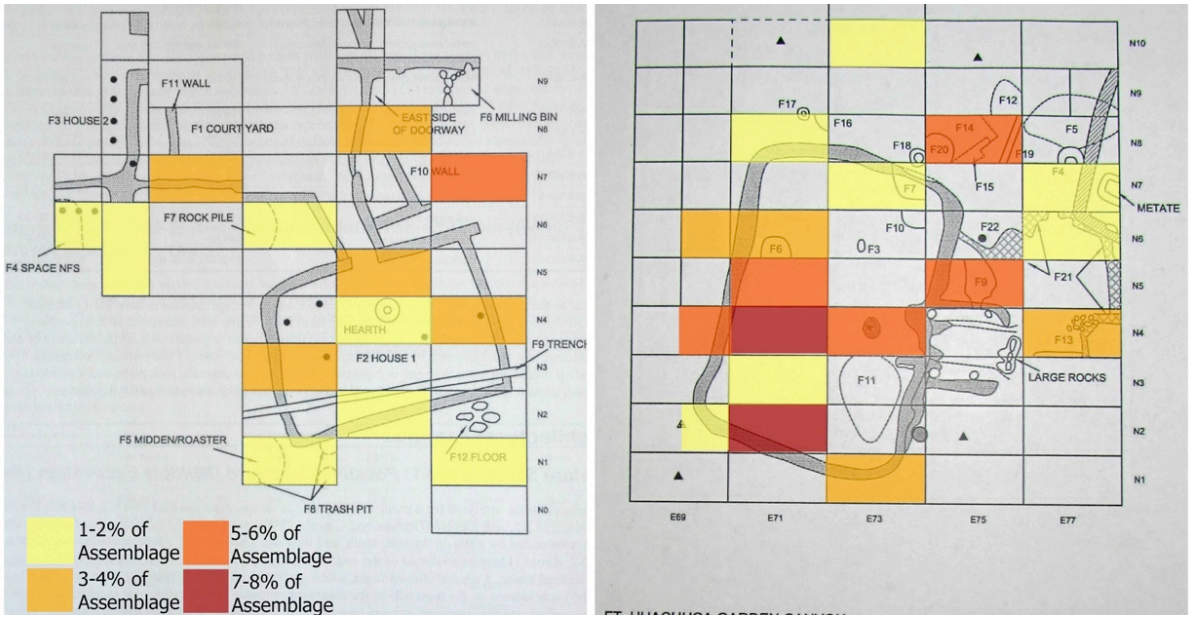

Figure 5.17 Distribution of ornaments in the E100 (left) and E75 (right) complexes

This group of ornaments was likely used for a combination of personal adornment and decoration. Jewelry has often played an important role in social identity in the prehistoric southwest, particularly among the Hohokam (Bayman 2002). Additionally, beads have been documented in caches and ritual offerings (Adams 2002). The relatively large proportion of ornaments- almost 20% of the entire ground stone sample- suggests that ornament manufacture was a significant activity at Garden Canyon Village. In Young's original analysis, he does not quantify the number of ornaments, but notes that there were a "surprising amount" of both shell

and stone beads (1972). Similarly, while the SWCA volume did not include stone ornaments, their analysis includes 49 shell beads, 17 shell pendants , and 12 shell bracelets (Whittlesey et al 2009b). These shell ornaments will be discussed further in Chapter 6.

Paraphernalia, Palettes, and Figurines

This portion of the collection includes figurine and palette fragments, as well as a broad category of shaped geometric and abstract items whose specific functions are unknown- dubbed "paraphernalia" by Adams (2002; Table 5.42). Locally available fine grained sedimentary materials made up much of the assemblage. There were also a large number of materials classified as anomalies, including unidentified materials, steatite, and calcite. Unfortunately, it is unknown whether steatite is available locally.

Table 5.42 Paraphernalia, palette, and figurine assemblage and raw material types

Material Type	Artifact Type					
	Paraphernalia		Figurine Fragments		Palette Fragments	
	#	%	#	%	#	%
Sedimentary	9	38%	1	50%	1	50%
Sandstone	4	17%	-		-	
Volcanics	3	13%	-		1	50%
Quartzites	-		-		-	
Obsidian	-		-		-	
Cherts	-		-		-	
Quartzes	-		-		-	
Anomalies (Calcite)	1	4%	-		-	
Anomalies (Steatite)	3	13%	-		-	
Anomalies (Unknown)	4	17%	1	50%	-	
Total	24	100%	2	100%	2	100%

Twenty-four artifacts were categorized as paraphernalia and include possible gaming pieces and shaped geometrics. One object is consistent with what has been called a stone ring by

Haury (1976) or a doughnut by DiPeso (1974; Figure 5.18). While similar in form to spindle whorls, these artifacts have a much thicker, more rounded doughnut shape, while spindle whorls are flattened discs. These rings or doughnuts may be related to shelling corn, weighting digging sticks, or gaming (Adams 1996:19-20). Twenty-one objects are described as geometrics- they are clearly specially shaped, but have no obvious use-wear damage or function. The shapes include spheres, rectangular pieces, a piece of calcite shaped into a flattened disc, incised objects, cylinders, and a cross (Figure 5.19) and they may have played a role in gaming or ritual activities. Two fragmentary objects with scalloped edges were also included in this category. Use-wear on the scalloped edges suggests that the objects may have been part of a rasp. Rasps have been previously documented at Garden Canyon Village, and at least one intact rasp made from phyllite- a type of layered metamorphic rock- was excavated by Young in his 1964 excavations (Cook 2003a). In their analyses of Young's rasp from the original excavation, DAI observed usewear suggestive of a stick or bone being rubbed along the rasp, likely to create a rhythmic sound, possibly important in ritual (Cook 2003a).

Figure 5.18 Stone ring

Figure 5.19 Stone cross

The collection included two stone figurine fragments. Ethnographic evidence has suggested that figurines play an important role in rituals, and they are often placed on altars at

the Hopi, Zuni, Acoma, Laguna, and Zia Pueblos (Adams 2002:216). One was too damaged for further determination of what it may have been, but it was manufactured from a greenish sedimentary material. Portions are etched with a cross-hatched pattern, and it measures approximately 1.5 cm by 1.8 cm. The other fragment is an animal figurine with four legs and a curved tail. It was manufactured from an unidentified, translucent grey material, and it measures 1.8 cm from its tail to neck. One leg and the head are missing, so the animal type cannot be determined. Unfortunately, the interpretation of these stone figurines is limited by their condition. However, zoomorphic figurines are common in the Hohokam area. In particular, ceramic figurines have been documented at Hohokam sites including Pueblo Grande, Los Guanacos, and Snaketown (Foster and James 2002). Foster and James suggest that these figurines may be representations of dogs (2002:165). Anthropomorphic ceramic figurines have also been documented in the Garden Canyon Village assemblage, and can shed light on the importance of figurines. Ceramic figurines will be discussed in greater depth in Chapter 6.

There are two palette fragments in the sample- an important artifact category that would suggest a link between Garden Canyon Village and the Hohokam culture to the north. Palettes are considered to be one of the "outstanding Hohokam hallmarks" (Figure 5.20; Haury 1976:286). However, palettes have also been documented in the Mimbres area (Cosgrove and Cosgrove 1967). During the Pioneer Period, the Hohokam modified tabular stone into rectangular forms with pronounced rims. During the Colonial period, palette shapes grew more elaborate, and included human and reptilian effigies. During the Sedentary period palettes declined, and were essentially lost by the Classic period (Haury 1976:286). The Garden Canyon Village palette fragments are simple in form and do not include the complex carvings that Hohokam palettes at their height are known for. One palette fragment from the E75 complex has

no embellishment and is made from tabular stone. On the other (Figure 5.21), a portion of a border design is intact- an incised line follows the edge and two etched triangles are intact. Notably, other possible palette fragments have been found in the area during survey, but none of the previous Garden Canyon Village analyses have documented palettes. (Schneider 2014).

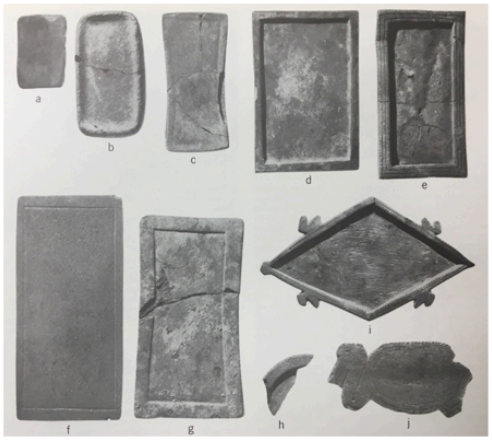

Figure 5.20 Examples of Hohokam palettes from Snaketown (Haury 1976)

Figure 5.21 A palette fragment from Garden Canyon Village

This group of artifacts may largely represent ritual activities. Palettes are often found in mortuary contexts across the southern southwest, and are therefore believed to have had ritual significance (Adams 2002:146). Importantly, these palette fragments are also evidence of a possible Hohokam-Garden Canyon Village connection. The figurines and paraphernalia may have also had ritual significance, or been used in gaming or other activities.

Unidentified Artifacts

Due to the fragmentary nature of the collection, 402 artifacts could not be identified. The vast majority (n=378) of this unidentified category consists of fragmentary local stone that is only recognizable as culturally modified by the presence of the incomplete and non-diagnostic remainder of a ground surface. Due to the large quantity of these unidentifiable and non-

diagnostic pieces and the lack of information that could be gained from them, they were only minimally recorded. Additional attention was paid to 24 unidentified artifacts that were deemed unusual or noteworthy. These unidentified artifacts are described in Table 5.43.

Table 5.43 Unidentified Artifacts

Description	#
Pair of uniquely shaped rocks, possibly manuports. One appears natural, and the other artificially shaped (Figure 5.22)	2
Possible worked stone; too fragmentary to determine form	4
Triangular piece of stone with concave ground area; possible crude palette	1
Rock with protrusion; possible manuport (Figure 5.23)	1
Fragmentary tapered cylinder; possible figurine or paraphernalia fragment (Figure 5.24)	1
Stones with holes that appear to be naturally occurring; possible manuports	3
Possible fragmentary spindle whorls; too fragmentary to definitively identify	2
Red stone with worked edges and an incipient drill hole (Figure 5.25)	1
Possible fragmentary floor polisher with pecked hole in center	1
Small sandstone pebble with line incised around the circumference (Figure 5.26)	1
Sandstone cobble with two long gouges and small striations across surface; possible abrader (Figure 5.27)	1
Fragmentary, non-diagnostic piece of non-local vesicular basalt	1
Cone shaped non-local vesicular basalt; possible bowl foot? (Example, Figure 5.28)	3
Non-local vesicular basalt cylinder with rounded end (Figure 5.29)	1
Non-local vesicular basalt short cylinder; possible plug?	1
Misc. other fragmentary and/or unidentified groundstone	378
Total	402

Figure 5.22 Uniquely shaped rocks

Figure 5.23 Rock with unusual protrusion

Figure 5.24 Fragmentary tapered cylinder

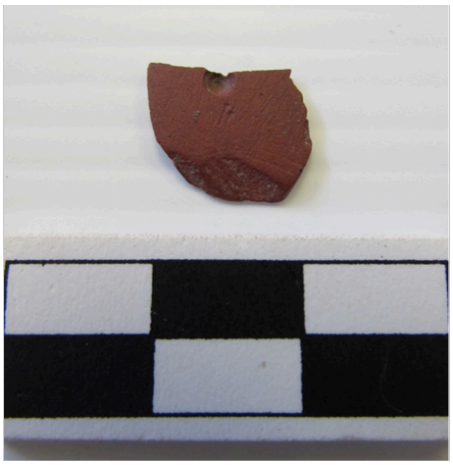

Figure 5.25 Worked stone with drilled hole

Figure 5.26 Stone with incised line

Figure 5.27 Cobble with gouges

Figure 5.28 Shaped vesicular basalt

Figure 5.29 Shaped vesicular basalt

Perhaps most significant is the presence of six pieces of shaped vesicular basalt- a material type that is not locally available in or immediately adjacent to the Huachuca Mountains. Three of these pieces of vesicular basalt are cone shaped, and may possibly have belonged to a footed object such as a metate or vessel. The closest known source of vesicular basalt is located near the Tucson basin; however, it is possible that there are other sources south of the border. Johnson (1963) observed vesicular basalt at the Trincheras La Playa site in Sonora. Vesicular basalt has also been previously noted at Garden Canyon Village by Jon Nathan Young. In his original excavations in the 1960's, Young described 3 volcanic stone cylinders, which he interpreted as phallic symbols (Young 1972). In their 2003 analysis of artifacts from Garden Canyon Village, DAI reanalyzed Young's "phallic symbols." DAI described them as conical pieces of vesicular basalt, two of which have caps (Figure 5.30; Cook 2003a:27). DAI interpreted these artifacts as plugs, and hypothesized that they may have been used to seal ceramic canteens or bottle gourds.

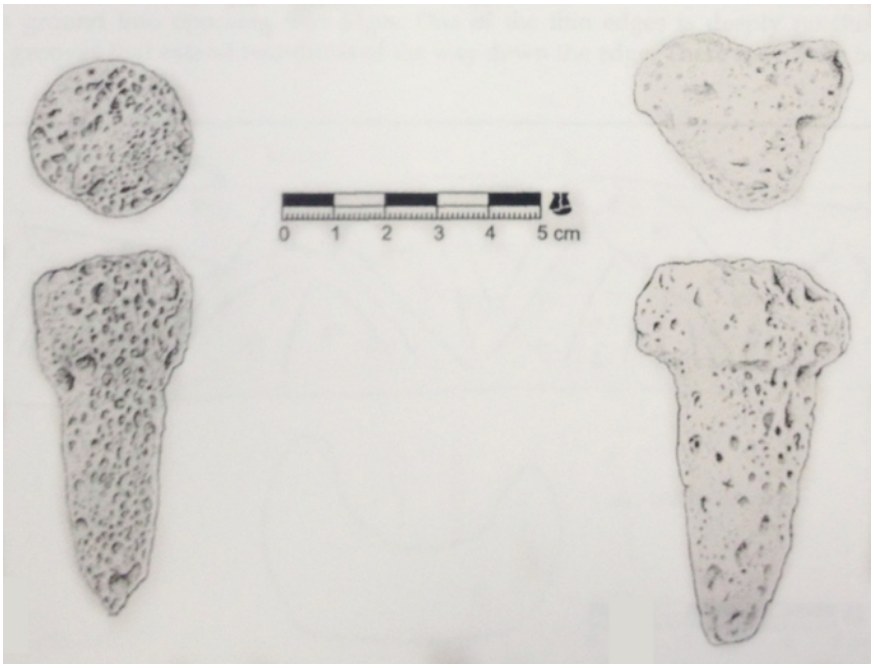

Figure 5.30 Vesicular basalt plugs, illustration from Cook 2003a

Young also uncovered a large footed vesicular basalt metate, which was unfortunately lost in subsequent years (Figure 5.31). Footed metates are most commonly found in Mesoamerica, and the earliest dated context for footed metates is at the Gulf Coast Olmec site of San Lorenzo, Veracruz (Graham 1992). However, the footed metate documented at Garden Canyon Village does not begin to approach the elaborate forms seen in Mesoamerica. While no synthesis of the prehistoric geographic distribution of footed metates has been completed, the presence of one this far north is an anomaly (Jenny Adams, personal communication 2016). Previously, footed metates have been documented at Paquimé and also in Chihuahuan sites south of Casas Grandes (Di Peso et al 1974, VanPool and Leonard 2002).

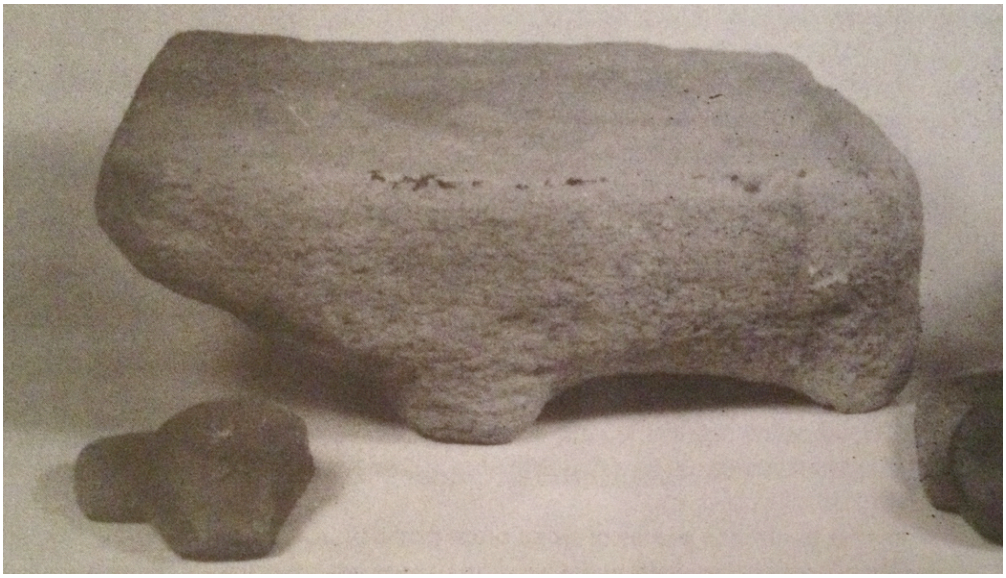

Figure 5.31 A vesicular basalt footed metate from the original 1960's excavation. Photo courtesy of the Fort Huachuca Museum.

Interregional Interaction

Geologic sourcing was a major component of this thesis, as the identification of non-local materials can help establish Garden Canyon Village's position in the larger Southwest. In this section, I will discuss the sourcing results for the Garden Canyon Village obsidian and turquoise,

and interpret these results in terms of interregional interaction. However, first, it is important to consider the nature of trade networks in the Southwest. In his discussion of the Hohokam, Doyel describes six different procurement strategies for conducting long-range commerce: expedition to source, acquisition through middlemen, down-the-line acquisition, interaction at or near source, colonization, and ritual integration or regulation (1991:241). These procurement strategies are useful for interpreting what the distance of each source might mean for how artifacts from that source came to be at Garden Canyon Village. For example, artifacts from nearby sources are more likely to have been acquired via expedition to source. Alternatively, artifacts from far away sources are more likely to have been transported via down-the-line acquisition, as they were passed from person to person across the landscape before reaching their final destination. Furthermore, Doyel predicts that with most types of exchange, the quantity of goods are expected to decrease as the distance to the source increases (1991:242). While definitively proving which of Doyel's procurement strategies were utilized at Garden Canyon Village is beyond the scope of this thesis, they provide a useful framework for thinking about how goods moved across the landscape and came to be in the collection analyzed here.

Obsidian

Sourcing analysis helped identify geologic sources of obsidian at Garden Canyon Village. Four of the obsidian artifacts submitted for testing were determined to be black chert rather than obsidian. The final obsidian assemblage included 1 biface, 2 edge modified flakes, 1 unidentified fragmentary artifact, 13 projectile points, and 6 pieces of debitage. The small quantity of obsidian debitage suggests that the formal obsidian tools may have arrived at Garden Canyon Village in a finished, or nearly finished, form. Twenty-Two percent of the obsidian submitted for

sampling is unprovenienced, and the remainder was split evenly between the E75 and E100 complexes.

EDXRF sourcing analysis revealed that the Garden Canyon Village obsidian came from a diverse range of sources including Mule Creek and Antelope Wells in western New Mexico, Cow Canyon in east central Arizona, the Animas Mountains in southern New Mexico, Los Jagüeyes in Chihuahua, and Selene in Sonora (Figure 5.32). Despite this diversity, the obsidian assemblage is still largely dominated by sources in west central New Mexico and the New Mexico/Chihuahua border (Table 5.44). Overall, these sources range from 145 km away from the Garden Canyon Village site, to over 350 km away. The Animas Mountains Source is the closest known source to Garden Canyon Village, although there may be other sources that have yet to be discovered.

Figure 5.32 Obsidian sources represented in the Garden Canyon Village assemblage

Table 5.44 Obsidian sources represented in the garden Canyon Village assemblage

Source	Approx. Distance from Garden Canyon	Quantity	Percent
Animas Mountains	145 km	4	17.4%
Antelope Wells, New Mexico/Chihuahua	170 km	5	21.7%
Cow Canyon, Arizona	217 km	4	17.4%
Mule Creek, New Mexico	220 km	8	34.8%
Selene, Sonora	265 km	1	4.3%
Los Jagüeyes, Chihuahua	354 km	1	4.3%
	Total	23	100%

The assemblage includes obsidian from diverse sources north of the U.S.-Mexico border. The Mule Creek source area is extremely chemically variable (Shackley 1995). It is the geographically largest obsidian source in the Southwest, and it can be found in Greenlee County, Arizona, Catron and Grants Counties, New Mexico, and the Mogollon Mountains to the east. The Antelope Wells (El Berrendo) source overlaps the border between southwestern New Mexico and Northwestern Chihuahua. Antelope wells obsidian appears in Archaic and Hohokam context in southern Arizona, and was also used by residents of northern Chihuahua, appearing at the Archaic site Cerro Juanequeña near Janos (Shackley 2005). The source is widely distributed throughout the Southwest. The Cow Canyon source is located in eastern Arizona, but Shackley has documented that this source has a secondary depositional extent much greater than anticipated. This source erodes east into the Blue River, south into the San Francisco River, and west into the Gila River (Shackley 1995). Cow Canyon obsidian has also been found at the Murray Springs Clovis site located 10 miles from Garden Canyon Village (Shackley 2005:52) The Animas Mountains source is a recently identified source, and was formerly known as Sonora Unknown A. It is fairly common in sites north of the modern border (Shackley 2015).

Additionally, the assemblage includes two sources in northern Mexico. Los Jagüeyes,

Chihuahua, is located south of Paquimé on a tributary of the Rio Santa Maria. Bipolar core fragments, and 10+ projectile points, many of which are similar to Cienega points and others recovered from Late Archaic/Early Agricultural sites in Chihuahua, Arizona, and New Mexico have been documented in the area around the source (Shackley 2005). Selene, Sonora is another recently identified source in the Sierra El Tigre that has been previously recorded as Sonora Unknown B. The Selene obsidian forms in relatively large nodules and has excellent knapping qualities, which Kibler and his co-authors believe contributed to the trade of Selene obsidian hundreds of kilometers away from its source (Kibler et al 2014:169). Selene obsidian has also been found in southern Arizona along the border near Douglas (Shackley 2005).

In addition to being diverse, the pattern of Garden Canyon Village obsidian acquisition is also unusual. While Doyel (1991) predicts distance decay and Shackley (1995, 2005) confirms such a pattern among Hohokam obsidian, Garden Canyon Village does not appear to follow this same pattern (Figure 5.33). Mule Creek and Cow Canyon obsidian make up 52.2% of the sample, yet these sources are significantly farther away than the closer Animas Mountains and Antelope Wells sources. This may be explained by desirable knapping qualities of Mule Creek and Cow Canyon Obsidian, multi-product trips in which multiple resources were obtained during an expedition, or perhaps some other, unknown, connection that facilitated trade between Garden Canyon Village and the area around the Cow Canyon and Mule Creek sources. Due to the distance to Mule Creek and Cow Canyon sources, it is likely that obsidian from these sources was acquired by acquisition through middlemen or down-the-line acquisition. As might be expected, the furthest sources- Selene and Los Jagüeyes- are also the smallest in quantity. Far away sources represented in small quantities most often result from down-the-line exchange (Renfrew 1975). In his report on the Garden Canyon Village obsidian, Shackley concludes that

"this diverse obsidian provenance assemblage…indicates not only contact and familiarity with the eastern Arizona/western New Mexico region, but points south well into Sonora and Chihuahua" (Shackley 2015:5).

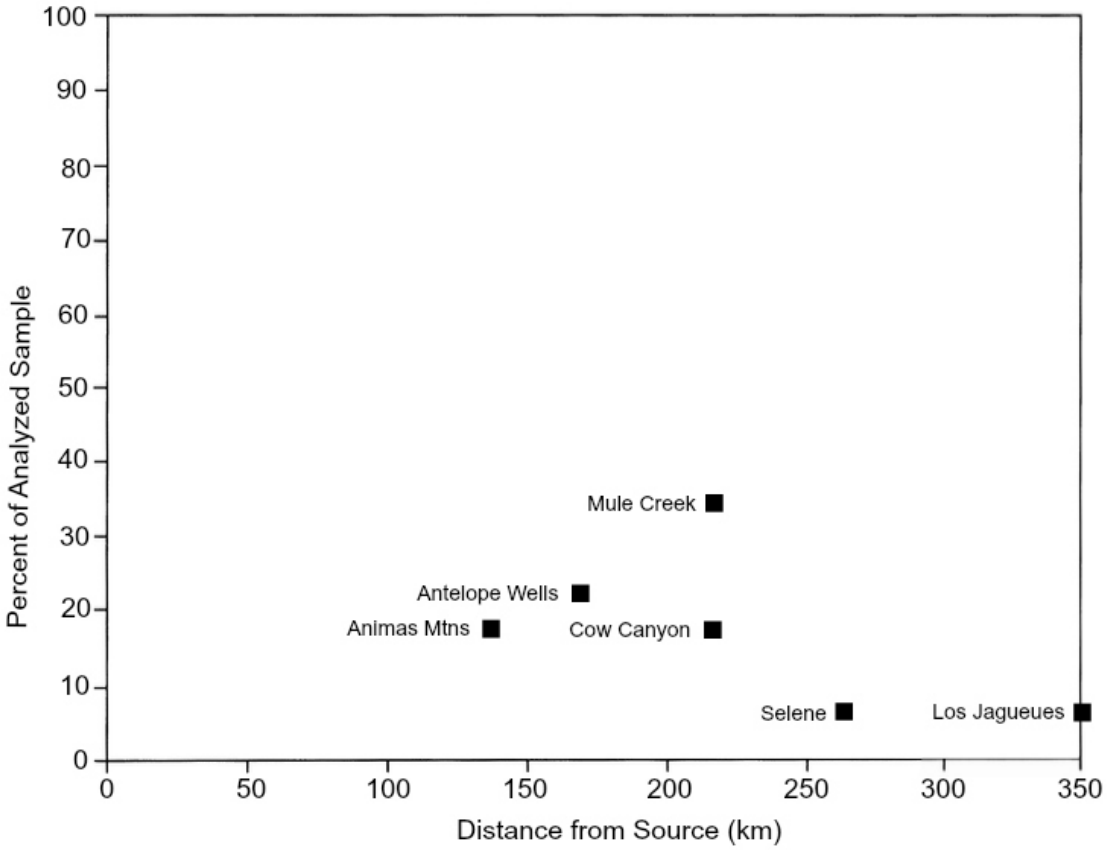

Figure 5.33 Obsidian proportions and distance to source from the Garden Canyon Village site for the analyzed sample.

Turquoise

The overall turquoise assemblage included 14 artifacts- 3 beads, 5 pendants, and 6 tesserae. The turquoise is approximately evenly distributed between the E75 and E100 complexes. Seven artifacts were selected for analysis based on their provenience and condition- this final sample included five tesserae, one bead, and one pendant.

Analysis of the turquoise showed that the Garden Canyon Village turquoise assemblage primarily draws from the closest known prehistorically mined turquoise source: the Courtland/Gleeson mine (Figure 5.34). Located 53.8 km from Garden Canyon Village, this source appears to be consistent with all of the Garden Canyon Village turquoise included in the sample. Returning to Doyel's model of southwestern exchange, this proximity may suggest that Garden Canyon Villagers acquired their turquoise directly, or possibly through other occupants of the San Pedro Valley (1991).

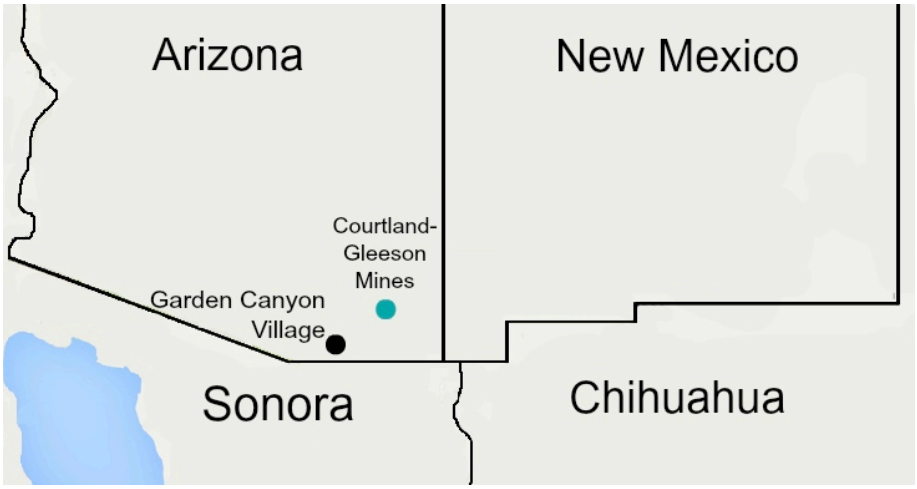

Figure 5.34 Turquoise sources represented in the Garden Canyon Village assemblage

The turquoise results, which suggest a single, close-proximity source, stand in sharp contrast to the obsidian results. However, this pattern appears to be typical for the southwest. Among the 137 pieces of turquoise from 19 sites across the southwest that have been sampled in other analyses undertaken by Dr. Alyson Thibodeau, the majority of sites appear to have exploited the closest and most convenient turquoise source, while the same sites often have obsidian from more distant and variable sources (Alyson Thibodeau, personal communication 2016). Further research is needed to elucidate this apparent pattern.

Discussion

In this chapter, 429 chipped stone tools, 2,337 pieces of debitage, and 709 pieces of ground stone were analyzed, for a total of 3,475 artifacts. Returning to the guiding research questions for this project, what can the lithic assemblage tell us about activities and interregional interaction at Garden Canyon Village?

Several patterns were noted across the entire assemblage. First, raw materials were predominantly local. As Shelley and Altschul describe, "the use of locally available materials is overwhelming in this collection, suggesting that inhabitants of the site had neither the need nor desire to acquire exotic materials…This seems a realistic interpretation given that the materials available locally in the Garden Canyon region are often those sought after and utilized by groups outside this region" (1996:93). The stone assemblage suggests opportunistic use of local materials to produce simple tools. Many were expedient, and tool categories such as hammerstones demonstrated a preference for convenient sources, such the veins of quartz located immediately adjacent to the Garden Canyon Village site. Additionally, the nature of local materials appears to have acted as a constraint on some artifact types. The small size of the locally available chert nodules is likely related to the small size of chert tools in the assemblage.

Second, the materials that were not local came from a wide variety of sources, ranging from the relatively close Courtland-Gleeson turquoise source- only 50 km away- to the much further away Los Jagüeyes obsidian source- located 350 km to the south. The presence of non-local raw materials suggest that Garden Canyon Village was a site of trade and interaction. The diversity of the obsidian sources represented in the collection suggests that Garden Canyon Village may have had trade connections with regions to both the south and the north. Additionally, these non-local materials likely represent a range of procurement strategies that

brought goods to Garden Canyon Village (Doyel 1991). While it is impossible to definitively prove any of Doyel's strategies without additional evidence, they can still help us think about how goods moved across the Southwest. It is likely that the closer sources, such as the Courtland-Gleeson turquoise mine, were exploited through direct expedition to the source or interaction at or near the source. Residents of Garden Canyon Village may have traveled the 50 km distance to the Courtland-Gleeson area to collect turquoise themselves, or they may have interacted with other residents of the San Pedro Valley who had more direct access to the turquoise source. For the more distant obsidian sources, it is likely that obsidian was acquired through middlemen or down-the-line acquisition as traders or travelers carried goods into the Middle San Pedro Valley. Projectile points provided further insight into interregional interaction. The projectile points in the assemblage suggest connections to Hohokam, Mimbres, Casas Grandes, and Eastern Arizona styles. However, many of the styles documented at Garden Canyon Village are extremely widespread across the southern Southwest and northern Mexico, and are therefore difficult to assign to specific cultural traditions (Margaret Nelson, personal communication 2015). The implications of these diverse non-local materials and styles will be discussed in Chapter 6.

The lithic assemblage represents a variety of activities. The debitage and cores informed on reduction activities at Garden Canyon Village. It appears that raw material was easily available, as only a small proportion of the cores were exhausted. Additionally, the raw materials observed in the core and debitage assemblages are largely consistent with one another, suggesting that most reduction took place on site. However, several important discrepencies were also observed. While obsidian is an important material for formal tools at Garden Canyon Village, very little obsidian is present in the core and debitage assemblage. Similarly, chert

makes up a large proportion of the tool assemblage but only a small proportion of the debitage. It is possible that some lithic reduction activities may have taken place off-site. Alternatively, goods such as obsidian projectile points may have been brought to the site from elsewhere, possibly as trade goods. Representing over 70% of the entire sample, it is clear that lithic reduction was a major activity at Garden Canyon Village.

The assemblage of informal tools were likely related to a variety of activities including the processing of plants and animals, hideworking, and woodworking. Furthermore, paraphernalia, palettes, and figurines suggest ritual activities. The projectile point assemblage alludes to hunting and warfare activities, but not exclusively. Some unusual point types were determined to be too small, too delicate, or otherwise impractical as instruments of warfare or hunting. It is likely that these points were ritual objects, or had some other function. The ground stone assemblage also implies a variety of activities, including maize agriculture and the exploitation of other wild resources that grew in and around Garden Canyon. Trough manos and metates were the most common style of grinding implement. Trough metates are considered to be highly efficient and are often associated with agricultural intensification. While early populations that were not completely reliant on maize agricultural used basin shaped metates, trough metates emerged as maize was incorporated as a dietary staple (Shafer 2003:199). The tabular tools in the sample have been associated with the processing of agave and other vegetal materials. Additionally, the mortars and pestles, in combination with the numerous bedrock mortars in the hills surrounding the site, may have been used for processing various wild plant foods. Most of the ground stone objects were classified as moderately used. It is likely that tools were used long enough to maximize their uselife, but due to the easy availability of local materials they could be replaced whenever necessary. However, metates deviated from this

pattern, and the majority of them were scored as heavily used. This may indicate a high intensity of grinding activity, reflect the amount of effort needed to produce a metate, or be the result of scavenging of metates by later people in the area. Additionally, since metates required larger pieces of stone, they may have been more difficult to replace than smaller artifacts like manos.

Other activities represented by artifacts in the assemblage include the manufacture of pottery and ornaments. Polishing stones and abraders were likely used on pottery, wood, bone, and other materials. The large assortment of beads made from primarily local materials, as well as the presence of drills, abraders, and a lapstone suggest that craftspeople resided at Garden Canyon Village. The analysis made it possible to identify a concentration of beads and drills in the corner of House 1 in the E75 complex. Unfortunately, due to the provenience issues, it is difficult to determine whether this was a floor or fill assemblage. However, it is possible that this concentration represents either a craftsperson's workshop, or debris from a nearby craft manufacturing area.

This chapter has provided an overview of the artifact types present in the Garden Canyon Village lithic assemblage, the lithic procurement strategies the raw material types imply, and the activities represented by various tools and objects. In the next chapter, I will explore how we can use these, and other, artifact types to explore cultural affiliation and interaction at Garden Canyon Village.

CHAPTER 6

Affiliation and Interaction in the Land Between

Throughout the history of investigations at Garden Canyon Village, it has been debated whether this frontier site represents Hohokam people with Mogollon influence, Mogollon people with Hohokam influence, an emergent local tradition, or some other combination. Ultimately, the question of affiliation and interaction can be broken down into the following questions: was the site occupied sequentially by different cultural groups? Or, alternatively, were various cultures occupying the site contemporaneously? Was Garden Canyon Village occupied by settlers from elsewhere, or was it home to a local culture that was distinct from its better known neighbors? While some of these questions are difficult to answer without absolute dates from temporally unmixed deposits, an overview of material culture excavated at Garden Canyon Village can begin to shed light on cultural affiliation. This chapter will largely represent a departure from the previous chapter since, in general, other artifact categories- particularly ceramics- are far more useful for addressing questions of cultural affiliation and influence than ground and chipped stone. This chapter will paint a more complete picture of the regional context that the activities evidenced by the lithic assemblage described in Chapter 5 took place within.

In this chapter, I will discuss prior analyses of Garden Canyon Village, and argue that Garden Canyon Village's affiliation shifted over time. Before A.D. 1200, I believe that Garden Canyon Village was primarily influenced by styles and ideas from the Hohokam and Mogollon areas. After A.D. 1200, the attentions of Garden Canyon Village and the middle San Pedro Valley appear to have shifted southward into Chihuahua and Sonora. I will also argue that the evidence suggests Garden Canyon Village was never strongly incorporated into any of the

neighboring regional systems such as the Hohokam ball court system or the Paquimé sphere. I believe that the persistent local traditions visible in the archaeological record at Garden Canyon Village illustrate that these prehistoric peoples exercised agency along a frontier (Stein 2002). Garden Canyon Village was no peripheral settlement controlled by a dominant core; it was a frontier settlement populated by agents who selectively borrowed styles and ideas from their neighbors, but also maintained their own traditions and identities.

First, I will provide an overview of how the problem of Garden Canyon Village's affiliation has been understood over the years by the other scholars who have studied Garden Canyon and the middle San Pedro. Then, I will discuss the evidence for and against connections between Garden Canyon Village and the various surrounding cultures. In order to do so, I will draw on previous analyses of Garden Canyon Village artifacts, as well as my own analysis presented in Chapter 5. Finally, I will incorporate frontier theory and apply it to Garden Canyon Village. Using what I have learned in my analysis, I will reformulate several concepts from frontier theory using Garden Canyon Village as a case study, and reflect on how archaeological sites such as this one can contribute to the development of frontier theory.

A History of Thought

Young's early work at Garden Canyon Village was primarily descriptive, and he did not venture to explain the cultural affiliation of the site. However, he did note the diversity of materials at the site. A quote from a 1964 newspaper article about his excavations describes his observations:

> "ordinarily archaeologists would assume that such a hodge-podge indicated that the place was the home, at different times, of different peoples. Young wonders, because the same

sorts of potsherds appear in…radically different dwellings, if two or more groups may have lived here concurrently- side by side" (1972:3).

In the decades after Young's excavations, it was generally assumed that Garden Canyon Village was a Hohokam or Mogollon site, due largely to its location. However, in the 1990's, SRI and Jeffrey Altschul undertook a series of projects at Fort Huachuca and in Garden Canyon and began to further clarify the cultural affiliation of the middle San Pedro. In their 1990 settlement pattern survey, which included portions of Garden Canyon, Altschul and Jones observed the following:

> "One of the most striking aspects of ceramic assemblages collected during the Fort Huachuca sample survey was its local character. Prior to the survey, it was assumed that most of the decorated pottery found would be Hohokam or Mogollon in nature. Previous reports discuss ceramic assemblages from sites in the region solely in terms of Hohokam or Mogollon affiliation. In the field, however, it was clear that ceramics of the local San Simon and San Pedro series were the dominant ceramic wares (225)."

In 1996, SRI undertook an analysis of materials recovered during the 1964 and 1991-1992 Garden Canyon Village excavations (Shelley and Altschul 1996). Based primarily on ceramics, SRI concluded that Garden Canyon Village was culturally Mogollon before A.D. 1000, after which they were increasingly influenced by the Tucson Basin Hohokam. SRI argues that by the late formative period, Garden Canyon Village had shifted toward local and Chihuahuan styles (1996:58).

In the 1996 volume and others, Jeffrey Altschul made several compelling arguments about the affiliation of Garden Canyon Village and the middle San Pedro. Altschul argued that the San Pedro Valley was abandoned by the Hohokam around A.D. 1200; at that time, cultural

affiliation shifted from the north to the south (1993). After this shift to the south, Altschul and Jones (1990) argued that Garden Canyon Village may have become part of a hierarchy of sites that ultimately answered to Paquimé. They believe that during the Late Formative, the Middle San Pedro Valley was dominated by a large village at the mouth of Ramsey Canyon, located to the south of Garden Canyon (1990:333). Their model of Casas Grandes' influence holds that Paquimé exerted power through local centers; in the middle San Pedro Valley, the Ramsey Canyon site may have been the local node that connected outlying hamlets such as Babocomari Village and Garden Canyon Village to Paquimé (1990:236). Wilcox agrees, describing Babocomari Village and other sites as part of a local settlement system that was, in turn, part of a regional system centered around Paquimé (1995:283). Unfortunately, only limited excavations were been performed at the Ramsey Canyon site before it was developed as a subdivision. The artifacts were never analyzed and no report was completed. More recently, Altschul's position has shifted somewhat. He no longer views the Late Formative communities of the middle San Pedro as directly aligned with Paquimé; instead, he argues that they took on the trappings of Chihuahuan culture as a response to broader cultural changes and population shifts in the southwest (Shelley and Altschul 1996:13).

In their 2009 Garden Canyon synthesis, SWCA undertook the most in-depth artifact analysis done to date. SWCA concluded that Garden Canyon Village's cultural affiliation was complex, and shifted through time. During the Middle Formative Period, SWCA believes that southeastern Arizona was influenced by the Hohokam and Mogollon, but it is "uncertain whether these influences represent exchange of material goods and information, migration and co-residence, or diffuse 'mixing' of cultures" (Whittlesey et al 2009b:214). Despite this outside influence, SWCA believes that the Middle Formative occupation was still largely an expression

of a unique local cultural tradition that may have developed in place during the Preceramic and Early Formative periods (2009b:215). By the Late Formative period, major changes and demographic shifts rippled through the southwest. SWCA posits that during this time Garden Canyon Village continued to have strong ties to groups in northern Chihuahua, western New Mexico, and southern Arizona, all while cultivating a unique expression of the local Babocomari culture (2009b:216-217). Whittlesey and others argue that the Babocomari culture is restricted to the middle San Pedro River valley, and is characterized by puddled-adobe construction, compound walls, storage granaries, a mixed subsistence system emphasizing cultivated plants and big-game hunting, cremation burials, and distinctive Babocomari tradition ceramics (2009b:217).

Garden Canyon Village in the Greater Southwest: A Reassessment

It is clear that the people of Garden Canyon Village negotiated their lives in a frontier where their identity, relationships, and beliefs were in a state of flux. But how do the dynamics of a frontier manifest themselves materially? In this section, I will provide my own interpretation of Garden Canyon Village's affiliation and interaction, using the results from previous projects as well as my own ground and chipped stone analysis. I will discuss each of the surrounding culture areas, and present the evidence both for and against connections with Garden Canyon Village. However, it should be noted that some of these areas are much better researched than others. For example, a lack of evidence connecting northern Mexico and Garden Canyon Village may say more about the scarcity of archaeological investigations in northern Mexico than it does about actual prehistoric interaction. The following sections are arranged based on strength of evidence. I will begin with the Trincheras, Salado, and Rio Sonora culture areas, for

which there is very little evidence of interaction. Next, I will discuss the evidence of a Mogollon connection, which appears to have been a significant force at Garden Canyon Village in the early years of its occupation. Then, I will discuss the Hohokam and Casas Grandes evidence, which is relatively strong, and culminate with the evidence for a persistent local tradition.

Trincheras

Evidence of a Trincheras/Garden Canyon Village connection is extremely limited. Fifteen Trincheras sherds were noted by SWCA in their ceramic analysis (Whittlesey et al 2009b). Similarly, Young recorded Trincheras purple-on-red sherds in his original excavation (1972).

Salado

Evidence for Salado influence at Garden Canyon Village is also relatively weak. It appears that Garden Canyon Village/Salado connections may have been limited by an apparent cultural boundary near Benson, as Salado sites in the San Pedro Valley do not seem to occur further south than this point (Altschul et al 1993:2-16). After A.D. 1200, sites north of Benson are dominated by Salado ceramics, while sites south of Benson are predominantly defined by Chihuahuan-inspired Babocomari ceramics (Altschul et al 1993).

However, there is some limited evidence for a possible Salado influence. Features noted by the earliest recorders of the site were compared to Salado style compounds (Whittlesey et. al. 2009a:4). Additionally, Young noted Gila Polychrome- a Salado style- in his original excavations (1972). A very small quantity of Gila plain ceramics were noted in SWCAs analysis (Whittlesey et al 2009b).

Rio Sonora

Evidence for a Rio Sonora connection is limited. The Rio Sonora is perhaps the least known cultural area discussed in this thesis, but also one of the closest in terms of geographic proximity. Significantly, the Rio Sonora cultural area is located directly south of Garden Canyon Village. As Pailes observes, "the Rio Sonora culture distribution happens to encompass all the best routes of travel between Mesoamerica and the Southwest on the west side of the sierras" (1978:134). The northern boundary of the Rio Sonora area is believed to be Cananea, Mexico- a mere 50 km south of Garden Canyon Village (Pailes 1984). It is possible that, with additional research, a better refined boundary, and an improved cultural definition, that the Rio Sonora culture area could be extended to include the Huachuca Mountains and Garden Canyon Village.

Garden Canyon Village and the Rio Sonora area have several artifact types in common. Both appear to have a preference for stone spindle whorls, as documented in the artifact analysis above. Additionally, the presence of corrugated and textured wares in the Garden Canyon Village assemblage may be significant because of the prevalence of surface textured pottery in the Rio Sonora area to the south (Pailes 1980). However, there is also significant use of corrugated pottery types to the north in the Ancestral Pueblo area. Trincheras and Chihuahuan ceramic varieties also span both Garden Canyon Village and the Rio Sonora area.

Mogollon

Evidence for a Garden Canyon Village/Mogollon connection is limited, but stronger than the evidence for Trincheras, Salado, or Rio Sonora connections. In their ceramic analysis, SWCA identified a number of Mogollon brown ware or San Simon tradition ceramics. In their analysis, Shelley and Altschul also observed San Simon Mogollon style sherds produced on local

clay. During the early Pre-Classic Period (A.D. 600 – A.D. 1100), most of the ceramics appear to have been San Simon Mogollon style (Shelley and Altschul 1996). Shelley and Altschul argue that Garden Canyon Village interacted with the San Simon Mogollon for most of the pre-classic period, and it may have represented a node in the San Simon system (1996:62). Additionally, the obsidian procurement pattern observed at Garden Canyon Village appears to share some similarities to that of the Mimbres area. In an analysis of 923 obsidian samples from 80 Mimbres sites, the major obsidian sources that were identified include Cow Canyon, Mule Creek, Antelope Wells and Los Jagueyes- all important sources at Garden Canyon Village (Taliaferro et al 2010).

While several projectile points in the assemblage are similar to Mimbres styles, Mimbres black-on-white pottery is conspicuously absent from the assemblage. Additionally, the Garden Canyon Village burials provide ambivalent evidence of affiliation. While the majority of the burials were cremations, Young also excavated a number of interments. This combination is suggestive, as Mogollon burials are primarily interred (Shafer 2003, Anyon and LeBlanc 1984), while cremation was the dominant Hohokam method before A.D. 1200 (Di Peso 1951, Haury 1976).

Hohokam

Overall, there is strong evidence for connections between Garden Canyon Village and the Hohokam. However, it appears that, despite the presence of material connections, Garden Canyon Village was not incorporated into the Pre-Classic Hohokam regional system defined by ball courts. Heckman and others hypothesize that there may have been a cultural barrier at Benson, and that the middle and upper San Pedro were on the boundary of the Hohokam system

but not incorporated into it (Whittlesey and Heckman 2000:9). There are no known Hohokam ball courts south of Benson. Additionally, in the middle Formative, Hohokam ceramics are more commonly found in the lower San Pedro Valley than in the Middle or Upper San Pedro Valley. Vanderpot and Altschul concluded that the San Pedro Valley was incorporated into the Hohokam system in its lower reaches, but the connection weakens further upstream (2007:62). While Young believed that he saw a ballcourt during his original excavations, the existence of this feature is questionable. When SWCA visited the site in preparation for their 2009 report, no ball court was visible (Whittlesey et. al. 2009a:4). Additionally, in my own survey work in Garden Canyon, no features that could be interpreted as a ball court have been observed. However, the possibility should not be eliminated. As observed by Steve Lekson, while we may think of ball courts as monumental structures, "many (most?) Hohokam ball courts are far smaller, much less well preserved and, in fact, rather subtle features" (2006:ix).

While Garden Canyon Village does not appear to have been part of the Hohokam system, the artifact assemblage suggests connections of some other kind. Two projectile points observed in the present analysis were typical of Hohokam Sedentary Period (A.D. 950 – A.D. 1150) projectile points. Additionally, a ceramic figurine originally excavated by Young has a "typical Snaketown-style head with incised facial features," breasts, arm stubs, and rounded legs (Cook 2003a:23). The ceramic figurine assemblage from the Hohokam Hodges Ruin site in the Tucson Basin (Figure 6.1) shares many similarities with Garden Canyon Village ceramic figurines (Figure 6.2), including wing-like nubbins for arms, prominent noses, and incised facial features (Kelly 1978). In their analysis of 30 modeled clay figurines, SWCA concluded that these figurines represent three styles. The first is a Preceramic style possibly associated with an Archaic occupation of Garden Canyon. The second is a Hohokam style similar to that found in

the Tucson basin. The third is an unknown style (2009b:176).

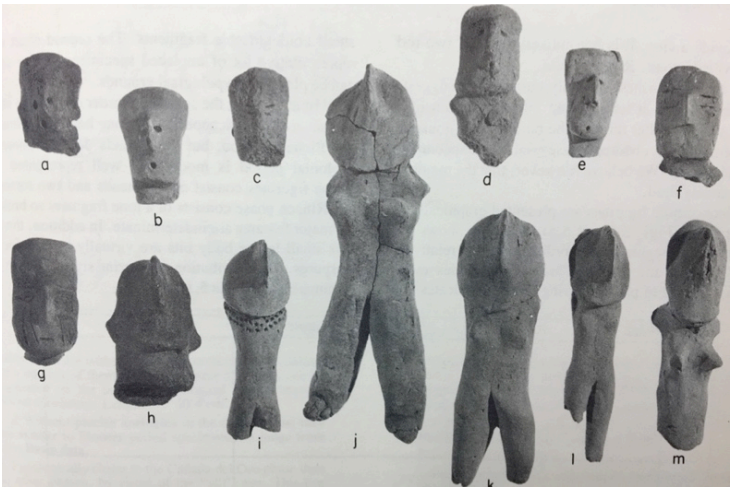

Figure 6.1 Hohokam figurines from the Hodges Ruin site in the Tucson Basin (Image from Kelly 1978)

Figure 6.2 Ceramic figurines from Garden Canyon Village (Images from Whittlesey et al 2009b)

Other evidence for connections between Garden Canyon Village and the Hohokam area includes the large shell assemblage. In SWCA's analysis of the shell assemblage, they identified beads, pendants, bracelets, ring-beads/ring-pendants, gaming pieces, and mortuary shell (2009b). Barrel-shaped beads reflect Classic period Hohokam assemblages. The most common genus was determined to be *Glycymeris*. In the Garden Canyon assemblage, *Glycymeris* seems to have been predominantly used to make small beads and ring-pendants (2009b:178). SRI made similar

observations during their 1996 study: over half of the assemblage was *Glycymeris* (Shelley and Altschul 1993:130). Shelley and Altschul noted that shell bracelets made up 72.4% of the finished artifacts. In Hohokam communities, shell bracelets typically represent between 70-80% of pre-classic assemblages (1996:139).

Shell was a social valuable with highly varied meaning among the Hohokam, and the presence of shell in the Garden Canyon assemblage has important implications for their relationship with the Hohokam. Shell bracelets, particularly those made from *Glycymeris*, are theorized to have been a badge of Hohokam identity, and there was a major *Glycymeris* shell industry among the Hohokam (Bayman 2002:80). Shell beads and pendants with animal motifs such as the bird and possible buffalo recorded by Young are also common among the Hohokam, and may have signified participation or membership in specific religious cults, or perhaps descent groups (Bayman 2002:83). Animal motifs also appeared in the stone assemblage, and my analysis in Chapter 5 included stone artifacts with both bird and other animal motifs. Additionally, in his original excavation, Young documented a quartzite stone bowl with a carved linear banded design of triangles and diagonal rectangles filled with dots (Cook 2003a:28). Similar stone bowls with geometric designs have been documented at Hohokam sites (Haury 1977).

While the evidence for a Hohokam/Garden Canyon Village connection is compelling, there is also evidence that the strength of this connection was limited. Despite the presence of Hohokam style ceramic figurines, the proportion of Hohokam pottery is extremely small. In SWCAs ceramic analysis of Garden Canyon Village, less than 1% of the ceramics were Hohokam. Additionally, in their documentation of rock art in Garden Canyon, Altschul noted that several Hohokam elements, such as a hunchback and a horned toad, were noted; however,

they differed stylistically from traditional Hohokam representations (Altschul et al 1993:1-27). Similarly, the presence of two stone palette fragments in the present analysis, as well as the discovery of other possible palette fragments in the area during various surveys, is compelling but not convincing. The sample of palette fragments observed is small and did not exhibit any of the major hallmarks of Hohokam palettes. Palettes have also been observed in the Mogollon area, so the presence of palette fragments at Garden Canyon Village may be the result of a broad regional trend rather than any specific connection with the Hohokam. Mortuary practices at Garden Canyon Village also provide ambivalent evidence of a Hohokam connection. The majority of Garden Canyon Village burials are cremations, and cremation was the dominant Hohokam burial method before A.D. 1200 (Di Peso, Haury 1976). However, Young also documented interments which, while generally more common in the Mogollon area, became more prevalent in the Hohokam area during the Classic Period (A.D. 1150- A.D. 1450).

Additionally, the geologic sourcing results suggest that Garden Canyon Village and peoples in the Hohokam areas seem to have participated in different trade networks, at least in terms of raw lithic material procurement. In an early study, Sigleo determined that the majority of the turquoise at the Hohokam Snaketown site came from Halloran Springs, California (1975). In contrast, most, if not all, of the Garden Canyon Turquoise was from the closest available source- the Courtland-Gleeson turquoise mine, located approximately 54 km northeast of Garden Canyon Village.

Even more compelling differences can be seen when Hohokam and Garden Canyon Village obsidian are compared. Garden Canyon Villagers exploited a different assortment of sources than the Hohokam did. Shackley analyzed 299 obsidian projectile points from Snaketown and determined that 60% came from the Superior source (75 km east of the Phoenix

basin) and 20% came from the Sauceda Mountains (100 km southwest of the Phoenix Basin). Additionally, there were small quantities from the Vulture, Sand Tanks, Government Mountain, Sitgreaves, Cow Canyon, and Mule Creek sources. Notably, while Cow Canyon and Mule Creek represent significant sources at Garden Canyon Village (17% and 35%, respectively), they each provided less than 2% of the Snaketown obsidian (Shackley 2005:154). The favored sources for the Hohokam- Superior and Sauceda Mountains- were also the closest, while Cow Canyon and Mule Creek were the furthest away. Shackley has found a similar patterns of obsidian procurement at the Grewe site (2005), Pueblo Grande (Shackley 1995:547), and the Gatlin Site: in all these cases, the closest source dominated the assemblage (Shackley 2005:162). It is clear that the dominant Hohokam pattern of raw material procurement was one of proximity, and the majority of obsidian at each site was usually obtained from the closest source (Mitchell and Shackley 1995). Sauceda Mountain obsidian is the most common glass found in Classic Hohokam contexts in both the Phoenix and Tucson Basins, and is the closest source to both of those areas (Shackley 1995:547). While the Hohokam obsidian appears to strongly follow the pattern of distance decay proposed by Doyel (1991), Garden Canyon Village deviates from this pattern- as discussed above in Chapter 5.

Overall, it appears that the Hohokam not only exploited a different range of obsidian sources than Garden Canyon Village did, but also exhibited a different procurement pattern. While there is overlap at the Cow Canyon, Mule Creek, and Antelope Wells sources, these appear to be major sources at Garden Canyon Village and minor ones for the Hohokam (Figure 6.3; Peterson et al 1997, Shackley 1995).

Figure 6.3 Obsidian sources exploited by the Hohokam (blue) and Garden Canyon Village (red)

Casas Grandes

The strength of the connection between Casas Grandes and Garden Canyon Village depends largely on how Babocomari style ceramics are interpreted. Some have described Babocomari pottery as a development local to the middle San Pedro River Valley (Whittlesey et al 2009b:78), while others interpret Babocomari ceramics as being heavily influenced by, or even direct copies of, Chihuahuan ceramic styles (Di Peso 1951:233; Altschul and Jones 1990). Wilcox has argued that Paquimé's secondary zone of influence- extending as much as 300 km from Paquimé- contains sites whose predominant painted pottery consists of Chihuahuan polychromes or copies of them, such as Babocomari Polychrome (1991:148). Given that Garden Canyon Village is less than 250 km from Paquimé and contains large quantities of Babocomari Polychrome ceramics, Garden Canyon Village certainly fits Wilcox's criteria for being within the Casas Grandes Sphere of interaction. Significantly, Babocomari Polychrome and Dragoon

red-on-brown- both types with deep connections to the middle San Pedro- have been found at Casas Grandes culture sites in northern Chihuahua (Phillips 2008). While it is beyond the scope of this thesis to prove that these sherds originated at Garden Canyon Village or perhaps Babocomari Village, a reciprocal flow of goods would be strong evidence for a Middle San Pedro/Casas Grandes connection.

Several other artifact types suggest a relationship between the Middle San Pedro and the Casas Grandes sphere of interaction. The shell assemblage includes small *Nassarius* shells used for whole-shell beads; these shells "are thought to reflect the influence of the Casas Grandes exchange system, where these shells were recovered in vast quantities (Whittlesey et al. 2009b:199). Rectanguloid, lenticular, and dentate-shaped beads also reflect possible influences from Casas Grandes (Whittlesey et. al. 2009b:199) Additionally, shell artifacts Di Peso dubbed "spangles" and interpreted as items of personal adornment appear at Garden Canyon Village, Casas Grandes, and rarely elsewhere (Whittlesey et. al. 2009b:199).

The rasp excavated by Young is also notable. In their analysis of Young's rasp, DAI described it as being made from a thin piece of phyllite with a handle and notches (Cook 2003a:31). Based on use wear, DAI hypothesized that a stick or bone might have been rubbed along the rasp, creating a rhythmic sound, possibly important in ritual. There are no close phyllite sources, and this material would have either required a walk of more than a day or trade to procure (Cook 2003a:31; Figure 6.4). Rasps are most often made from wood or bone, so this stone rasp is unusual; however, similar stone rasps have been documented at Casas Grandes (Cook 2003a:32). In the sample analyzed in Chapter 5, two possible rasp fragments were identified, suggesting that there may have been even more stone rasps at Garden Canyon Village.

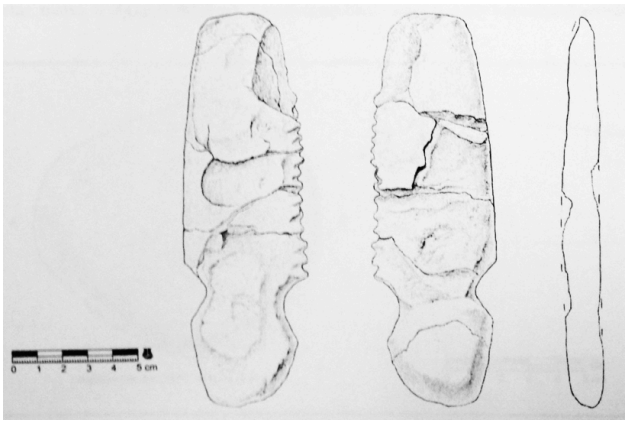

Figure 6.4 Phyllite rasp, illustration from Cook 2003a

The obsidian projectile point in my assemblage from Los Jagüeyes- a source located south of Paquimé- further suggests a northern Chihuahuan connection. Additionally, the pattern of obsidian procurement observed at Garden Canyon Village shares several common sources with obsidian from Medio Period sites in northern Chihuahua. In an analysis of 116 obsidian artifacts from the Casas Grandes region, Dolan (2015) found obsidian from Mule Creek, Antelope Wells, Selene, Los Jagüeyes, and several other sources.

Additionally, while not definitively connected to Casas Grandes, the presence of a vesicular basalt footed metate at Garden Canyon Village is compelling. Both vesicular basalt and footed metates are not local to the middle San Pedro. Footed metates are generally considered a Mesoamerican style. Previously, footed metates have been documented at Paquimé and also in Chihuahuan sites south of Casas Grandes (Di Peso et al 1974). Vesicular basalt is also a common material type for metates in northern Chihuahua (VanPool and Leonard 2002). Shelley and Altschul concluded that "the footed metate indicates contacts with the Casas Grandes culture in northern Chihuahua, but whether or not it is a locally produced copy of a Casas Grandes style or an imported item cannot be determined" (1996:93). Additionally, the presence of fragmentary conical and cylindrical pieces of vesicular basalt- analyzed in Chapter 5- suggests that other

vesicular basalt artifacts may have been present at Garden Canyon Village. These conical pieces may have been metate or vessel feet.

Local Traditions

There is strong evidence for persistent local traditions at Garden Canyon Village, as well as continuity over the long span of occupation. Many of these local traditions are shared with Babocomari Village, suggesting that they may have been part of a shared cultural tradition local to the Huachuca Mountain area.

Architecturally, both the Garden Canyon Village surface structures and the pit structures that preceded them are of similar size, shape, and construction, with two large central posts and three rows of smaller posts running the length of the house. These similarities suggest that there may have been continuity in occupation at the site between the earlier pit house dwelling peoples and the later builders of adobe surface structures (Shelley 2005:5). Additionally, SWCA interpreted the aboveground rooms that appear to be the primary architectural form of the Late Formative Period as circular compounds. If this is correct, this circular compound enclosure pattern is unusual; in the broader southwest, compounds are typically rectangular. However, Babocomari Village also shares a circular plan. As Shelley and Altschul note, "this style of construction appears to be unique to the middle San Pedro; elsewhere in the Southwest at this time compounds tend to be rectangular to trapezoidal" (1996:4). Additionally, Young (1972) described a circular surface structure similar to features found at Babocomari Village that Di Peso called "round houses' or 'women's houses" (1951).

The ceramic assemblage also indicates important local traditions. A "shoe pot" recorded by DAI (Cook 2003a) is similar to varieties found in other southeastern Arizona sites, including

Babocomari Village (Di Peso 1951:117). The prevalence of red-on-brown pottery is another testament to the importance of local traditions. While Dragoon designs exhibit Mogollon and Hohokam influence, the pottery type is characteristic of the San Pedro River Valley (Cook 2003a:18). This distinctive, locally made pottery was made between A.D. 700 and 1100, and it is found at numerous sites in the middle San Pedro (Vanderpot and Altschul 2007). Additionally, there are a large quantity of Babocomari ceramics in the assemblage. As discussed above, Babocomari ceramics may be either local to the middle San Pedro, or related to Casas Grandes ceramics. Regardless, the large quantity of Babocomari ceramics at both Garden Canyon Village and Babocomari Village indicates that it was locally important. Additionally, the assemblage of ceramic figurines also indicates a local style. While SWCA concluded that portions of the figurine assemblage were Hohokam or Archaic in style, they also identified a third style. While this style is unknown, they speculate that it may be representative of a tradition unique to Garden Canyon Village (Whittlesey 2009b:176).

During his 1964 excavations, Young documented two deer scapula rasps- one complete and one fragmentary (1972:17). The complete rasp has over 3 dozen notches cut along the length of the scapula to create a rhythmic sound when a stick or bone is rubbed along the notches (Young 1972:17). Similar scapula rasps have been reported at the Babocomari Village site (Cook 2003a:33). While the Garden Canyon worked bone resembles many Hohokam assemblages, the presence of bone rasps may indicate a specialized ritual or rite (2009b:36-37). SWCA hypothesizes that the rhythmic sound produced by these raps may have been part of "regionally important rituals associated with large game…or a local phenomenon (Whittlesey et al 2009b:37).

Discussion

It is clear that the material culture of Garden Canyon Village is diverse and indicates a variety of connections. Garden Canyon Village has been described as "both Hohokam and Mogollon and neither" and the village residents likely incorporated elements from each culture, while also cultivating their own local innovations (Whittlesey et. al. 2009b:215). Additionally, it appears that their regional affiliation changed through time, tracing the rise and fall of the surrounding culture areas through time. While provenience issues and the lack of secure dating of the various components of the site limit our ability to trace cultural affiliation over time, some transitions can be inferred. It appears that before A.D. 1200, Garden Canyon Village and the Middle San Pedro were primarily influenced by the San Simon Mogollon and Hohokam. San Simon series ceramics dominated assemblages during this time period, and certain Hohokam artifact types such as ceramic figurines and *Glycymeris* shell bracelets were present at Garden Canyon Village. After A.D. 1200, the middle San Pedro Valley appears to shift its attentions south as Paquimé emerges and exerts influence throughout the Casas Grandes sphere (Altschul et al 1993). It is around this time that Chihuahua-influenced Babocomari ceramics become a major production focus of Garden Canyon Village.

While Garden Canyon Village was clearly influenced by and possibly affiliated with neighboring regions throughout time, the strength of its local traditions should not be underestimated. Architectural continuity and the importance of locally made ceramics, including Dragoon and Babocomari styles, are evidence of strong local traditions. Additionally, the appearance of some styles and traits from surrounding cultural areas and not others is evidence that the residents of Garden Canyon Village were selectively incorporating outside elements into their local canon. Data from my analysis, as well as previous work at the site, suggests limited to

no evidence that the local middle San Pedro system was tightly integrated into a larger regional system, such as the Hohokam ballcourt system or the Casas Grandes sphere. Therefore, the appearance of Hohokam or Casas Grandes traits at Garden Canyon Village likely signifies influence or inspiration rather than domination or colonialism. In addition to importing styles and traits, non-local raw lithic materials also appear in the Garden Canyon Village assemblage. Sourcing analyses performed as part of this thesis revealed that non-local lithic materials come from sources as close as the Courtland-Gleeson turquoise mine, located 50 km away, and as far as Los Jagüeyes, Chihuahua, located 350 km to the south. This wide range of sources suggests that a variety of procurement strategies were likely used (Doyel 1991). While closer sources might have been exploited by direct expedition to source or interaction at the source, longer-range commerce may taken place through middlemen or down-the-line acquisition (Doyel 1991). While Doyel also presents colonization and ritual integration as possible procurement strategies, there is no evidence for these at Garden Canyon Village (1991:241). It is possible that the same interactions that brought non-local turquoise and obsidian to Garden Canyon Village also transmitted ideas and styles. From its location on the frontier between numerous culture areas, Garden Canyon Villagers were able to draw from surrounding traditions as they saw fit- an idea that will be further explored in the next section.

Garden Canyon Village: A Frontier Settlement

In this section, I will explore the idea of Garden Canyon Village as a frontier settlement by returning to Lewis' (1975) criteria for a frontier settlement and Parker's continuum of boundary dynamics (1996). In Chapter 3 I described the criteria for a frontier society set forth by Lewis (1975) and adapted by Pailes (1984). While Lewis' criteria were a significant first step in

identifying signs of a frontier settlement in the archaeological record, his model was still highly Western and colonial, and relied on the presence of a nearby state or culture core. In this section, using the data observed at Garden Canyon Village, I will present a new, updated set of criteria for a frontier settlement. The criteria, expanded upon below, are as follows:

1. The material culture of a frontier settlement will reflect outside influences.
2. A frontier settlement is likely located on a geographic, as well as cultural, frontier.
3. The material culture of a frontier settlement will change through time, reflecting the rise and fall of neighboring culture areas.
4. Despite the presence of material culture from surrounding areas, local traditions and innovations persist.

First, the material culture of a frontier settlement will reflect outside influences. Whether these outside influences come in the form of trade items, emulation, or adaptation of styles may vary. At Garden Canyon, direct trade items were scarce and were often local adaptations of outside styles and ideas. For example, the rock art recorded in Garden Canyon contained several Hohokam-style elements that deviated from the traditional Hohokam canon. However, my analysis in Chapter 5 included artifacts such as palettes that reflect a more direct Hohokam influence. Similarly, projectile points with a single serrated edge may reflect a Mimbres Mogollon influence, and the obsidian and turquoise sourcing results show that outside influences also came in the form of trade.

Second, frontier settlements are often located on geographic frontiers. This is largely because various culture areas are often bounded and defined by geography. Geography can often impede or enable the movement of people and ideas, so geographic and cultural frontiers often coincide. At Garden Canyon Village, the north-south trending basin and range landscape divides

both the Hohokam and Mogollon areas as well as the Sonoran and Chihuahuan deserts. Garden Canyon Village is located along this divide. Furthermore, the San Pedro River Valley provides a natural corridor between the Rio Sonora, Trincheras, and San Pedro Valley cultures.

Third, the material culture of a frontier settlement will change through time, reflecting the rise and fall of other culture areas in the surrounding area. Garden Canyon Village, in many ways, acted as a compass indicating shifting power in the southern Southwest- first, it was oriented north toward the Hohokam as they experienced their fluorescence, then, later, south toward Paquimé. These shifts in material culture emphasize an important concept from frontier theory: identity and affiliation are malleable, and can change through time in ways that are perceived to be advantageous. This trait is also important because, historically, there has been a desire to categorize Garden Canyon Village as a single culture, homogenous through both time and space. However, my analysis and others have demonstrated that there is nothing homogenous about Garden Canyon Village.

Finally, and perhaps most importantly, despite the presence of material culture from surrounding areas, local traditions and innovations persist. As Naum has observed, in the analysis of frontier areas, the "importance of the traditions and culture of the native population…was often marginalized or ignored" (2010:105). Indeed, this desire to put Garden Canyon Village squarely in a "Hohokam" or "Mogollon" box erases its unique local developments. Hinterlands must be examined not only in terms of their relationships with other areas, but also in terms of their own local histories (Douglas 2007). This acknowledgement of local traditions is consistent with Stein's call to recognize the agency of frontier populations, and the conscious choices they made as they selectively incorporated ideas and styles from other areas into their own local canon (2002).

While a reformulation of Lewis' criteria for a frontier settlement can shed light on what makes Garden Canyon Village a frontier site, Parker's continuum of boundary dynamics can shed further light on the nature of that boundary (Figure 6.5). Out of Parker's boundary types, geographic and cultural boundaries are the most relevant here. However, with additional research, it may be possible to address political, demographic, and economic boundaries in the middle San Pedro as well. The analysis in Chapter 5 clearly illustrates that Garden Canyon Village lies along a relatively porous and fluid geographic frontier. Not only does the geography suggest favorable conditions for the movement of people and things; the geographic sourcing of obsidian and turquoise proves it. These nonlocal materials entered the middle San Pedro Valley from as far as 350 km away, demonstrating that the geographic boundaries of the region were easily crossed. Additionally, the diversity of styles and objects at Garden Canyon Village suggest that the cultural boundaries of the region were also porous and fluid. Garden Canyon Village was able to borrow styles and ideas from neighboring culture areas, while also perpetuating their own local traditions, resulting in a hybridity of styles and ideas.

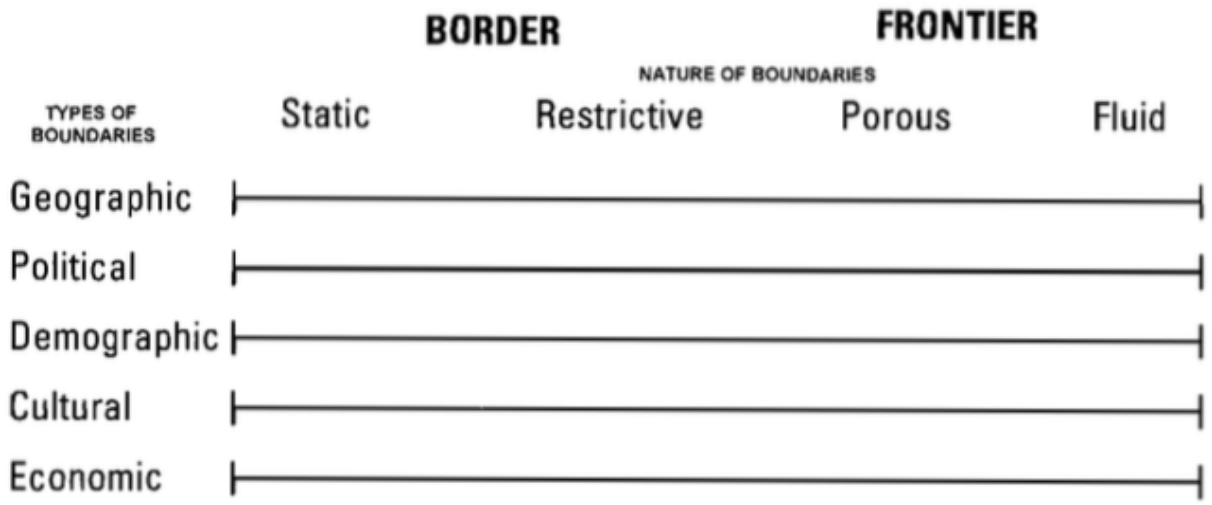

Figure 6.5 Parker's Continuum of Boundary Dynamics (Parker 2006)

In conclusion, Garden Canyon Village and sites like it can both benefit from frontier theory, and also contribute the development of new ideas in the current post-Turnerian, postcolonial turn of frontier studies. Frontier settlements are particularly important for explaining the relationship between the American Southwest, the Mexican Northwest, and Mesoamerica. As Gumerman describes, "settlement or areal studies…have forced us to recognize that the majority of Anasazi, Hohokam, and Mogollon lived not in the nucleated settlements, i.e., the Snaketowns, Cliff Palaces, and Grasshoppers, but there in small farming villages scattered over the Southwestern landscape" (1978:24).

CHAPTER 7

Summary and Conclusions

Garden Canyon Village is a site of great research potential that, unfortunately, has gone untapped due to a history of unfortunate archaeological practices as well as the general neglect of the southernmost Southwest and northern Mexico. In this thesis, I have attempted to fill a particular gap of knowledge about the artifact assemblage by undertaking an analysis of chipped and ground stone artifacts. My analysis revealed a wide variety of artifacts that were evidence of varied activities at Garden Canyon Village, including intensive agriculture, the exploitation of wild plant foods, pottery manufacture, spinning and weaving, hunting, and other gaming or ritual activities. Additionally, the results of my geologic sourcing analysis provided strong evidence for regional trade, connecting Garden Canyon Village to places as far as 350 km away. Furthermore, I consulted the archaeology of neighboring culture areas in order to place the Garden Canyon Village artifact assemblage in its regional context. It appears that before A.D. 1200, Garden Canyon Village and the middle San Pedro River Valley were primarily influenced by the San Simon Mogollon and Hohokam. After A.D. 1200, the middle San Pedro Valley appears to shift its attentions south as Paquimé emerges and exerts influence throughout the Casas Grandes sphere (Altschul et al 1993). However, Garden Canyon Villagers also maintained a variety of local traditions, and exercised agency as they selectively incorporated styles and ideas from neighboring areas into their own local canon. In this chapter, I will review what I have learned through this project, discuss future research directions, and provide an overview of the significant contributions of this study.

Summary

In this thesis, 439 chipped stone artifacts, 709 ground stone artifacts, and 2,337 pieces of debitage were analyzed. These artifacts represented a sample from the E75 and E100 complexes- the two excavation areas with the best documentation. My analysis revealed that a wide variety of artifacts were made and utilized at Garden Canyon Village. While local raw materials dominated the collection, small quantities of non-local materials such as obsidian and turquoise are testament to trade and participation in broader regional networks.

In the introductory chapters, I introduced the site, my research questions and goals, and the importance of ground and chipped stone research for answering questions about subsistence, prehistoric activities, and interregional interaction. I proposed that Garden Canyon Village was part of a cultural crossroads between the American Southwest and Mexican northwest. Due to its location and the natural travel corridor formed by the San Pedro River Valley, I argued that the area was a melting pot for people and material goods. Additionally, I provided an overview of the environment and setting of Garden Canyon Village, concluding that it was, overall, an extremely advantageous place to life. I also discussed the prehistory of the southern Southwest and the Middle San Pedro River Valley. First, I focused on the limited chronological information we have about Garden Canyon Village itself, and then I placed Garden Canyon Village into the regional context of developments and events taking place in the southern Southwest. Finally, I outlined the history of archaeological investigations at Garden Canyon Village. This history highlighted some of the challenges that archaeological investigations of Garden Canyon Village currently face due to missteps in the past. However, despite past issues, a relatively complete site description can be compiled from the various works that have taken place over the past 50 years.

Additionally, I presented the theoretical orientation of this thesis, and provided an overview of frontier theory from its colonial roots to its more recent postcolonial turn. I argued for the relevance of frontier theory at Garden Canyon Village both in the context of larger debates about Mesoamerican-Southwest connections, as well as the specific nature of Garden Canyon Village as a site along the "international four corners" where the Hohokam, Mogollon, Trincheras, Rio Sonora, and Casas Grandes cultures meet. I also established my own theoretical position that Garden Canyon Village is best understood using the more recent frontier scholarship. In the spirit of Naum (2010) and Bhabha, Garden Canyon Village is not merely a peripheral Hohokam, or peripheral Casas Grandes site, but instead a third space marked by hybridity. Garden Canyon Village was populated by creative agents who adopted ideas from the world around them while also developing their own local traditions.

The methods that I selected were designed to reveal the nature of subsistence and other activities at Garden Canyon Village, as well as interregional interaction that Garden Canyon Village may have participated in. My analysis showed that the assemblage contained a wide variety of artifact types that implied agriculture, the exploitation of wild plant foods, pottery manufacture, spinning and weaving, hunting, and other gaming or ritual activities. The spatial distribution of these artifact provided further detail about the site- namely, that there is a concentration of ornaments and associated tools in House 1 in the E75 Complex, and some artifact types such as stone spindle whorls are more common in one complex than the other. The results of geologic sourcing showed that Garden Canyon Village obtained goods from far away locations, and likely participated in a variety of trade networks.

In light of my analysis, I placed the chipped and ground stone assemblage in context with prior work done at Garden Canyon Village in order to expand on the nature of affiliation and

interaction at Garden Canyon Village. I began with an overview of how other researchers have interpreted Garden Canyon Village. Then, I reviewed each of the surrounding culture areas and the strength of evidence for interaction between them, and Garden Canyon Village. I concluded that there was strong evidence of interaction with the Hohokam, Mogollon and Casas Grandes areas, and somewhat weaker evidence of connections with other areas. It appears that prior to A.D. 1200, Garden Canyon Village was more closely affiliated with the Hohokam and Mogollon. After A.D. 1200 and with the Paquimé florescence, their affiliation shifted southward. However, the residents of Garden Canyon Village also appear to have maintained their own traditions and styles. I concluded this chapter by proposing my own set of criteria for a frontier settlement based on observations made at Garden Canyon Village, and applying the model presented by Parker (2006) to Garden Canyon Village.

Conclusions

The geography of southeast Arizona, particularly the natural north-to-south corridor of the San Pedro River Valley, lent itself to movement of people, things, and ideas between southern Arizona, southwestern New Mexico, and northern Mexico. Due to these geographic and cultural factors, the Middle San Pedro Valley and Garden Canyon Village were part of a frontier where diverse groups came into contact, identities and social relations were negotiated, and cultural constructs were created and transformed. Whittlesey and Heckman aptly describe southeastern Arizona as a "cultural cross-roads…where people of Hohokam, Mogollon, Salado, and northern Mexican cultures met with the local inhabitants, interacted, and exchanged ideas" (2000:22), and that, in addition to the mosaic of cultures, "the region was inhabited by indigenous peoples who had probably lived there since Clovis times, and who developed their

own vigorous culture and interacted with these diverse people" (2000:4).

While it is easy to simplify Garden Canyon Village as a peripheral settlement alternatively influenced by their Hohokam or Mogollon neighbors, Garden Canyon village was not merely a passive recipient of innovations from the cultural cores that surrounded them. They adopted ideas from their neighbors, but also cultivated vibrant local ideas and styles. There is no sharp border between the Hohokam, Mogollon, and northern Mexico. Instead there is a socially charged frontier where ideas were combined, transformed, and incorporated into the lives of it's residents, creating a unique material culture that can provide insight into ancient life on a southwestern frontier. Along this frontier, the residents of Garden Canyon Village engaged in a wide variety of activities, including intensive agriculture, the exploitation of wild plant foods, pottery manufacture, spinning and weaving, hunting, and other gaming or ritual activities.

Future Research

While poor documentation and missing artifacts create challenges, Garden Canyon Village's unexcavated areas and underutilized collections present opportunities for future research. Here, I will outline several areas for investigation. Perhaps the most urgent need is to continue efforts to mitigate the issues with the excavations that have taken place thus far. With improved maps and provenience information, important temporal and spatial questions can be addressed. Additionally, continued effort is needed to locate the missing artifacts. This may include additional GPR and continued communication with institutions where artifacts from Garden Canyon Village may have ended up. Furthermore, there are still portions of the collection that have not been analyzed. Further analysis- including additional geologic sourcing- should take place, and efforts should be made to improve curation.

Additionally, further work is needed to examine settlement patterns and population densities in Garden Canyon and the Huachuca Mountains as a whole. While modern development and a lack of archaeological investigation has hindered a large scale settlement pattern analysis, it appears that every major canyon in the Huachuca Mountains may have had a prehistoric village at its mouth. Additionally, recent survey (Schneider 2014) has suggested that Garden Canyon is home to numerous sites in addition to Garden Canyon Village (Figure 7.1). Whether these sites were contemporaneous, affiliated, or possibly part of one single site that is much larger than previously believed has yet to be determined. Additionally, we know little about the true size and population of Garden Canyon Village. Babocomari Village, which has been compared to Garden Canyon Village, was estimated to have a peak population of approximately 30 to 40 people (Wilcox 1995:300-301). However, it is unclear whether Garden Canyon Village was similar in size. While further excavation is unlikely, survey and GIS analysis can still reveal new information about how Garden Canyon and the Huachuca mountains were occupied and utilized by prehistoric peoples.

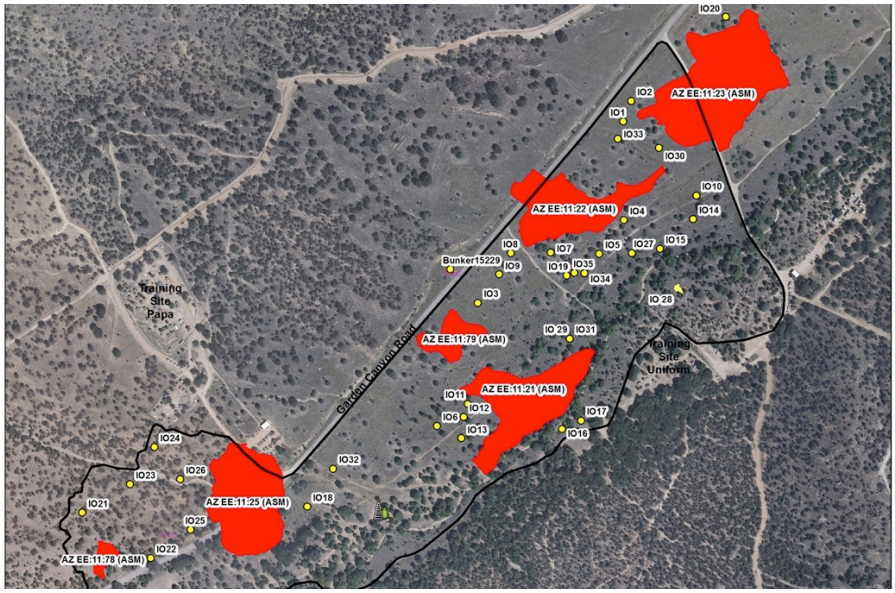

Figure 7.1 Archaeological sites and isolates located in Garden Canyon, not including Garden Canyon Village (Map courtesy of Fort Huachuca ENRD)

Similarly, additional settlement analysis of the entire San Pedro valley would be a valuable contribution. A comprehensive, transnational analysis of the Lower and Middle San Pedro Valley in Arizona, and the Upper San Pedro Valley in Sonora would help clarify the nature of the southern Southwest as well as interaction between northern Mexico and the southwestern United States. The possibility of some sort of cultural boundary at Benson should also be explored. Heckman and others have hypothesized that there may have been a cultural barrier at Benson, and that the middle and upper San Pedro were on the boundary of the Hohokam system but not incorporated into it (Whittlesey and Heckman 2000:9). Similarly, Salado sites in the San Pedro Valley do not seem to occur further south than Benson (Altschul et al 1993:2-16). What is the nature of this boundary at Benson? Did it persist through time, and was it hostile, or collaborative?

In addition to these major research directions, several other important questions hold potential for future research projects, outlined here.

- Despite evidence that the occupants of Garden Canyon Village may have been skilled farmers, their water control techniques are still unknown (Whittlesey et. al. 2009:13). What sort of water control and agricultural techniques were used at Garden Canyon Village?
- If trade goods such as turquoise and obsidian were coming into Garden Canyon Village, what sorts of goods were going out? As a likely manufacturing center for Babocomari Polychrome, did Garden Canyon Village distribute ceramics to other areas?
- What is the geographic distribution of footed metates, and how did one come to be as far north as Garden Canyon Village?

- Why is there a disparity in the sources for turquoise (which tend to come from the closest available source) and obsidian (which most often comes from a wide variety of sources, some much farther than the closest available source)?
- How do drill-tips vary based on the materials they were used on? Can usewear analysis and experimental archaeology be utilized to develop a typology of drills?
- What was the relationship between Garden Canyon Village and other sites in and around the Huachuca Mountains such as Babocomari Village and the Ramsey Canyon site? Was the Ramsey Canyon really a regional node connecting the Middle San Pedro Valley to the Casas Grandes sphere?

Contributions of this Thesis

This research is significant because Garden Canyon Village and the surrounding region have been chronically understudied. As described by Stephanie M. Whittlesey and Robert A. Heckman, "our understanding of prehistory…in southeastern Arizona is still in its infancy, despite more than 60 years of archaeological research" (2000:1). Southeastern Arizona has been the subject of only a few major investigations, and many of these, such as Charles Di Pesos (1951) work at nearby Babocomari Village, took place before the advent of modern dating and sourcing techniques. Research was undertaken at Garden Canyon in the 1960's and 1990's, but the majority of the site remains unexcavated and many of the recovered artifacts have never been analyzed.

Additionally, this thesis has hopefully helped contribute to efforts to mitigate Garden Canyon Village's unfortunate archaeological past. Garden Canyon Village is an educational case study in the efforts needed to mitigate bad archaeology. Early excavations at Garden Canyon had

no research design, were not sufficiently documented, and were not of a professional quality. Additionally, many of the artifacts went unanalyzed, and inadequate curation resulted in the loss of collections, including human remains (Whittlesey et. al. 2009:1). The sample of ground and chipped stone analyzed here had been excavated improperly with minimal documentation, and then curated with no analysis. Previous researchers have written this collection off. Regarding the Young collection, Cook commented that "the unintentional result of [the missing artifacts, jumbled proveniences, and lack of documentation] was to make the collection virtually useless for scientific purposes" (2003:26-27). This thesis attempted to utilize the collection, gain new information from it, and integrate it into the body of existing knowledge on Garden Canyon Village. My efforts here speak to larger issues in archaeology, such as the need to analyze existing collections rather than excavating more artifacts that will be stored away and potentially ignored.

Additionally, I was able to confirm some of the previous findings at Garden Canyon Village, and refute others. In Shelley and Altshul's analysis, they reported that there were a relatively small number of nonlocal materials or styles, and concluded that evidence for interregional interaction is minimal (1996:96). By undertaking the first and only geological sourcing study at Garden Canyon Village to date, I was able to demonstrate that not only are there nonlocal materials at Garden Canyon Village, but these materials came from as far as 350 km away. However, with the exception of turquoise and obsidian artifacts, the rest of the assemblage confirmed what previous researchers have argued: that the Garden Canyon Village collection showed a strong preference for local raw materials.

This thesis is also part of efforts to erase the international border and incorporate the archaeology of northern Mexico into our understandings of the prehistoric Southwest. While

previous scholars have focused on connections between Garden Canyon Village and the Hohokam, Mogollon, and Salado, I worked to incorporate the literature on the Trincheras, Rio Sonora, and Casas Grandes culture areas. I also utilized the rich body of frontier theory, which I believe has a lot to offer archaeology. Additionally, I have argued for the strength and importance of local traditions at Garden Canyon Village. As Altschul and Jones describe, the middle San Pedro River Valley "generally has been perceived as a region that received and reacted to cultural influences rather than produced them" (1990:225). However, the archaeological record challenges this idea- while the residents of Garden Canyon Village were clearly influenced by the world outside the middle San Pedro Valley, they also maintained their own traditions and exerted agency by selectively incorporating some outside ideas and rejecting others.

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Appendix: A. Chipped Stone Attributes

For all chipped stone artifacts…		
Attribute	**Attribute State**	**Definitions**
Type *(Adapted from Crabtree 1982 unless otherwise specified)*	Biface	A tool flaked on both faces or sides
	Core	A mass of material bearing negative flake scars resulting from the process of lithic reduction
	Debitage	Residual lithic material resulting from lithic reduction
	Drill	A tool for perforating
	Edge Modified Flake	A flake that has been intentionally modified along at least one edge to create a simple tool
	Hammerstone *(Adams 2002)*	Irregularly shaped rocks selected for their useful size and weight and wielded with forceful strokes
	Blade	Specialized flake with parallel or subparallel lateral edges; length is equal to or more than twice the width
	Multitool	A tool that has been used for multiple purposes (i.e. a core that shows evidence that it has been used as a hammerstone)
	Projectile Point	A spear point, dart point, or arrowpoint
	Scraper	A unifacially retouched flake tool with a working edge for scraping motions
	Unidentified or Other	Any artifact that cannot be placed in one of the categories above; either an unknown form or too fragmentary to make a confident assessment
Condition *(Adams 2002)*	Whole	Intact
	Measurable	Complete with exception of minor damage that does not affect measurements
	Incomplete	>50% intact based on visual inspection
	Fragmentary	<50% intact based on visual inspection
Cortex	0	0% Cortex
	1	1-25% Cortex
	2	26-50% Cortex
	3	51-75% Cortex
	4	76-100% Cortex
Retouch	Bifacial	Artifact bears flake scars on both faces
	Unifacial	Artifact bears flake scars on one face
Material *(Shelley and Altschul 1996)*	Group 1	Dense sedimentary rocks with fine microscopic and submicroscopic grain size; includes argillite, siltstone, shale, mudstone
	Group 2	Sandstone and some limestone; fine, granular texture
	Group 3	Volcanics, primarily rhyolite; brown-to-red and gray-to-black
	Group 4	Quartzites and orthoquartzites, medium grain size often with quartz

	Group 5	Obsidian
	Group 6	Cherts and Chalcedonies
	Group 7	Quartz and Quartz Crystals
	Group 8	Anomalies
Local	Yes	Material type is available locally
	No	Material type is not available locally and may have been procured through trade or travel
	Unknown	Material is of unknown source
Measurements *Taken with digital calipers to the nearest hundredth of a millimeter*	Maximum Length	Distance from the tip to the base of the tool
	Maximum Width	Distance between the lateral edges of the tool, perpendicular to the length
	Maximum Thickness	Maximum distance between the two faces of the tools
Weight	Taken to the nearest 5 grams using a digital scale	
For Bifaces, Edge Modified Flakes, Debitage…		
Size Class	1	0 - .5 cm
	2	.5 – 1 cm
	3	1 – 1.5 cm
	4	1.5 – 2 cm
	5	2 – 2.5 cm
	6	2.5 – 3 cm
	7	3 – 3.5 cm
	8	3.5 – 4 cm
	9	4 – 4.5 cm
	10	4.5 – 5 cm
	11	5 – 5.5 cm
	12	5.5 – 6 cm
	13	6 – 6.5 cm
	14	6.5 – 7 cm
	15	7 – 7.5 cm
	16	7.5 – 8 cm
For projectile points (based on Shelley and Altschul 1996)…		
Blade Shape	Straight	Sides of the blade are straight
	Excurvate	Sides of the blade are convex
	Incurvate	Sides of the blade are concave
	N/A	Blade shape is indeterminate, other or too fragmentary to assess
Base Shape	Concave	The base is incurvate
	Convex	The base in excurvate
	Stemmed	If stemmed, record shape of stem.
	Straight	The base is straight across
	N/A	Base is indeterminate, other, or too fragmentary to assess
Notch Location	Base	Notch is located along the base
	Corner	Notch is located where the side of the blade and base meet
	Side	Notch is located on the side of the blade

	Serrated	Edges have small flakes removed resulting in a jagged margin
	N/A	Notches are indeterminate, not present, or too fragmentary to assess
Type	Projectile points analyzed using Shelley and Altschul 1996, Tagg 1994, Justice 2002, Kelly 1978, Whalen and Minnis 2009, Shafer 2003, Anyon and LeBlanc 1984, Cosgrove and Cosgrove 1967, and others	
Measurements *Taken with digital calipers to the nearest hundredth of a millimeter*	Length	Maximum distance from the proximal end to the distal end
	Width	Maximum distance between the margins of the point
	Thickness	Maximum distance between the dorsal and ventral faces of the point
For drills…		
Tip Shape	Blunt	Wide with a thick, dull, rounded end; > 3 mm across
	Midrange	Tips in between blunt and sharp; 2-3 mm across
	Sharp	Narrow point that comes to an acute angle; < 2 mm across
Design	Strategic	Shape of rock modified through pecking, grinding, chipping, drilling, etc. to achieve a specific shape
	Expedient	Natural shape of rock altered through use only
For cores…		
Flake Scars	Counted and recorded	
Platforms	Multiple	
	Single	
Directionality	Unidirectional reduction	
	Multidirectional reduction	
Exhaustion	A core is categorized as "exhausted" if it had reached a high enough degree of reduction that it was unlikely to produce any more usable flakes.	

Appendix: B. Ground Stone Attributes

For all ground stone artifacts…		
Attribute	**Attribute State**	**Definition**
Type *(Adams 2002)*	Abrader	Handstone with one or more rough surfaces useful for removing material from contact surfaces
	Awl	Small conical or cylindrical pieces of stone sharpened to a point
	Axe	A percussion tool modified for hafting with notches, ¾ grooves, or full grooves
	Figurine	Stone modified to depict anthropomorphs, zoomorphs, or geometric shapes, ranging from realistic forms to abstractions
	Floor Polisher	Large, disk shape handstone frequently with striations and a central pecked area
	Handstone	General category for handstones lacking attributes to identify them as members of a more specific subset
	Mano	Handstone used in combination with a metate for grinding
	Metate	Netherstone used in combination with a mano for grinding
	Mortar	Netherstone designed with a basin that confines an intermediate substance that is worked with a pestle in some combination of crushing, stirring, or pounding strokes
	Ornament	Includes beads, pendants, mosaic tesserae, nose plugs, etc.
	Palette	A specialized lapstone embellished with borders and made from schist, phyllite, or a similarly tabular material
	Paraphernalia	Personal and group ritual equipment, gaming devices, and items whose specific functions are unknown
	Pestle	Handstone used to pulverize, or to crush and grind
	Polishing Stone	Handstone with a smooth texture that alters the surface of other objects through abrasive and tribochemical mechanisms
	Shaft Straightener	Stone modified with a straight, U-shaped groove
	Spindle Whorl	Thin disk perforated with a centrally located hole that fits over a spindle shaft
	Tabular Tool	A thin, tabular piece of stone with one or more edges used in cutting, scraping, slicing, or chopping motions
	Unidentified or Other	Any artifact that cannot be placed in one of the categories above; either an unknown form or too fragmentary to make a confident assessment
Shape	*For Metates:* Basin *(Adams 2002)*	Grinding surface is a circular or elliptical basin manipulated with circular or reciprocal strokes; distinguished from flat metates by intentional shaping of the basin
	Flat/Concave	When used with manos shorter than the width of the metate, the metate starts with a flat surfaces

		but extensive wear can create depressions; alternatively, if used with manos the same length as the metate width, it will remain flat edge-to-edge
	Trough	Intentionally manufactured with a rectangular basin or trough; mano can only be moved reciprocally
	Manos: Trough	Rectangular shape with end wear from contact with the walls of trough metates
	Flat	Flat use surface with use wear restricted to the grinding surface
	Basin	Circular shape and evidence of rotary use wear
Condition *(Adams 2002)*	Complete	Intact
	Measurable	Complete except for minor damage that does not affect measurements
	Incomplete	>50% intact based on visual inspection
	Fragmentary	<50% intact based on visual inspection
Burned	Fire Cracked	Rock that has cracked or fractured due to exposure to burning or heat
	Fire Affected	Rock that has been altered in color or surface texture due to exposure to burning or heat
	Unburned	No evidence of burning
	Unknown	Indeterminate
Texture *(Adams 1996)*	Fine	Grains of < 1mm in size, on average
	Medium	Grains of 1-2 mm in size, on average
	Coarse	Grains of 2-4 mm in size, on average
	Conglomerate	Grains of >4 mm in size, on average
	Mixed	Grains of varying sizes
Color	Qualitatively described for reference and to assist with material identification	
Material *(Shelley and Altschul 1996)*	Group 1	Dense sedimentary rocks with fine microscopic and submicroscopic grain size; includes argillite, siltstone, shale, mudstone
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Local	Yes	Material type is available locally
	No	Material type is not available locally and may have been procured through trade or travel
	Unknown	Material is of unknown source
Design	Strategic	Shape of rock modified through pecking, grinding, chipping,

		drilling, etc. to achieve a specific shape
	Expedient	Natural shape of rock altered through use only
	Indeterminate	Object is inconclusive or too fragmentary to judge
Use Surfaces	Single Use Surface	Observable use-wear is present on one surface
	Multiple Adjacent Use Surfaces	Observable use-wear is present on two surfaces located adjacent to each other
	Multiple Opposite Use Surfaces	Observable use-wear is present on two surfaces located on opposite surfaces of the artifact
	Other	Some other configuration of use surfaces, to be described in comments
Degree of Use *(Adams 2002)*	Light	So little evidence that it can barely be seen with the unaided eye
	Moderate	Enough to leave obvious damage but not alter the basic shape of the tool
	Heavy	Changes the natural or manufactured shape of the tool
Measurements *Taken with digital calipers to the nearest hundredth of a millimeter*	Maximum Length	Distance from the tip to the base of the tool
	Maximum Width	Distance between the lateral edges of the tool, perpendicular to the length
	Maximum Thickness	Maximum distance between the two faces of the tools
	Ground Area Width	Defined by visual and tactile examination
	Ground Area Length	Defined by visual and tactile examination
Weight	Taken to the nearest 5 grams using a digital scale	